Town of Swanzey, New Hampshire
2022 Master Plan Update



Adopted by the Swanzey Planning Board on June 9, 2022

Table of Contents

Introduction 3

Population and Housing 6

Transportation 20

Natural Resources 44

Community Facilities 57

Historic and Recreational Resources 69

Economic Development 77

Land Use 87

Implementation Plan 98

Appendices 112

Introduction

The Swanzey 2022 Master Plan Update is a culmination of two years of dedicated work by the Planning Board, Conservation Commission, Economic Development Advisory Committee, and Town staff. The Southwest Region Planning Commission was hired to complete the Transportation Chapter, Population & Housing Chapter, and Implementation Chapter, in consultation with the Planning Board. This section of the plan provides an overview of the master planning process, the public engagement process for completing the current update, and the vision statement for the plan.

What is a Master Plan?

The Town Master Plan is a planning document that guides the character, physical form, growth, and development of the community. Under NH RSA 674:1, the Planning Board has the responsibility to "prepare and amend from time to time a master plan to guide the development of the municipality." The first Master Plan for Swanzey was completed in 1979 and the Planning Board completed updates to the plan in 1990 and 2003.

The primary purpose of the master planning process is to help a community develop a vision for its future and map out how it can achieve that vision through the creation of ordinances and land use development principals, the budgetary process, and other measures. Importantly, the Master Plan is a comprehensive planning process that looks at all components of the community, such as transportation, housing, natural resources, land use, and how these different functions interrelate to each other. The Master Plan is a long-term plan that usually looks out 5 – 10 years into the future and establishes goals and action steps based on that timeframe.

In New Hampshire, the Master Plan is not an ordinance or regulatory document. However, it does serve as a policy guide that helps the Planning Board, the Board of Selectmen, and Town officials make decisions about the needs of the community. A Master Plan is also legally required for a community to adopt a Zoning Ordinance, Historic District, or growth management ordinance, and for the establishment of a capital improvement program.

Periodic review and updating of the Master Plan is recommended. Going forward, it is recommended that the Town review and update the Master Plan at a minimum every 10 years. The Town may also may want to consider updating individual chapters in the Master Plan more regularly, depending on how the community grows and changes, but keeping the overall goal that each chapter will be updated at least every 10 years.

Public Engagement Process

The current Master Plan update process began in the summer of 2019 with a community-wide survey that was conducted primarily online. The Town received over 400 responses to the survey and the results provided the Planning Board with clear direction in developing the plan. Key takeaways from the survey results are shared at the beginning of many of the chapters in the plan. The full survey results are provided as an appendix to the Master Plan.

A formal kick off meeting for the update process was held in November 2019. The results of the survey were presented and attendees participated in a visioning process. A series of focus group meetings were scheduled to take place in spring 2020, but unfortunately due to the COVID-19 pandemic these needed to be cancelled. In an effort to continue the update process in the midst of the pandemic, the Town elected to work through its volunteer committees, such as the Conservation Commission, to help update the chapters in the plan. The Planning Board also set aside time at their regular meetings to review and develop the different chapters within the plan.

Throughout this process, we have also focused on what makes for a "good plan" and strived to achieve this. Many others have developed key features that make for a good plan and the following are ones we have tried to be incorporated in the plan:

- Address the unique attributes of the community
- Tell an interesting story
- Set realistic objectives
- Take a comprehensive approach
- Strike a fair and equitable balance of competing interests
- Always try and remember what is best for the community as a whole

Master Plan Vision

According to New Hampshire state law, a Master Plan must include a Vision chapter. This section is required to "contain a set of statements which articulate the desires of the citizens affected by the master plan, not only for their locality but for the region and the whole state. It shall contain a set of guiding principles and priorities to implement the vision." Through the public engagement process, the Planning Board developed the following Vision statement for the community and guiding principles.

Vision Statement:

Swanzey is a vibrant community that celebrates its rich history and natural resources, provides residents and businesses with efficient public services, diverse housing options, recreational opportunities, and safe transportation facilities, and which responsibly plans for future growth and change.

Guiding Principles:

- Prioritize a responsible balance of residential development, commercial and industrial development, and open space protection.
- Support and celebrate Swanzey's small town atmosphere and rural character.
- Encourage a variety of housing choices for multiple generations and maintain housing affordability.
- Encourage retail, restaurant, and entertainment uses that complement the Town's existing character.
- Increase transportation options, including improved safety for pedestrians and bicyclists.
- Ensure proper maintenance of existing Town roads and work with NH DOT on traffic and safety issues on State roadways.

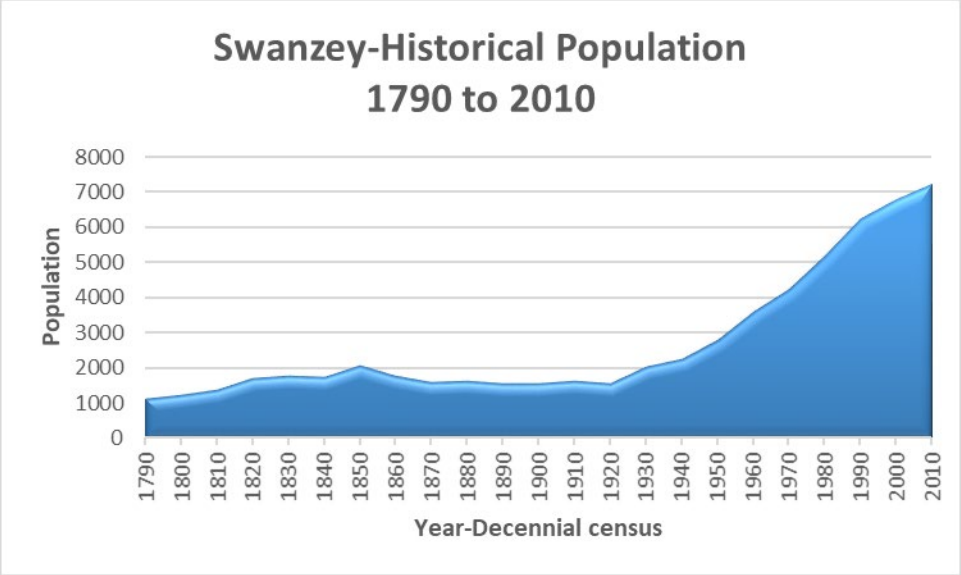
- Increase employment opportunities, in particular in the areas of manufacturing, healthcare, professional office, and agriculture.
- Improve local internet service and cell phone coverage.
- Maintain and protect the high quality of the Town's natural resources and outdoor recreational opportunities.
- Support existing and plan for future recreational facilities and programming for all members of the community.
- Protect the Town's cultural and historical resources.
- Ensure the proper maintenance and upkeep of municipal facilities and public utilities in order to meet the needs of the community.

Population and Housing

The housing and population chapter in any Master Plan helps establish the framework for other chapters since it provides critical demographics that are necessary to assess the current development and better prepare and plan for anticipated changes. The population study will alert the town to the possible future demands on schools, housing, public facilities, and services and other forms of land use and needs.

Population

Population change is attributed to two factors: natural increase/decrease (the number of births and deaths) and migration (the number of people moving in and out of town). The chart below shows the historical population changes that have occurred in Swanzey since the first census in 1790. Unlike most of the towns within the Monadnock Region, Swanzey did not experience any significant population decline/spikes throughout its history but instead maintained a population of 1,000 to 2,000 residents between 1790 and 1930. Since then, the town has experienced a steady increase each decade.



Source: US Census

The next table shows a more recent look at population trends in Swanzey and the surrounding (or subregional) towns, as well as Cheshire County and New Hampshire figures. This information is useful since the need for adequate housing and employment opportunities can be influenced by the economy beyond the town line.

The top portion shows the actual population numbers according to the census counts in the last four decades. The lower portion provides a look at the percentage of change to better understand how each town compares in population change. The table shows that the population trend in Swanzey represents a very similar trend experienced in New Hampshire and Cheshire County.

Population Trends: 1980-2010

POPULATION	1980	1990	2000	2010
Swanzey	5,183	6,236	6,800	7,230
Chesterfield	2,561	3,112	3,542	3,604
Keene	21,449	22,430	22,563	23,409
Marlborough	1,846	1,927	2,009	2,063
Richmond	518	877	1,077	1,155
Troy	2,131	2,097	1,962	2,145
Winchester	3,465	4,038	4,144	4,341
Cheshire County	62,116	70,121	73,825	77,177
New Hampshire	920,610	1,109,252	1,235,786	1,316,256

% CHANGE	1980-1990	1990-2000	2000-2010
Swanzey	20.3%	9.0%	6.3%
Chesterfield	21.5%	13.8%	1.8%
Keene	4.6%	0.6%	3.7%
Marlborough	4.4%	4.3%	2.7%
Richmond	69.3%	22.8%	7.2%
Troy	-1.6%	-6.9%	9.3%
Winchester	16.5%	2.6%	4.8%
Cheshire County	12.9%	5.3%	4.5%
New Hampshire	20.5%	11.4%	6.5%

Source: US Census

Changes in Population: Natural Increase and Migration

This section examines the trend in population change through natural increase (or decrease) and migration. A calculation of births and deaths is made and compared to the actual population from the most recent census count. This will provide a sense of movement of residents.

The Natural Increase table shows the number of births and deaths of Swanzey residents from 2000 to 2017. For this analysis, we will only use the years of 2000 to 2010 to be consistent with the last two census figures for total population. The average number of births in this time period was 75 per year, and the average number of deaths was 54 per year. The natural increase during that time period was 229.

The In-Migration table uses the 10-year natural increase number (229). It adds to the census figure from the 2000 population to determine what the population in Swanzey would be without any migration. It then makes a comparison with the actual 2010 census population. The difference is the population increase due to people moving into Swanzey, which is 201 people.

Therefore, the population growth of 430 residents during the 2000 to 2010 period was relatively equal for births/deaths and migration (in and out of Swanzey).

Natural Increase			
Year	**Births**	**Deaths**	**Natural Increase**
2000	81	45	36
2001	72	60	12
2002	67	52	15
2003	69	54	15
2004	68	32	36
2005	72	46	26
2006	79	62	17
2007	76	60	16
2008	81	66	15
2009	79	54	25
2010	78	62	16
2011	82	67	15
2012	70	70	0
2013	68	71	-3
2014	72	61	11
2015	67	69	-2
2016	78	65	13
2017	58	76	-18

In-Migration 2000-2010	
Population, 2000	**6,800**
Natural increase, 2000-2010	229
Population in 2010 with no in-migration	7029
Actual 2010 population	**7,230**
Population increase due to in-migration	201

Sources: US Census; NH DHSS, Health Statistics & Data Mgt

Population Density

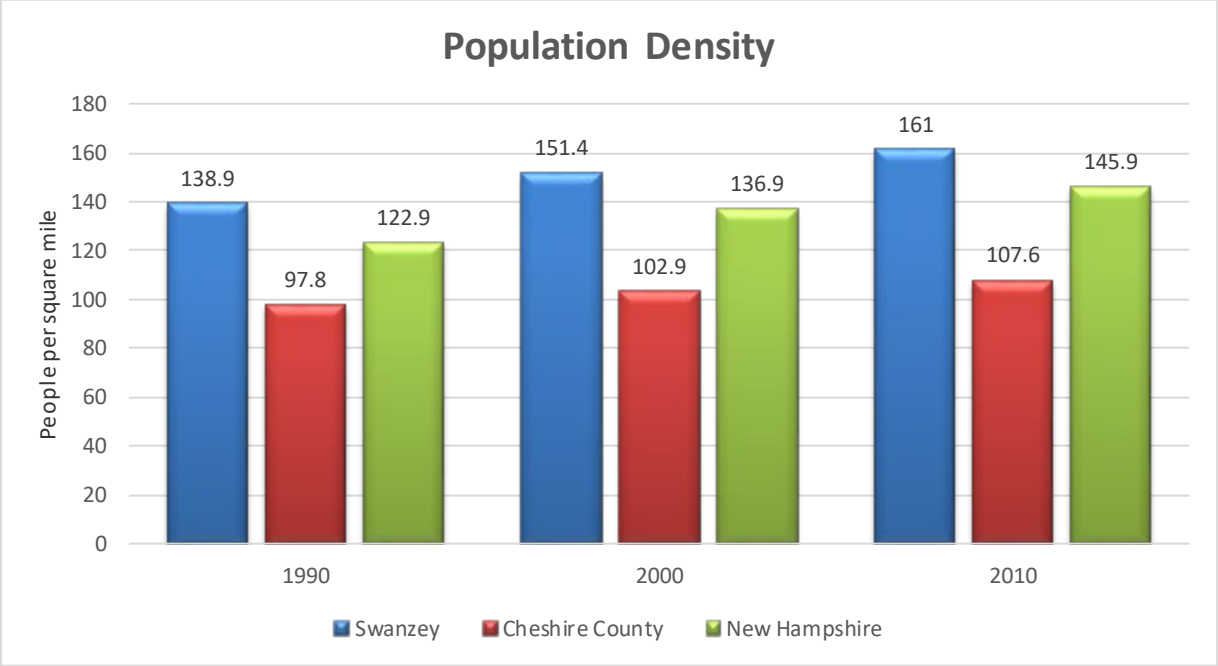
The number of people per square mile is called the population density. This is helpful when trying to determine existing clusters of population and areas for potential future growth. The table shows the trend in Swanzey of population density from 1990 to 2010. Because the land area is a constant of 44.9 square miles, the population density increased from 138.9 people per square mile to 161 people per square mile.

Population Density

	Land Area in sq. miles	**1990**		**2000**		**2010**	
		Population	**Density**	**Population**	**Density**	**Population**	**Density**
Swanzey	44.9	6,236	138.9	6,800	151.4	7,230	161.0
Cheshire County	717.2	70,121	97.8	73,825	102.9	77,177	107.6
New Hampshire	9,024.20	1,109,252	122.9	1,235,786	136.9	1,316,470	145.9

Sources: US Census

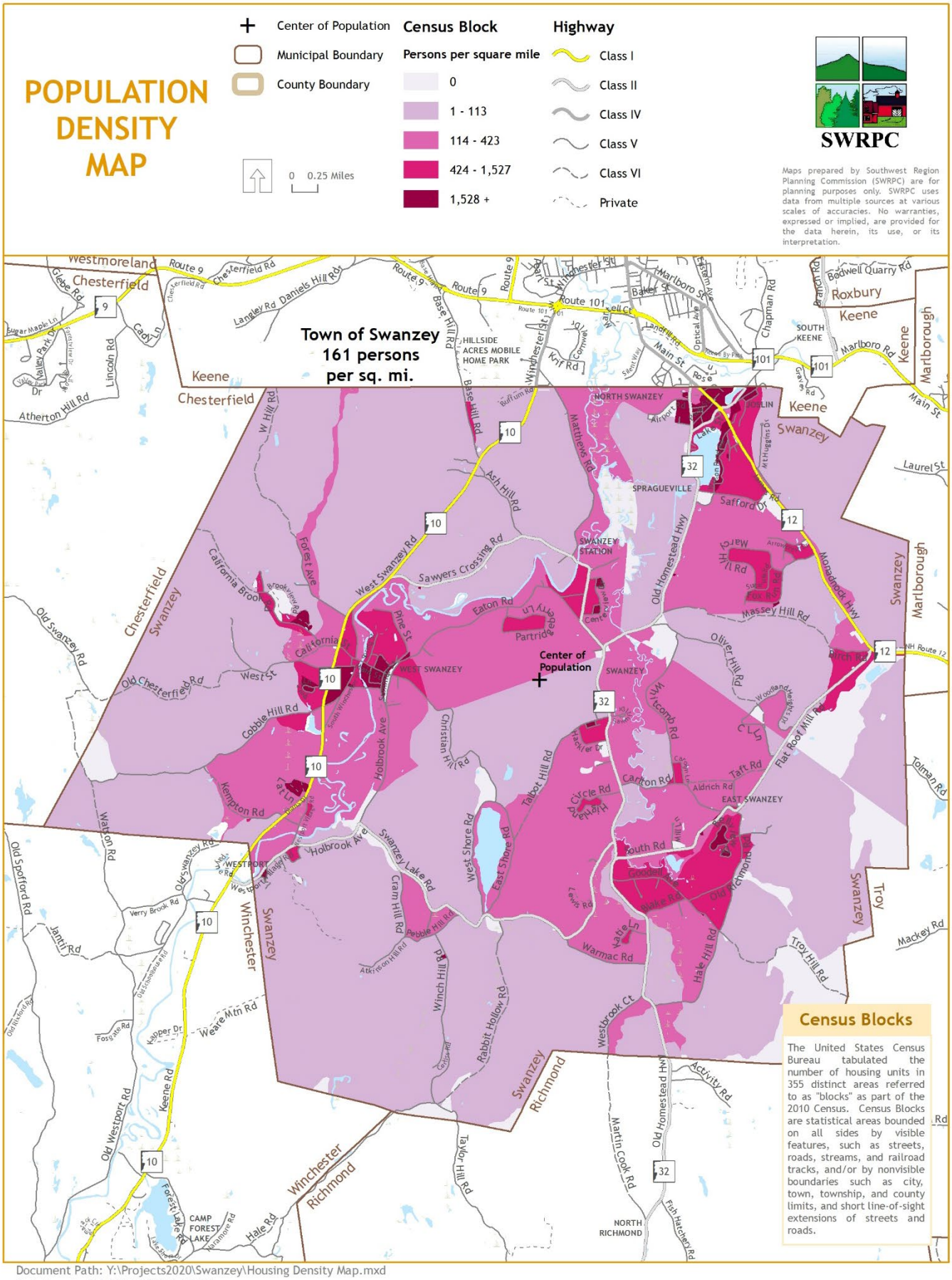
The table also shows the density change for Cheshire County and New Hampshire during the same time period. This graph provides a visual representation of these changes. Swanzey has the highest population density in each of the decades shown. The rate of increase in density for Swanzey is very similar to that of New Hampshire. The rate of increase in Cheshire County, however, was relatively minor during this period.



Source: US. Census; NHOSI

The Population Density Map on the next page shows the areas of differing levels of population concentration in Swanzey. The color scheme darkens as the population increases. The greatest concentration of residents is shown along the three state highways; NH 10, NH 12 and NH 32.

POPULATION DENSITY MAP



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Population Projections - Subregional

When planning for future needs, population projections should also be considered. While this is useful information to help in planning, caution should be used since it is a *projection* and is subject to change based on several factors including economic, housing needs and other unknown factors. The table below provides population projections for Swanzey from 2010 to 2040. It indicates that Swanzey and all of the surrounding towns are projected to experience some population increase over the next 20 years. The towns of Swanzey and Marlborough show the highest projected increases (5%) while the towns of Winchester (1%) and Chesterfield (2%) show the lowest projected increases.

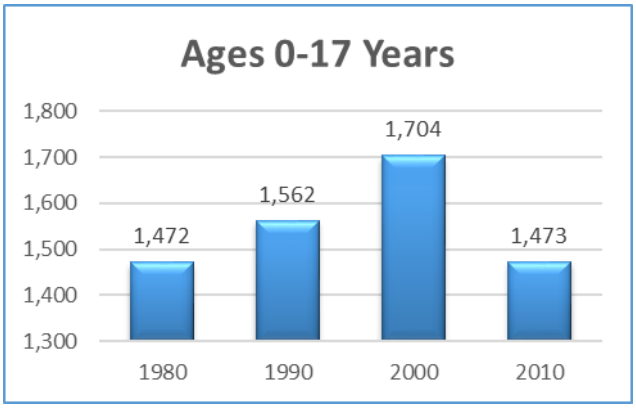
Population Projections - Subregional

	2010	2015	2020	2025	2030	2035	2040	% Change 2010 to 2040
Swanzey	7,230	7,339	7,445	7,554	7,585	7,606	7,622	5%
Chesterfield	3,604	3,557	3,551	3,598	3,633	3,657	3,661	2%
Keene	23,409	23,332	23,531	23,842	24,076	24,233	24,260	4%
Marlborough	2,063	2,110	2,130	2,151	2,160	2,166	2,170	5%
Richmond	1,155	1,159	1,172	1,185	1,189	1,193	1,195	3%
Troy	2,145	2,135	2,159	2,185	2,194	2,200	2,205	3%
Winchester	4,341	4,334	4,345	4,357	4,375	4,388	4,396	1%

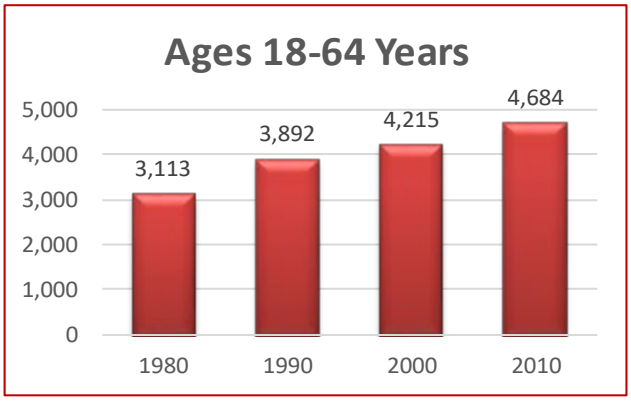
Source: US. Census; NHOSI

Age Distribution

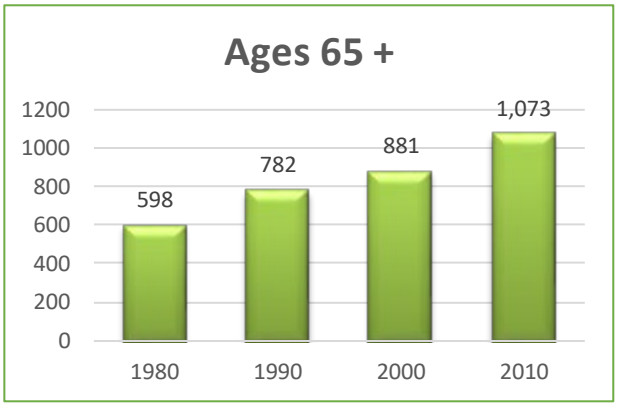
A look at the age categories is beneficial to help determine the type and level of services required to meet the needs of the residents. From a planning perspective, these are grouped into three categories: school age (0-17 years old), working age (18-64 years old), and retirement age (65 years and older). The charts below show the trend for each of these age groups from 1980 to 2010. There was a steady increase in each category with the exception of the decline in school-age residents between 2000 and 2010.



School-Age - This age group shows that the number of infants and school age residents in 2010 is the same as it was in 1980. Although there was a steady increase between 1980 and 2000, there was a sharp decline as indicated in the 2010 census. Changes such as this make it difficult to plan for school related needs.



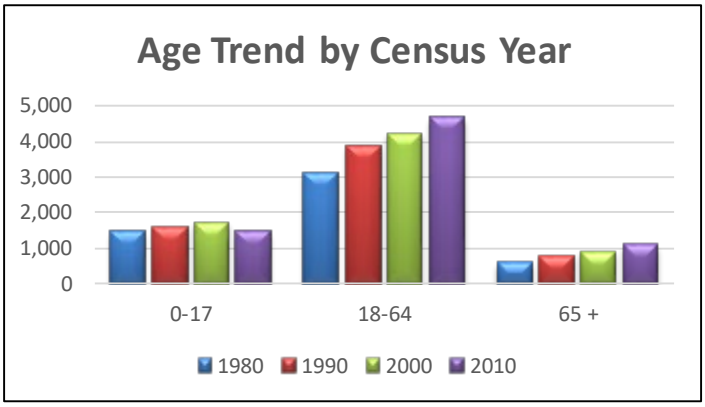
Working Age - This group has shown a steady increase in each decade with the largest increase occurring between 1980 and 1990.



Retirement Age - Similar to the *Working Age* group, this group has shown a steady increase in each decade. The largest increase was a 31% increase between 1980 and 1990.

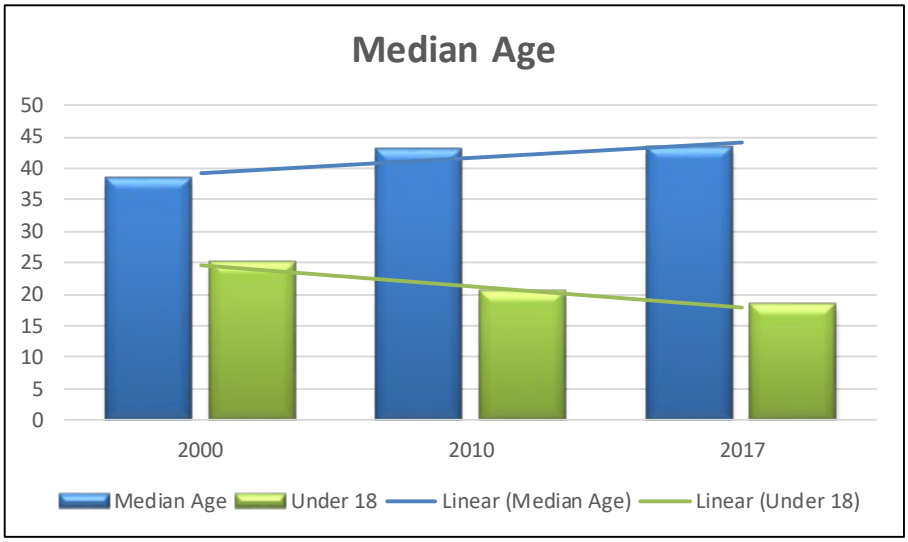
Source: US Census

This chart shows the age groups together to compare the trends between 1980 and 2010. The only decrease was in the school age population between 2000 and 2010.



Median Age

The changes in the age distribution has resulted in an increase in the median age of Swanzey's residents. This chart shows the increase in median age and also shows the decline in the percentage of residents that are under 18 years of age.



Source: US. Census; NHOSI

	2000	2010	2017
Swanzey	38.4	43	43.3
Cheshire County	37.6	40.7	42.5
New Hampshire	37.1	41.1	42.7
United States	35.3	37.2	37.8

Source: US. Census; NHOSI

This table shows a comparison of local, county, state and federal median ages between 2000 and 2017 (estimates). Swanzey has a higher median age than the others in 2017, however, it most closely resembles New Hampshire's median age. These are much higher than the median age of the United States.

Housing

This section provides an analysis of the housing in Swanzey by looking at the trends in the number of units, housing type, age of the housing stock, affordability, and others. It also provides a housing needs assessment to help plan for meeting future housing needs. As defined by the US Census, a housing unit is a house, an apartment, a group of rooms or a single room intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from any other individuals in the building and which have a direct access from the outside of the building or through a common hall.

Trend in Total Number of Housing Units

Beginning with the basic number of total housing units, the table below presents these numbers for 1970-2010. In 2010, there were 3,205 housing units, which is an increase of 387 units since the previous decade. Swanzey's largest increase in housing units occurred between 1970 to 1980

yielding a 37% increase. The next decade (1980 - 1990) saw a similar increase in housing units with a 36.3% increase.

	1970	1980	Change 1970-1980	1990	Change 1980-1990	2000	Change 1990-2000	2010	Change 2000-2010	Change 1970-2010
# of Units	1,382	1,894	37%	2,582	36.3%	2,818	9.1%	3,205	13.7%	153.6%

Source: US Census, ACS 5-year estimates 2013-2017

The number of housing units in Swanzey is increasing at a higher rate than most of the surrounding towns. The table and corresponding chart below show the change in the percentage of total units between 2000 and 2010. Swanzey experienced a 13.7% increase in the number of housing units during that time period. Swanzey is keeping pace with the percentage increase in the number of housing units as that of New Hampshire. This translates to approximately 39 units built per year during that period. The table also shows the change from 1980 to 2010, which was a growth period for towns within the Southwest Region.

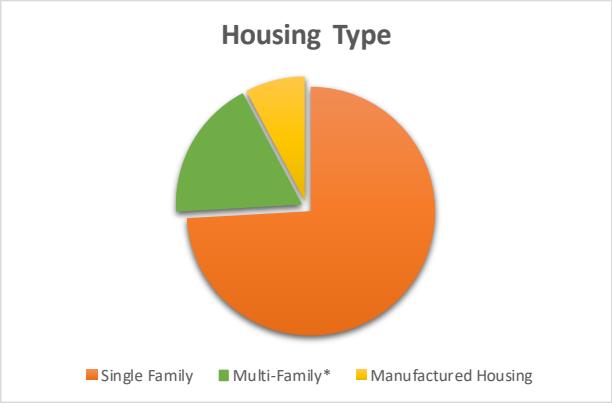
Trend in Total Number of Housing Units-Subregional

	Year				Percent Change	Percent Change
Housing units	**1980**	**1990**	**2000**	**2010**	**2000-2010**	**1980-2010**
Swanzey	1,894	2,582	2,818	3,205	13.7%	69.2%
Chesterfield	1,330	1,527	1,632	1,802	10.4%	35.5%
Keene	7,934	8,841	9,295	9,719	4.6%	22.5%
Marlborough	703	856	896	946	5.6%	34.6%
Richmond	230	398	432	492	13.9%	113.9%
Troy	782	867	755	932	23.4%	19.2%
Winchester	1,342	1,673	1,741	1,932	11.0%	44.0%
Cheshire County	23,274	30,350	31,876	34,773	9.1%	49.4%
New Hampshire	347,758	503,541	547,024	614,754	12.4%	76.8%

Source: US Census

<u>Housing Type</u>

Looking at the types of housing units in Swanzey is one part in identifying gaps in housing options and potentially identifying the need for additional multi-family units at an affordable rate. This chart shows that the predominant housing type in Swanzey is the single-family home (74%). Multi-family units account for approximately 18% of housing units and manufactured housing is approximately 8% of Swanzey's housing units.



Source: US Census, ACS 5-year estimates 2013-2017, table DP04

Swanzey Housing Characteristics- 2017 Estimates

	Owner Occupied 2017*	Renter Occupied 2017*
Total Occupied Units	2,124	704
Vacancy Rate	1.5%	0%
Average Household Size	2.71	2.02

Source: US Census, ACS 5-year estimates 2013-2017, table DP04

The housing tenure table gives information on recent trends of occupancy (owner occupied or renter occupied) as well as the average number of people per unit in each category. It should be noted that this information is an estimate and is subject to change, especially the change in vacancy rates.

Affordability

The information in this section is intended to help determine how affordable and available housing is for Swanzey residents. These tables present the relative cost of housing for home ownership and for rentals in Swanzey, based on the 2017American Community Survey (ACS) estimates.

Swanzey: Cost of Housing 2017*	
Swanzey	**2017***
Median Mortgage	$1,455
Median Gross Rent	$949

Source: US Census, ACS 5-year estimates 2013-2017, table DP04

Rentals

This table shows the number of rental units in each gross rent category. The number of rooms per unit in each category, however, is not given in the data. A rental analysis would need to be completed to get a more detailed representation of the rental market. Approximately 41% of Swanzey's rental units are in the rental range of $500 to $999 per month.

Gross Monthly Rent- 2017		
Gross Rent (monthly)	**Number of Units**	**% of Total Rental Units**
Less than $500	122	19.7%
$500 - $999	255	41.1%
$1000 - $1499	108	17.4%
$1500 and more	135	21.8%
Median Monthly Rent	$949	

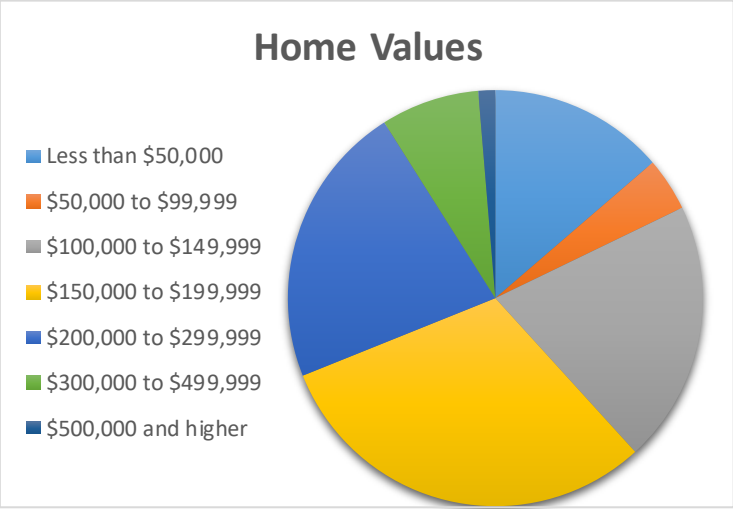
Source: US Census, ACS 5-year estimates 2013-2017, table DP04

Home Ownership

The table and corresponding chart below show the home values as identified in the 2013-2017 ACS estimates. The median home value is $167,300. Approximately 66% of the home values in Swanzey are between $150,000 to $299,999.

Home Values in Swanzey, 2017

Home Values	# of Units	% of Occupied Units
Owner-occupied units	**2,124**	**100%**
Less than $50,000	291	13.7%
$50,000 to $99,999	88	4.1%
$100,000 to $149,999	433	20.4%
$150,000 to $199,999	652	37.7%
$200,000 to $299,999	469	28.5%
$300,000 to $499,999	163	11.9%
$500,000 to $999,999	28	5.1%
$1,000,000 or more	0	0
Median	$167,300	----



Source: US Census, ACS 5-year estimates 2013-2017, table DP04

In considering the amount of income that is affordable to spend on housing, the suggested amount is to spend **no more than 30% of your income**. This next table looks at the housing costs and the amount of monthly income spent toward that expense.

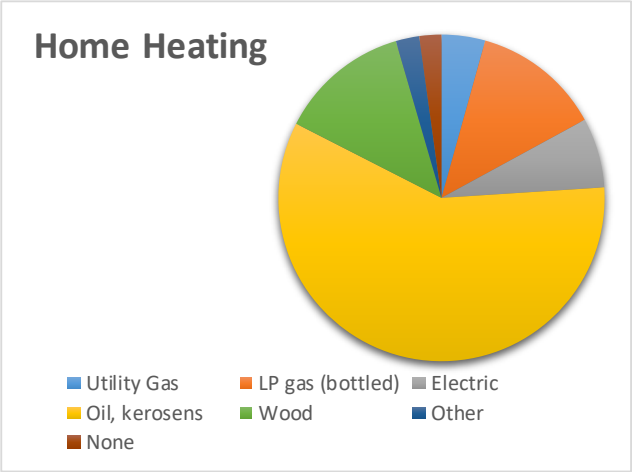
Selected Monthly Owner Costs as a Percentage of Household Income (SMOCAPI) and Gross Rent as a Percentage of Household Income (GRAPI) 2017

Swanzey Housing Costs (% of household income)	Households With a Mortgage		Households Without a Mortgage		Households that Rent	
	# of Units	% of Units	# of Units	% of Units	# of Units	% of Units
Less than 20.0 %	473	33.1%	488	70.4%	87	14.3%
20.0 to 24.9 %	258	18.0%	71	10.2%	62	10.2%
25.0 to 29.9 %	174	12.2%	43	6.2%	140	23.1%
30.0 to 34.9 %	258	18.0%	28	4%	34	5.6%
35.0 % or more	268	18.7%	63	9.1%	284	46.8%
Total Housing Units	1,431	---	693	---	607	---

Source: US Census, ACS 5-year estimates 2013-2017, table DP04

The number of residents that own a home and have a mortgage is 1,431. The figures show that approximately 36.7% (or 526 homeowners), are spending 30% or more of their monthly income on housing, which is considered to be above the affordable rate. The number of renters in Swanzey that are spending 30 % or more of their monthly incomes is even higher. More than 50% of renters fall into this category (318 rental units out of 607). Homeowners that do not have a mortgage, however, are spending far less on monthly housing costs with less than 10% that are outside of the affordable rate.

It should be noted that utilities are factored into the monthly household owner and renter costs. Using the same source of data, it is estimated that 58% of the occupied households use oil as the primary heat source. The full breakdown of primary heat sources includes utility gas (4%), bottled, tank, or LP gas (13%), wood (14%), electric (7%), solar (1%), other, (2%) and none (2%).



Source: US Census, ACS 5-year est. 2013-2017, table DP04

Home Ownership Affordability in Swanzey, 2017*

	2017* Median Household Income	80% of 2017* Median Household Income	50% of 2017* Median Household Income
Annual Income	$71,702	$57,362	$35,851
30% of income	$21,511	$17,209	$10,755
Purchase price affordable at 4.5% for 30 years**	$239,123	$177,877	$86,004

*Sources: *2017 ACS Estimates, ** NH Housing Mortgage Calculator - calculations assume $10,000 down payment, Swanzey tax rate of 2.7%, $500 homeowner's insurance, and monthly debt of $500 (monthly payments for car, student loans, credit cards, etc.).*

Age of Housing Stock

The age of the housing stock is useful in gauging its probable condition. There is a presumption that homes built before 1940 are less energy efficient and are more likely to have outdated heating, plumbing and electric systems. Nearly 1 in 3 homes in the Southwest region of New Hampshire are over 75 years old. Many of these homes add historical significance and charm to the downtown villages. Older homes are generally more expensive to own, especially considering wintertime heating costs, thereby adding to the monthly living expenses. In Swanzey, approximately 18.5% of the homes fall into this age group. With the rising interest in rooftop solar arrays, it is expected that more homeowners will choose this option.

Year Built	<1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2009	2010-2019
% of Total Units	18.5%	4.9%	13.3%	7.8%	13.4%	16.5%	11.4%	11.9%	2.2%

Source: US Census, ACS 5-year estimates 2013-2017

Future Housing Need

An important part of community planning is looking at the projected needs and budgeting for community facilities and infrastructure to accommodate the growth. The final part of this chapter attempts to project what the housing needs will be to meet the anticipated population growth. Two methods are used to accomplish this, the Past Trend Method and the Projection Based Method. In the Past Trend Method, we use the population trends from 1990, 2000 and 2010. Although it would typically be advisable to use additional years, it would likely result in an unrealistic projection due to the housing boom in 1970 and 1980. Swanzey's future housing need is estimated based on the projected population by dividing the population by the housing units to reach a person per unit figure. A person per unit figure can be calculated for the past decades: 2.4 in 1990, 2.4 in 2000 and 2.3 in 2010. A simple average will be used, which is 2.4 out to 2040 to estimate the population. Likewise, we will use the same person per unit figure for the Projection Based Method. The following table shows the housing need projected to 2040 using both methods.

Methodology Used	2010 Housing Units	Average Population Change Between 1990-2010 (Census)	2040 Projected Population	Persons Per Unit (average of 1990-2010)	Total Housing Units Needed
Past Trend Method	3,205	2.1	9,108	2.4	3,795
Projection Based Method	3,205	N/A	7,622*	2.4	3,176

*Source: U.S. Census Bureau; and NH OEP Population Projections**

Therefore, if Swanzey were to experience the same level of population growth between now and the year 2040 (using the Past Trend Method) as it did between 1990 and 2010, the number of housing units needed at the current average household size of 2.4 persons per household is 3,795 units. To meet that figure, there would need to be approximately 20 housing units built each year until 2040. If, on the other hand, the Projection Based Method was used, the number of housing units needed would be 3,176, and the current number of housing units is adequate to meet future demands. While it is difficult to project which method to rely on, the rate of growth has been at a much slower pace than previous decades, so it is less likely that the Past Trend Method will continue. Therefore, it is recommended to consider a figure somewhere between the two methods.

It is critical for a town to have a housing stock that meets the needs of all residents to maintain a healthy diversity. Having the necessary regulations that enable a range of housing options will help to ensure that there are no regulatory barriers for residential development. Nevertheless, there are other housing issues to be considered that are not addressed by the current zoning provisions, in particular, the availability of housing for the elderly. Based on regional, state and national trends, we can expect to see a continued increase in the number of elderly residents.

Population and Housing Goals & Objectives

For a complete list of the goals and objectives for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: To ensure that there is adequate housing for existing and future residents.

- Objective #1: Implement and administer land use regulations to reduce regulatory barriers in order to provide for a range of housing types in a variety of price categories.
    - Action 1: Conduct a regulatory review of Ordinances, Site Plan Review Regulations, and Subdivision Regulations.
    - Action 2: Assess the need for senior housing.
    - Action 3: Consider innovative approaches to increasing the housing stock with starter homes and workforce housing such as: in-fill development, mixed us housing, and adaptive reuse of existing structures.
    - Action 4: Explore areas in need of expansion of water and sewer infrastructure to support the development of housing.

Transportation

Transportation is an essential planning consideration that has far reaching impacts on the development of the Town. The careful planning of road and other transportation-related infrastructure will help determine where development will occur, and the type of land uses it will attract. Transportation planning is not just for vehicular traffic, but should include and encourage all modes of transportation such as transit, pedestrian and bicycle users. In addition, freight transportation should be considered.

Linkages of Transportation to Local Master Plan and Other Plans: Transportation planning considerations factor into several other parts of Swanzey's Master Plan and sometimes other Town plans. It is important to recognize the interconnectedness to guide the growth and development of the Town and ensure that the Town's transportation goals align with other Town goals.

Land Use: Transportation connects origins to destinations and helps people access goods, services and each other. Roads will, in large part, be the basis for development patterns in the future. Road design, functionality and placement will determine the types of land uses that will be able to occur on a parcel of land. For example, a collector road will attract a mix of uses including retail, professional offices and residential, whereas a local road will typically provide safe access to residential development. Transportation should be considered in the goals of the Land Use Chapter.

*Economic Development***:** The ability to provide access to businesses will enhance the success of the Town's ability to attract and retain businesses. Direct access to major roads and parking availability are key elements to attract and retain uses that depend on drive-by traffic. Planning for nodal development, or interspersing centers of development between roads with little development, allows communities to plan for multiple economic and cultural activity centers that are separated by roadways designed for moving traffic. Freight transportation, or the movement of goods, is another important economic development and transportation consideration.

Housing/Population/Demographics: The *pattern* of residential development will be determined, in part, by the roads that service them. Roadway classifications also have an effect on the *density* of development that can occur. Local roads can serve residential neighborhoods and multi-family developments safely without concerns of heavy through traffic. The use of access management also provides safe transportation to denser developments. Road design standards such as width, grade and speed are factors to consider when choosing to live in certain types of residential development. Higher density housing and lower-income housing may benefit by offering bicycle, pedestrian or transit improvements to maximize space and increase the neighborhood's affordability. Demographic considerations are also important. Different age groups tend to have different transportation needs. For example, youth often need safe walking and bicycling environments. The older adults may need transit or volunteer driver services.

Natural Resources: The careful consideration of locating roads away from sensitive areas such as streams and wildlife habitats is critical to the protection of our natural resources. Avoiding these

areas will not only protect the wildlife that depend on large unfragmented areas but will also add to the safety of roadway users. The use of Low Impact Development methods (LIDs) will help to reduce the length of roads, thereby reducing the amount of impervious surface. This will protect the water quality of our waterbodies and will also allow for groundwater recharge. Transportation has a significant impact on air quality and should be planned to reduce vehicle miles traveled whenever practical.

Hazard Mitigation: Maintaining access to primary and secondary evacuation routes in Town is an important life safety issue. Proper culvert size and installation for all road/stream crossings must be a priority for hazard mitigation in the event of heavy storm events. Bridge maintenance, erosion control and stormwater management are also important considerations to maintain safe roadway infrastructure. Considerations such as these should be added into the Hazard Mitigation Plan and included as priority action items. An inventory documenting the condition of road/stream crossings should be updated regularly, and erosion control methods should be used along roads with steep slopes to prevent washouts and erosion.

Road Classifications and Conditions: Swanzey roads are managed under a series of classifications. Roads are grouped and classified for several reasons. Some important reasons to classify roads include:

- Designing appropriate capacity, safety measures and design speed for roads;
- Guiding investment priorities for roads;
- Providing a framework for a road maintenance program; and
- Guiding land use related regulations and access management standards with frontage on the roadway system.

At a minimum, New Hampshire roads are classified for planning purposes into two types: State Highway Classification and Federal Functional Classification. *State highway classification* refers to the state's system of defining state and town responsibilities for road construction and maintenance. *Federal functional classification* is the system by which streets and highways are grouped into classes according to the type of service they are intended to provide. Basic to this process is the understanding that individual roads or streets do not serve travel independently. Rather, travel involves movement through a series of roadways in a logical manner by defining the part any particular road or street can play in serving traffic flow through a highway network.

State Highway Classification: All public roads in New Hampshire are classified in one of seven categories per NH RSA 229:5. Highways under state maintenance and control include Classes I, II, III and III(a). Classes IV, V and VI highways are under the jurisdiction of municipalities. The following provides a description of various administrative classes.

Class I: Trunk Line Highways
Class II: State Aid Highways
Class III: State Recreational Roads
Class III(a): State Boating Access Roads
Class IV: Town Roads with Urban Compact

Class V: Town Roads
Class VI: Unmaintained Highways

Of these seven road classifications, Swanzey roads fall into four classifications. The definition of these classifications, and the roads that fall within each category are described below. These can also be found on the Transportation and Infrastructure Map (Figure 3).

Class I: Trunk Line Highways - These belong to the primary state highway system. NH DOT assumes full control and responsibility for construction, reconstruction and maintenance of these roads. There are 9.05 miles of Class I highways in Swanzey which include NH 10 and NH 12.

Class II: State Aid Highways - These consist of highways that belong to the secondary state highway system. All sections improved to state standards are maintained and reconstructed by NHDOT. Other Class II highways, not improved to NHDOT's standards, are maintained by Swanzey and are eligible to be improved to NHDOT standards using state aid funds as those funds become available. The same applies to bridges on Class II highways. There are 19.8 miles of Class II roads in Swanzey including: Old Homestead Highway (NH 32), Flat Roof Mill Road, Lake Street, Sawyers Crossing Road, South Road, Swanzey Lake Road, Swanzey Factory Road, and Westport Village Road.

Class III: Recreational Roads - Recreational Roads are those roads leading to and within state reservations designated by the State Legislature. NHDOT assumes full control for construction, reconstruction and maintenance of these roads. There are no Class III roads in Swanzey.

Class IV: Urban Compact Section Highways - These are portions of highways designated by NHDOT within the compact sections of towns and cities. The municipality assumes full responsibility for construction and maintenance of these roads. There are no Class IV roads in Swanzey.

Class V: Town Roads - These consist of all regularly maintained roads that are not in the state system, which the Town has the duty to construct and maintain. These roads may be paved or graveled. There are 63.6 miles of Class V roads in Swanzey including, but not limited to Old Richmond Road, Marcy Hill Road, Whitcomb Road, and Christian Hill Road.

Class VI: Unmaintained Highways - These are all other existing public ways that are not maintained by the Town and have not been for five or more consecutive years. While subdivision of land is usually restricted on Class VI roads, the potential for development exists if the roads are upgraded to a Class V status either by the landowner or the Town.

As frontage along Class V roads becomes less available and the centers of town villages reach capacity, there is mounting pressure to develop on Class VI roads. Class VI roads are an important component of a town's transportation infrastructure as they exemplify the community's rural character and can provide a variety of recreational opportunities. The Town should evaluate and make recommendations for the future status of Class VI roadways and develop a Class VI road policy. There are 13.8 miles of Class VI roads (unmaintained roads) in

Swanzey including, but not limited to: Rabbit Hollow Road (portion), Massey Hill Road (portion) and Kempton Road (portions).

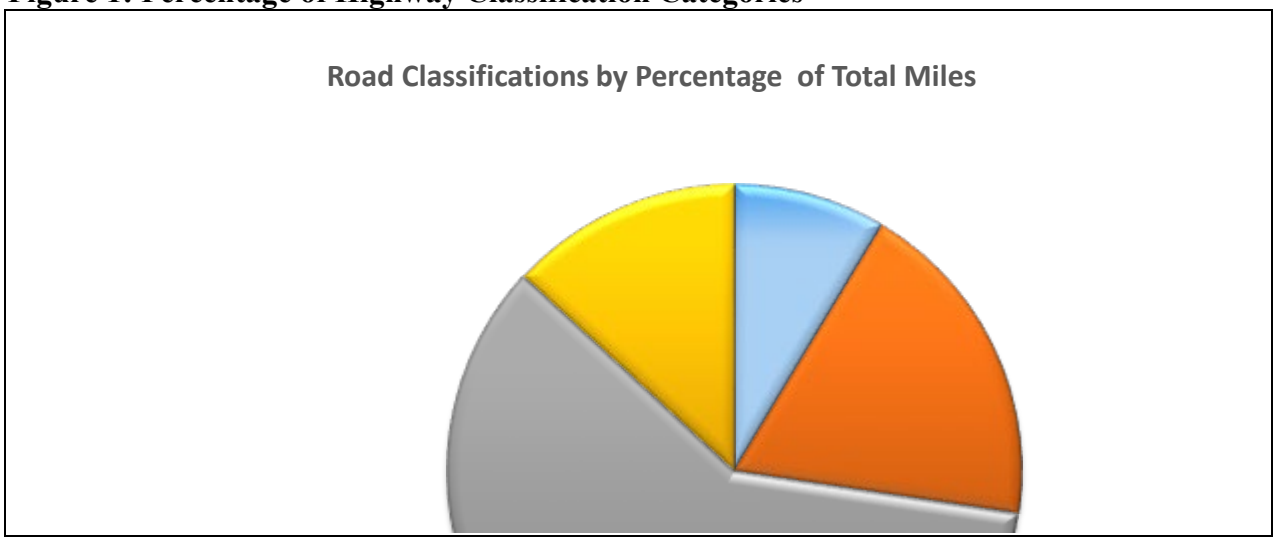
Table 1 shows the State Highway Classification of Swanzey Roads and the mileage for each class and Figure 1 provides a visual representation. Approximately 60% of the roads in Swanzey are Class V roads. Figure 1 represents the percentage of total miles per State Highway Classification in Swanzey.

Table 1: State Highway Classification of Swanzey Roads

Road Class	Miles
Class I: Trunk Line/Primary State Aid Highways	9.05
Class II: Secondary State Aid Highways	19.8
Class III: Recreational Roads	0
State Miles	**28.9**
Class IV: Urban Compact Section Highways	0
Class V: Town Roads and Streets	63.6
Class VI: Unmaintained Roadways	13.8
Town Miles	**77.4**
Total Miles of Roadway	**106.3**

Source: NH Department of Transportation Mileage by Town and Legislative Class

Figure 1: Percentage of Highway Classification Categories



Source: NHDOT Mileage by Town and Legislative Class

Federal Functional Classification: Functional classifications can be used by local, state and federal governments, but the federal functional classification is most commonly cited in transportation planning. It is a method of grouping roads by the service they provide and is particularly useful for planning purposes. Functionality, at its most basic level, is divided into three road types: arterials, collectors and local roads. By identifying the function of the road, decisions can be made as to the road design and speed. Roads that function to move traffic from one town to another town have

different needs than roads that provide access within a residential neighborhood. They will require different road widths, speeds, signs, and construction standards. A road that has truck traffic is constructed differently to handle heavier, larger and wider vehicles and greater traffic volumes than those serving neighborhoods. Access and turning maneuvers are also different depending on the functional classification. Therefore, identifying the function of the road is an essential part of planning. It is important to balance all three types of roadways to ensure an efficient (and in the long-term, less costly) transportation system. Reducing road widths will not only be less costly to construct, but they will also be less costly to maintain, and reduce the amount of impervious surface, which is beneficial to the environment.

Major Arterial Roads - These arterials are controlled access highways and interstates. Major arterial highways are designed to carry the largest percentage of traffic entering and leaving a region as well as the greatest amount of traffic traveling through the region. Examples of major arterial roads in Swanzey include NH 10 and NH 12.

Minor Arterial Roads - Similar to the major arterial roads, these are designed to carry traffic through the region. Minor arterials have limited access and faster speeds than collector and local roads. An example of a minor arterial road in Swanzey is Old Homestead Highway (NH 32).

Collector Roads (major & minor) - The collector system provides more direct land access than do the arterials. Collector streets may enter residential areas, business districts and industrial areas. A major collector is designed to move medium traffic volumes at low speeds between or within communities and funnel traffic to and from residential and commercial areas to an arterial system. A minor collector has lower traffic volumes and provides alternative routes to major collectors. Examples of collector roads in Swanzey include Flat Roof Mill Road, Swanzey Lake Road, Eaton Road, Matthews Road, and Sawyers Crossing Road.

Local Roads - The local street system includes all other streets not classified in one of the higher systems. The primary function of these roads is to provide direct access to individual properties. This system offers the lowest level of mobility. Through-traffic is usually deliberately discouraged. Examples of local roads include but are not limited to: East and West Shore Roads, Ash Hill Road and Safford Drive.

National Highway System: A third highway classification scheme used in transportation planning is the National Highway System (NHS). Roadways in this classification make up a network of strategic highways within the United States. These highways are usually classified as Class I highways by the state Administrative Classification. In Swanzey, NH 12 is classified as an NHS roadway.

Scenic Road Classification: NH RSA 231:157 allows towns, by a vote at Town Meeting, to designate any road other than a Class I or II highway as a Scenic Road. The effect of this designation is that there shall be no tree cutting or alteration of stone walls within the right-of-way without approval of the Planning Board, after a duly-noticed public hearing. The only

exception to this applies when there is an emergency situation. This law does not affect the rights of individual property owners, nor does it affect land uses as permitted by local zoning. The statute also authorizes towns to adopt provisions dealing with Scenic Roads that are different from, or in addition to, those that are spelled out in the law. There are no roads in Swanzey classified as Scenic Roads.

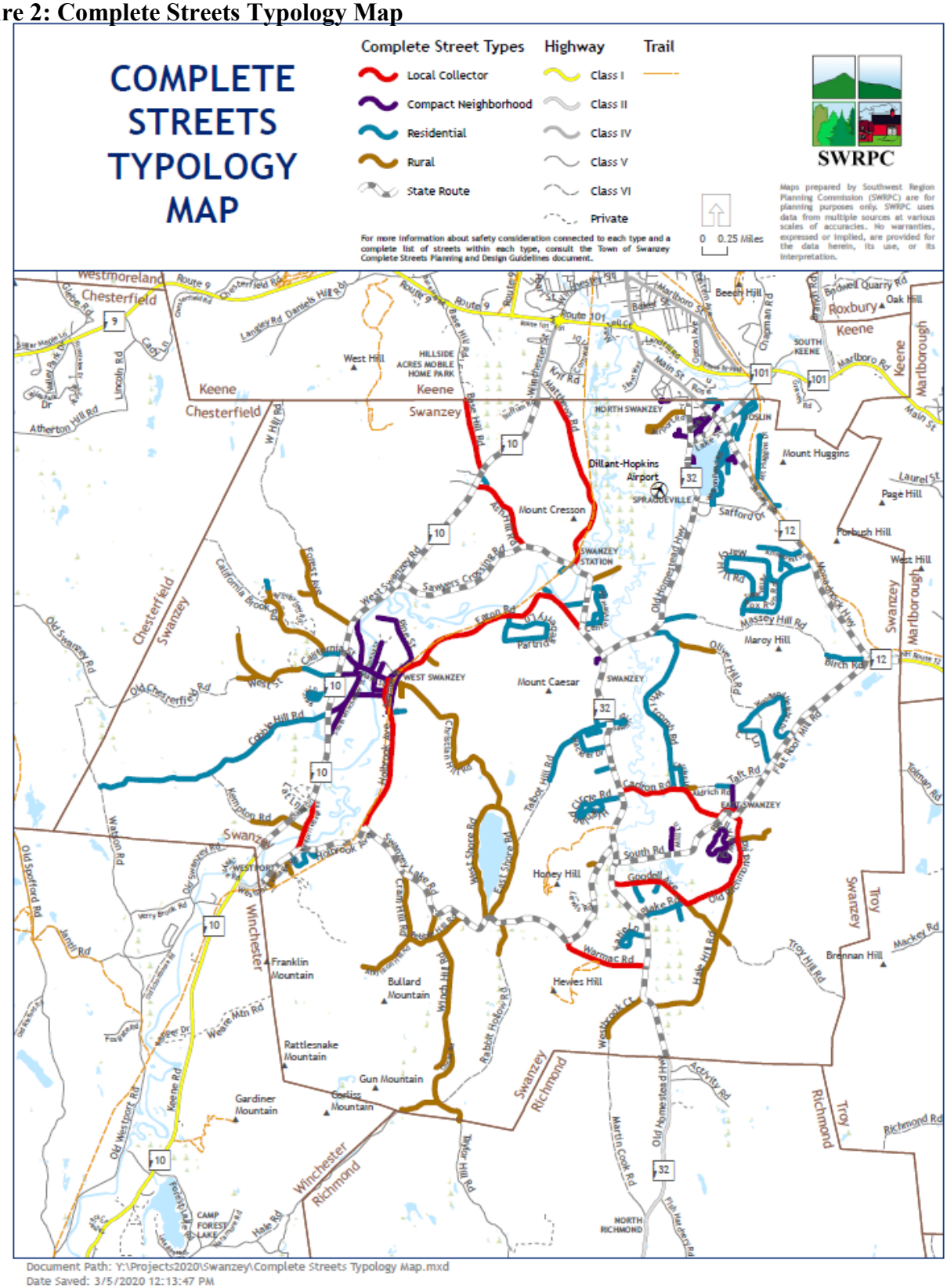
Complete Streets Typology: Another street classification system used in the Town of Swanzey is its "Complete Streets" typology system. "Complete Streets" refers to an overall approach to planning, improving and maintaining the street right-of-way for all potential users of the roadway, taking into account users of all ages or abilities. For instance, if a street connects a local school to a residential neighborhood, it considers the needs of local youth that may need safe walking and biking accommodations.

The Town adopted a Complete Street Policy in 2015. The Swanzey street typology system classifies streets by roadway function and surrounding context, including right-of-way width, building types, predominant travel modes, land use, and density of development. Street types are not necessarily continuous along the entire length of a street; a single street may change typology as the surrounding land uses or functions of the road change. By designating Swanzey's roadways as different street types, the Town can ensure that the design and use of a street complement the surrounding area and vice versa. The typology system also ensures connectivity within the street network for local bicycle and pedestrian trips in and around the community. The street types identified for Swanzey, shown on the following map (Figure 2), include: Local Collector, Compact Neighborhood, Residential, and Rural Streets.

Components of Swanzey's Complete Street Policy states that the Town should approach every transportation improvement and project phase as an opportunity to create safer, more accessible streets for all users. Types of improvements that should be considered include but are not limited to**:**

- the addition of sidewalks and bicycle lanes;
- intersection improvements to include crosswalks and signalization for pedestrians and bicyclists;
- the installation of raised or textured crosswalks in locations that have higher pedestrian traffic;
- streetscape amenities such as benches, streetlights and shade trees;
- sidewalk curb extensions for creating locations for trees and benches, and other traffic calming principles.

Figure 2: Complete Streets Typology Map



Roadway Usage and Conditions: Roadway usage and conditions impact our everyday enjoyment of, or frustrations with, traveling through Town. As the population increases within the state and region, so will the amount of traffic. Careful planning of our roadways, including alternative routes, will give users options to get to their destinations. The next table shows the Average Annual Daily Traffic Counts that have been recorded over the last eight years. This is an important factor in planning the location of future land uses and access points. The changes in traffic counts can be attributed to a variety of factors including but not limited to new subdivisions, new businesses opening, closing of businesses, and road construction.

Average Daily Traffic Counts: The table below shows the traffic counter locations and the average daily traffic counts for each location (no counts were done in 2012, 2015 and 2018). Counts are generally done in three-year intervals. This provides a way to see any changes or trends in the amount of traffic at each location. The trend shown in Swanzey is that traffic at these locations has remained relatively flat or declined over the past decade.

Table 2: Average Annual Daily Traffic Counts

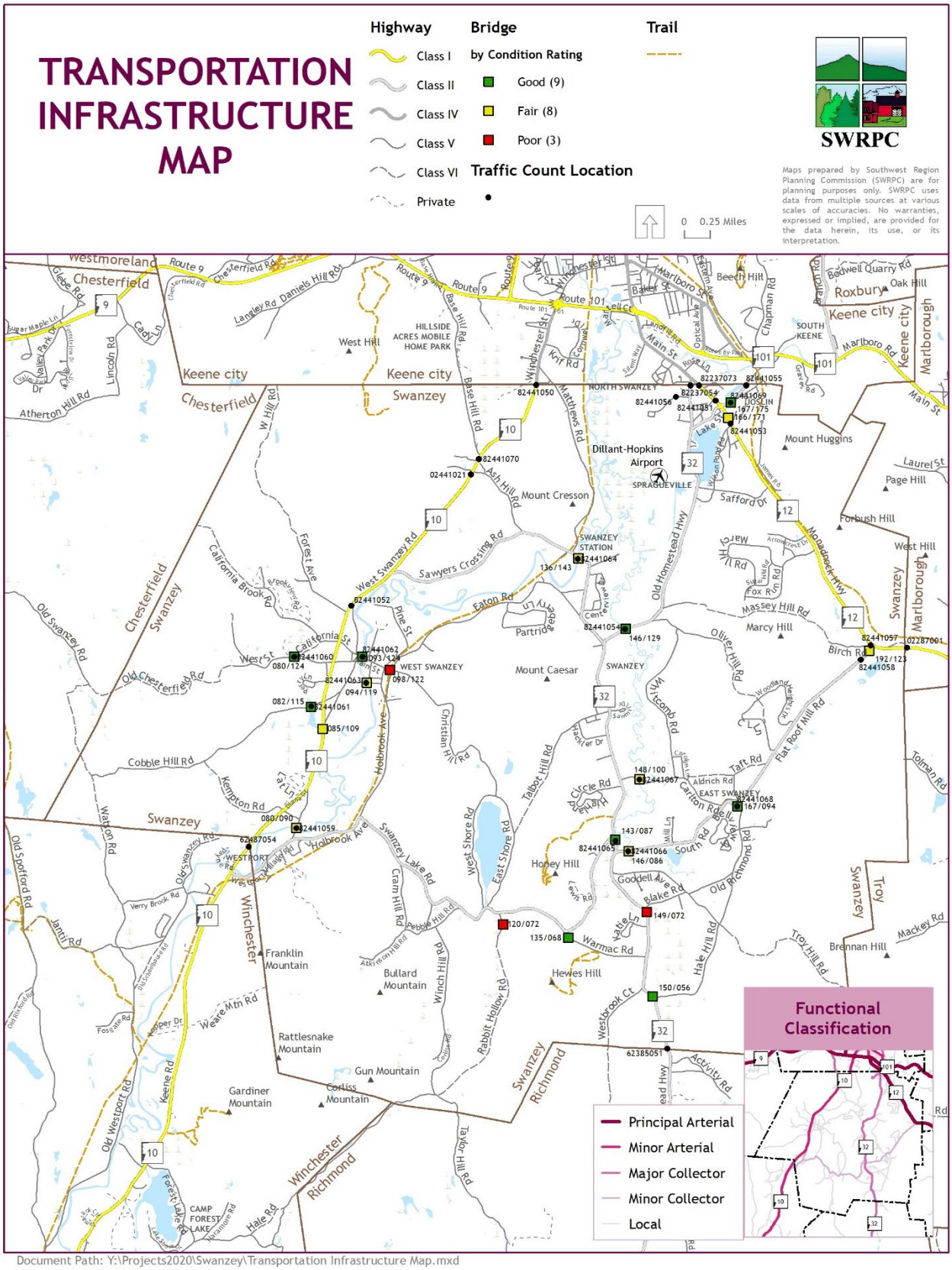
Counter Number	Counter Location	2011	2013	2014	2016	2017	2019
441050	NH 10 at Keene TL	---	14,000	---	---	---	---
441053	NH 12 south of Rust Way	---	13,000	---	14,000	---	12,700
441054	NH 32 over S Branch Ashuelot River	---	4,100	---	4,400	---	3,100
441056	Airport Rd. west of NH 32	420	---	320	---	440	---
441058	Flat Roof Mill Rd. S. of Massey Hill Rd.	---	2,000	---	1,800	---	1,900
441059	Westport Village Rd. over Ashuelot River	---	870	---	730	---	730
441060	West St. east of Ford Rd.	---	250	---	260	---	160
441061	Cobble Hill Rd. west of NH 10	---	590	---	380	---	390
441062	Main St. over Ashuelot River	2,800	3,100	---	3,000	---	2,000
441063	Denman Thom. Ave over Ashuelot River	1,200	---	1,100	---	1,400	---
441064	Sawyers Crossing Rd. over Ashuelot River	3,100	---	4,200	---	3,600	---
441065	NH 32 south of Swanzey Lake Rd.	---	3,000	---	2,200	---	3,100
441066	South Rd. over S. Branch Ashuelot River	720	---	710	---	890	---

Counter Number	Counter Location	2011	2013	2014	2016	2017	2019
441067	Carlton Rd. over S. Branch Ashuelot River	---	1,300	---	600	---	520
441068	Old Richmond Rd. east of Flat Roof Mill Rd.	1,200	---	1000	---	850	---
441069	Swanzey Factory Rd. over Troy Brook	---	2,200	---	2,300	---	2,400
441070	NH 10 south of Base Hill Rd.	---	14,000	---	13,000	---	13,500

*Source: NH Department of Transportation * No data for 2012, 2015, and 2018.*

The Transportation Infrastructure Map, Figure 3, shows the counter locations, location of bridges and their condition rating, the State Highway Classifications, and the Federal Functional Classifications. Additional information on bridges and the NHDOT Bridge report for Swanzey is located on page 36.

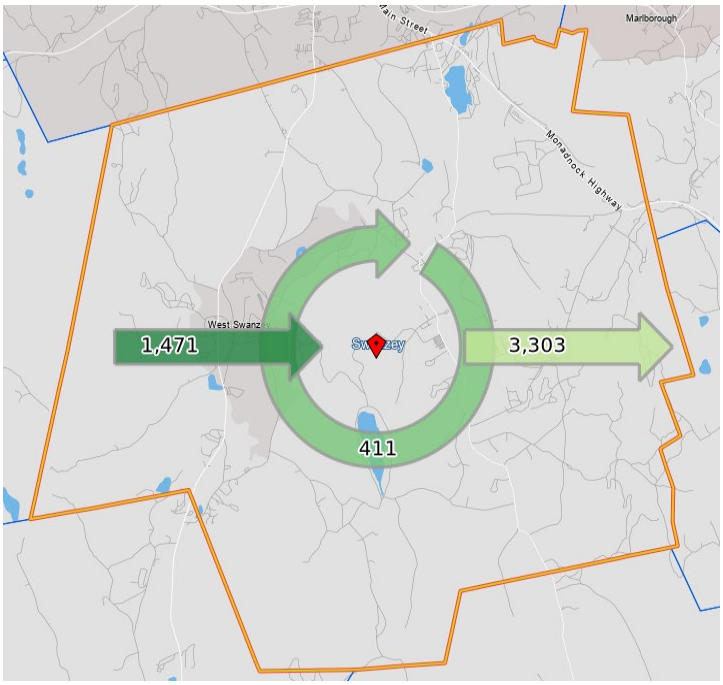
Figure 3: Transportation Infrastructure Map



Commuting:

The Inflow/Outflow chart and table show the employment-related commuting figures of Swanzey employed residents and of workers commuting into Swanzey for local businesses. The left arrow indicates that approximately 1,471 people commute into Swanzey to work in Swanzey businesses. It also shows that approximately 411 people live and work in Swanzey. The right arrow shows that there are approximately 3,303 Swanzey residents that are employed and travel to jobs located outside of Swanzey.

Figure 4: Inflow/Outflow for Employment



Source: US Census Bureau- LongitudinalEmployer-Household Dynamics (LEHD) program, 2017

Table 3 shows that there are 78% of the people who work in Swanzey commute in from other towns. It also shows that 89% of the Swanzey residents with jobs commute out of town for employment.

Table 3: Commuting-Inflow/Outflow

Inflow/Outflow Job Counts (All Jobs)		
Employment Within Swanzey	Count	% of All Jobs
Total Jobs in Swanzey	1,882	100%
Employed in Swanzey but Living Out of Town	1,471	78.2%
Employed and Living in Swanzey	411	21.8%
Swanzey Residents that are Employed	Count	% of All Jobs
Employed Swanzey Residents	3,714	100%
Residents with Jobs Out of Town (commuting out)	3,303	88.9%
Residents Living and Working in Town	411	11.1%

Source: US Census Bureau- Longitudinal Employer-Household Dynamics (LEHD) program, 2017

The next tables summarize where employees live and work. Table 4 shows the most common town of residence for people that work in Swanzey. Approximately 43% of jobs in Swanzey are filled with workers from Keene and within Swanzey. Table 5 provides information on Swanzey residents that are employed, and the towns that they work in. The top work destination is in Keene.

Table 4: Commuting into Swanzey

Commuting into Swanzey for Work (where workers live)		
Origin	# of Workers	% Working Population
Total Swanzey Jobs	1,882	100%
Swanzey (live & work)	411	21.8%
Keene	395	21.0%
Winchester	83	4.4%
Fitzwilliam	57	3.0%
Troy	50	2.7%
Chesterfield	42	2.2%
Marlborough	41	2.2%
Jaffrey	38	2.0%
Walpole	35	1.9%
Brattleboro	32	1.7%
Other locations	698	37.1%

Source: US Census Bureau- Longitudinal Employer-Household Dynamics (LEHD) program, 2017

Table 5: Common Commuting Locations (Where Swanzey Residents Work)

Where Residents Work	# Residents	% Working Population
Swanzey Residents with Jobs	3,714	100%
Keene	1,523	41.0%
Swanzey	411	11.1%
Brattleboro, VT	150	4.0%
Concord	98	2.6%
Chesterfield	73	2.0%
Winchester	71	1.9%
Lebanon	62	1.7%
Nashua	62	1.7%
Manchester	60	1.6%
Jaffrey	58	1.6%
Other locations	1,146	30.9%

Source: US Census Bureau- Longitudinal Employer-Household Dynamics (LEHD) program, 2017

Maintenance and Condition of Roads: Knowing the history of road repairs and the condition of roads that may need repair can assist the Town in budgeting for and prioritizing road improvements. Table 6 shows the most recent road improvements undertaken in Swanzey.

Table 6: Swanzey Road Improvements-2016 to 2020

Name	Year	Description of Work
Pine Street	2020	Reconstruction
East Shore Road	2020	Reconstruction
Holbrook Avenue	2020	Repave
Woodale Avenue	2020	Repave
Carlton Road	2020	Chip Seal
Westport Village Road	2020	Chip Seal
Franklin Mountain Crossing	2020	Chip Seal
Katie Lane	2020	Chip Seal
Fox Run Road	2020	Chip Seal
Sugar Hill Road	2020	Chip Seal
Kempton Road	2020	Chip Seal
Eaton Road	2019	Reconstruction
James Road	2019	Repave
Rust Way	2019	Repave
Longwood Drive	2019	Repave
Thompson Lane	2019	Repave
Dartmouth Road	2019	Repave
Colonial Village	2019	Repave
Ash Hill Road	2019	Repave
Hale Hill Road	2019	Repave
Mount Huggins	2019	Chip Seal
Cresson Drive	2019	Chip Seal
Centerview Drive	2019	Chip Seal
Spruce Circle	2019	Chip Seal
Matthews Road	2018	Repave
Hale Hill Road	2017	Reconstruction
Base Hill Road	2017	Chip Seal
Cobble Hill Road	2017	Chip Seal
Warmac Road	2017	Chip Seal
Main Street	2016	Reconstruction
Warmac Road	2016	Repave
Arrowcrest Road	2016	Repave
Summer Street	2016	Repave
Hillside Avenue	2016	Repave

Transportation Safety: Vehicle accidents are an occurrence we all want to avoid. However, without careful planning of roadways and intersections, there may be an increase of accidents at a given location. Accident reports obtained from the Police Department are an effective way to identify areas that need safety improvements. Factors such as sightline visibility at intersections and driveways, poor drainage, excessive speed, sun glare, and icing are some of the key reasons for traffic accidents. Many of these can be avoided with good design. It is more efficient and

cost-effective to identify potential conflicting points prior to construction than to retrofit a problem. It is also easier for drivers, so they don't need to adjust to the change.

New development projects involving heavy traffic should be required to submit a traffic study by a licensed engineer to the Planning Board. A traffic study will identify the projected level of service at intersections and the entrance to the property during peak hours of traffic. The Planning Board may require a peer review, or third-party review, to check the accuracy of the traffic study. The peer review may also result in potential alternatives such as a more suitable driveway location, intersection improvements, pedestrian enhancements, or other safety measures. Consulting with the local traffic authority and road agent to review sight lines for proposed new accessways can help reduce hazardous situations.

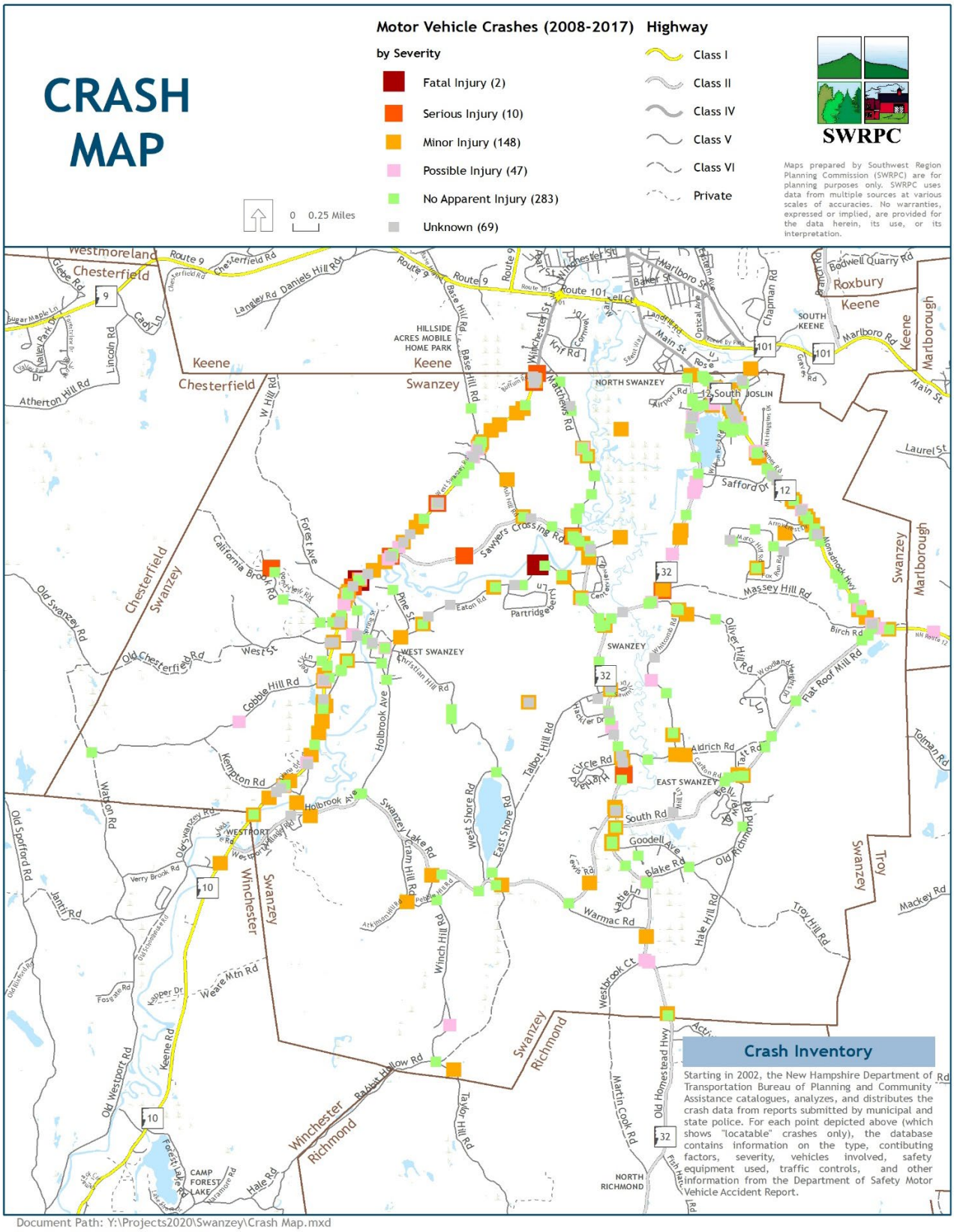
Table 7 shows *areas of concern* where safety improvements may be warranted. These are intersections, hidden driveways, curves, or hills in the roadway or other obstructions that raise concern for vehicular and/or bicycle and pedestrian safety.

Table 7: Areas of Concern

Location	Safety Concern/ Obstruction
NH 10/Base Hill Road	Intersection design, visibility
NH 10 between Base Hill Road and Whittemore Farm Road/Ash Hill Road	Intersection/roadway design, curb cuts
NH 10/Whittemore Farm Road/Ash Hill Road	Intersection design, visibility
NH 10/Sawyers Crossing Road	Intersection design, delays for turning on to NH 10
NH 10/North Winchester Street	Intersection design, visibility
NH 10/California Street	Intersection design, visibility
NH 10/West Street	Intersection design, visibility
NH 10/Cobble Hill Road	Intersection design, visibility
NH 10/South Winchester Street	Intersection design, visibility
NH 10/Westport Village Road	Intersection design, visibility
NH 10/Kempton Road	Intersection design, visibility
NH 12/Old Homestead Highway	Intersection design, visibility
NH 12/Flat Roof Mill Road	Intersection design, visibility
Goodell Avenue/Blake Road/Old Richmond Road/Troy Hill Road	Intersection design
Flatroof Mill Road/South Road/Old Richmond Road	Intersection design, visibility
Goodell Avenue/Old Homestead Highway	Intersection design, visibility
South Road/Old Homestead Highway	Intersection design
Pine Street/Eaton Road	Intersection design

The *Crash Map,* Figure 5, shows previous accident locations. The cluster areas provide insight as to where changes may be necessary to improve safety. The majority of accidents occurred on the state highways of NH 10, NH 12, and NH 32, likely related to those roads having higher traffic volumes and higher speed traffic. These highways also have been the areas with the most fatalities and serious injuries. Examining the cause of the accident will help determine appropriate actions needed. Some common sources include: speed, intersection configuration, hidden driveways, curves, or hills in the roadway or other obstruction. Road design standards and driveway regulations should be reviewed periodically to determine edits that are needed.

Figure 5: Crash Map



Bridges: NH RSA 234:2 defines a *bridge* as a structure on a public highway that has a clear span of 10 feet or more, measured along the highway's center line, spanning a watercourse or other opening or obstruction. It includes the substructure, superstructure, deck, and approaches. This definition is important to help the town and state in determining the maintenance and funding responsibility. Bridges are inspected annually by the NH Department of Transportation and given a classification according to the condition of the bridge. These classifications are defined as:

Not Deficient - Bridges that do not need repairs, just scheduled maintenance.

Structurally Deficient - A bridge, due to its deteriorated condition, no longer meets current standards for load carrying capacity and structural integrity.

Functionally Obsolete - A bridge, due to the changing need of the transportation system, no longer meets current standards for deck geometry, load-carrying capacity, vertical or horizontal clearances or alignment of the approaches to the bridge.

Red List - Bridges that require more frequent inspections due to known deficiencies, poor structural conditions, weight restrictions, or the type of construction (such as a replacement bridge installed temporarily).

There are twenty bridges in Swanzey. Below is a list of bridges with information that may be useful in planning for the Capital Improvements Program (CIP).

Table 8: NH DOT Bridge Report

Bridge No.	Location	Owner	Year Built	Condition
080/090	Westport Rd over Ashuelot River	Swanzey	1862, 2001	Not Deficient Covered bridge
080/124	West St over California Brook	Swanzey	2005	Not Deficient
082/115	Cobble Hill Rd over California Brook	Swanzey	2013	Not Deficient
085/109	NH 10 over California Brook	NHDOT	1953	Not Deficient
093/124	Main St over Ashuelot River	Swanzey	1832, 1993	Not Deficient Covered bridge
094/119	Denman Thompson Hwy over Ashuelot River	Swanzey	1976	Not Deficient
098/122	Christian Hill Rd over NHRR (Abandoned)	Swanzey	1930, 1960	Structurally Deficient-Municipal Redlist
120/072	Rabbit Hollow Rd over Perry Brook	Swanzey	2019	Not Deficient

Bridge No.	Location	Owner	Year Built	Condition
135/068	Warmac Rd over Perry Brook	Swanzey	2013	Not Deficient
136/143	Sawyers Crossing over Ashuelot River	Swanzey	1859, 1996	Not Deficient Covered bridge
143/087	NH 32 over Martin Brook	NHDOT	1929, 2013	Not Deficient
146/086	South Rd over So Branch Ashuelot River	NHDOT	1936, 1983	Not Deficient
146/129	NH 32 over So Branch Ashuelot River	NHDOT	2002	Not Deficient
148/100	Carlton Rd over South Brook	Swanzey	1869, 1997	Not Deficient Covered bridge
149/072	NH 32 over Martin Brook	NHDOT	1929	Structurally Deficient-State Redlist
150/056	NH 32 over Martin Brook	NHDOT	1928, 2012	Not Deficient
166/171	NH 12 over Troy Brook	NHDOT	1970	Not Deficient
167/094	Old Richmond Rd over S Branch Ashuelot River	Town of Swanzey	1999	Not Deficient
167/175	Swanzey Factory Rd over Troy Brook	NHDOT	1970, 2011	Not Deficient
192/123	Flat Roof Mill Rd over small brook	NHDOT	1951, 1984	Not Deficient

Source: NHDOT 2019 Bridge Summary

Of the twenty bridges in Swanzey, seventeen are listed as being in good condition; three are listed as structurally deficient; none are listed as functionally obsolete and three are red-listed. Two of the red-listed bridges have been added into the NH 10-Year Transportation Improvement Plan for repair or replacement. Bridge #149/072 is slated for construction to begin in 2022 with a budget of $1.86 million through the State Aid Bridge Program. Bridge #098/122 is slated for bridge replacement with construction to begin in 2024 - 25 with a budget of $1.64 million.

NH RSA 234:23 imposes a requirement on towns to inspect all bridges along town roads, every two years. This inspection and corresponding classification are useful planning tools for budgeting of those bridges in need of repairs or replacement. Priority should be given to bridges that are in the primary and secondary evacuations routes in the event of emergencies.

Covered Bridges: Swanzey is fortunate to have four historic covered bridges that add to the character of the Town. While they still serve as a means of access to cross the river, the size and construction limitations provide challenges of height, width and load capacity restrictions.
Multimodal: Multimodal transportation describes the variety of ways of moving people and goods. It encompasses a broader range of transportation modes other than vehicular. Multimodal transportation includes:

Pedestrian: Planning for pedestrian traffic involves providing areas and amenities that allow pedestrians to get to their destination by walking. Providing sidewalks, crosswalks and pathways is the way to accomplish this form of transportation. Adding amenities, such as benches and shade trees, will help encourage walking. Another point of consideration for this mode is *connectivity* from one location to another. The proximity and safety between locations will be a deciding factor for some users. Sidewalks that do not connect pose a safety risk for pedestrians, especially those with physical challenges and strollers. It forces them to walk in the roadway or walk across unpaved and uneven terrain. Curb cuts should be provided at the end of each sidewalk and driveway entrances. One area that would be beneficial to add sidewalks is the area between Eaton Road and the Cresson Covered Bridge. Additional locations that should be considered for sidewalks and other pedestrian improvements are listed in Swanzey's Complete Streets Design Guidelines.

Bicycle: As people become more health conscious and environmentally aware, this form of transportation is more attractive. The cost of fuel also contributes to this decision. Providing bicycle lanes along the roadways is an important and responsible part of transportation planning. This includes clearly established bike lanes, pavement markings and signage. Planning for the safe passage of bicycle users also includes bike friendly drainage grates and an awareness of other potential hazards. Similar to the needs of pedestrians, connectivity between locations is important for the local bikers trying to get to areas within Town. Making sure that pathways and bike lanes connect to local destinations will help to avoid conflicts between bikes and vehicles. Bike racks should be required for sites that tend to attract the bicycle users. The Complete Streets Design Guidelines identify specific streets that should be considered for bicycle safety improvements.

Trails: The trail system is an important part of outdoor enjoyment by Swanzey residents and visitors of the region and beyond. A considerable amount of effort has been done to create a network that serves as a recreational attraction as well as an alternative method of transportation in the Town. In 2018, Swanzey was awarded funding through the NHDOT Transportation Alternatives Program (TAP) to continue these efforts by making improvements to the Ashuelot Rail Trail and the Cheshire Rail Trail. To enhance the trail network, consideration should be given to making a connection between the Cheshire Rail Trail and the Ashuelot Rail Trail. Wayfinding signs and improved road crossings should also be given consideration. The Implementation Chapter of this Master Plan update incudes several strategies that should be considered to improve the enjoyment of the trail system in Swanzey.

Carpooling: Ride sharing to work and events is a form of transportation that should be encouraged. While most of us enjoy the freedom of getting to our destinations in our own vehicle, and at our own convenience, there are other options that can be utilized to be environmentally sensitive and budget wise. A role that the Town can play to help facilitate this is to establish commuter lots. Locating commuter lots near rail trails provide parking areas for trail users and also serve as commuter lots. Providing a ride-share board may help establish a way for interested commuters to make connections with other commuters that are travelling to a similar destination.

Public Transportation: Home Health Care, Hospice and Community Services (HCS) operates the fixed route/fixed scheduled bus service known as the City Express which has recently expanded its routes further into Swanzey from the City of Keene. Specifically, the City Express' Black Route (Bus #1) includes a route that travels south on NH 12 from Keene, turns right at the intersection of NH 32, makes a stop at the Edgewood Apartments, takes a left and makes a stop on Lake Street, and finally takes a left on NH 12 and makes a stop at the Princeton Apartments on its way back into Keene. The Black Route runs from approximately 8 a.m. to 5 p.m. on weekdays. The Keene State College campus, which is part of the City Express service and is open to the general public, includes a stop at the Market Basket in Swanzey on NH 10. This bus route runs from 7:30 a.m. to 7:30 p.m. on weekdays while Keene State College is in session. Flag stops are permitted on both routes as long as the driver determines it is safe to make a stop. Transfers are available between all City Express bus routes. All buses are equipped to carry passengers with disabilities, however, HCS also operates complementary paratransit service for people with disabilities not able to access the route, if they live within ¾ mile from any of the City Express routes. In addition to the City Express service, HCS operates a shopping shuttle targeted for seniors but open to all that connects senior facilities in Swanzey and Marlborough with Market Basket on the second and fourth Tuesday of each month.

For Swanzey residents not living on the City Express route or not living in a location that provides the senior shopping shuttle service, there are other options through volunteer driver programs operated by the Community Volunteer Transportation Company and Volunteers Enabling Transportation. These transportation programs operate by donation and requires advanced reservations. In addition to the volunteer driver programs, some social service agencies provide rides connected with social service agency activities.

In addition to these local public transit services, the area is served by a Greyhound intercity bus route and several for-profit local and regional transportation or taxi companies. The Greyhound bus routes include a daily northbound and southbound route that extends from White River Junction, VT. to New York, NY. via Keene.

Rail: The closest connections to intercity rail service are in Brattleboro, VT and Fitchburg, MA. Brattleboro is one of the stops of Amtrak's Vermonter service, which runs a northbound and southbound train daily from St. Albans, VT to Washington, D.C. Parking is available in Brattleboro near the Amtrak station. The Massachusetts Bay

Transit Authority offers multiple runs of commuter rail service from the Wachusett station in Fitchburg into the North Station in Boston seven days a week and includes parking as well. There are no public transportation connections to either of these rail stations at this time, but access may be available through local private transportation companies or taxis.

Dillant-Hopkins Airport: In addition to the surface transportation listed above, Swanzey is home to the only municipally owned public air facility in the Southwest Region. The airport, located on 830 acres of land in Swanzey, is owned and operated by the City of Keene. It is considered a general aviation airport which had approximately 80 private aircraft based at the airport at the time of the Airport Master Plan update in 2017. Aircrafts based at the airport range from mid-sized corporate jets to single engine aircraft. The airport serves recreational and business aviation needs and there is no commercial aviation activity currently. There were an estimated 28,000 operations (takeoffs, landings and other aircraft activities) in 2016.

The Airport Master Plan projects that aircraft takeoffs and landings will increase over the next two decades by 3.65%, which is consistent with growth projections for other general aviation airports around the United States. The airport is expected to continue to host recreational and business aviation activities.

Access Management: Access management is a planning mechanism to improve the safe usage of the roads for motorists, cyclists and pedestrians. It includes careful planning for the location, spacing, design, and operations of driveways and commercial accessways onto the road. Encouraging interconnections between properties helps to limit the number of access points onto the road and thereby reduces the number of conflict points. This is especially useful in retail centers and in residential areas that have sight-line limitations due to road design. RSA 236:13 establishes requirements for driveway permits.

The State has the authority to regulate access to and from state highways (See the Class I and II highways shown in Figure 1) which can affect the overall mobility and accessibility of those roads. The State exercises this authority by issuing permits for driveways and entrances, and planning signalization, medians and other design considerations for new developments that are expected to have high traffic generation.

Swanzey adopted Access Management regulations for multi-family dwellings and commercial uses in 2001 and amended them in 2011. It establishes design standards for new accessways including minimum sight distances and minimum distance between accessways and other standards.

Traffic Calming: Many communities in New Hampshire have a concern about the speed of traffic through the Town center. The lack of state highway bypasses leaves some communities with a heavy flow of drive-through traffic. While this traffic may be beneficial for local businesses, it often creates traffic from additional motor vehicles with out-of-town destinations. To slow traffic down, it may be necessary to use traffic calming techniques in these areas.

Traffic calming measures are designed to alter drivers' behavior and improve safe conditions for pedestrians and cyclists. The following list includes information on traffic calming methods that may be utilized in appropriate areas of Town, as necessary.

- *Raised, textured or colored crosswalks* - raised crosswalks is a physical approach to slowing speeds; textured or colored crosswalks are visual approaches to slowing speeds.
- *Raised median strip/island* - this method narrows the road and limits turning across traffic.
- *Signalization and signage*_- traffic signals with pedestrian features provide safety for pedestrians; signage can also be an effective method for reducing speed and providing safe pedestrian passage.
- *Roundabouts* - these can be used to reduce speeds and allow a flow of traffic, thereby reducing negative effects of pollution that occurs with idling vehicles at traffic lights.
- *Reduce road width* - narrowing the road width generally slows the speed of vehicles, however, it also reduces the safe zone for cyclists.

Future of Transportation Modes/Changing Technologies: Planning for the future involves a great deal of insight to the trends within the region, state, country, and even worldwide. The changing technologies will undoubtedly bring about changes to the way we look at our modes of transportation. With the cost of gasoline and the increased environmental awareness, the movement towards alternative fuel sources is stronger than ever. With these changes, we may be faced with finding creative ways of adjusting to accommodate them. Although the change is inevitable, it will be a gradual process. Fortunately, with careful planning, we can make the necessary shift to the future. It is anticipated that changes to roadway standards, parking areas, refueling/repowering stations, and more will require us to change the way we currently think about transportation.

State and Regional Transportation Plans: State and regional plans provide important information that should be considered as an aid to the Town for planning. They can be useful in preparation for Capital Improvement Programs, site plan and subdivision reviews, multimodal planning and other uses as well. It is beneficial to provide local input to these studies as they are updated.

Table 9: State and Regional Transportation Plans

State Plans	Description	Source	Web link
NH Ten Year Transportation Improvement Plan	List of projects planned for construction in a ten-year period	NHDOT	http://www.nh.gov/dot/org/projectdevelopment/planning/typ/index.htm
NH Long Range Transportation Plan	Inventory of transportation system and policy recommendations for state	NHDOT	http://www.nh.gov/dot/org/projectdevelopment/planning/lrtbp.htm
NH Climate Action Plan	Plan that includes many transportation policy recommendations specifically on transportation	NHDES	http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm

Regional Plans	Description	Source	Web link
Southwest Connects Regional Transportation Plan	Inventory of transportation system, policy recommendations for Region and priority projects	SWRPC	http://www.swrpc.org/trans
Coordinated Community Transportation Plan	Documentation of regional community transportation needs and plans for improvement	SWRPC	http://monadnockrcc.weebly.com/
NH 10 Job Access Study	Assessment of job access need on NH 10 South corridor between Keene and Winchester	SWRPC	http://www.swrpc.org/trans
MRTMA Action Plan	Multimodal development plan for the region	MRTMA	http://www.mastnh.org/

Useful Resources, Links, Programs, Funding Opportunities: The following list provides a variety of state and federal programs with potential funding opportunities. These resources cover a range of transportation projects including, but not limited to road and intersection improvements, bridge and culvert projects, sidewalks and other pedestrian safety enhancements

- State Aid Bridge (SAB)
- State Aid Highway (SAH)
- Block Grant Aid (BGA)
- Federal Bridge Aid (MOBRR)
- Highway Safety Improvement Program (HSIP)
- Transportation Alternatives Program (TAP)
- Recreational Trails (RT)
- FEMA

Transportation Goals & Objectives

For a complete list of the goals and objectives for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: To provide for the safe and convenient circulation and movement of goods and people within the Town of Swanzey and to points beyond.

- Objective #1: Provide for adequate streets and street systems in all existing and future residential, commercial, and industrial subdivisions.
  - Action 1: Review driveway regulations to provide safer sightlines and standards for drainage.
  - Action 2: Invest in street and sidewalk maintenance and replacement on an annual basis through the capital improvement planning process.

- Objective # 2: Provide safe passage for cyclists and pedestrians.
  - Action 1: Seek opportunities to make improvements to the Swanzey trail system.
  - Action 2: Identify areas that the town would like to incorporate amenities for pedestrians/bicyclists using Complete Streets concepts.
  - Action 3: Identify areas that are in need of improvements for walkability. Determine options to make improvements to areas identified, including but not limited to the area from Eaton Road to the Cresson Covered Bridge.
  - Action 4: Consider development of wayfinding for population centers with existing sidewalk networks/rail trails.
  - Action 5: Explore the possibility of a trail connector between the Cheshire and Ashuelot Rail Trails.
  - Action 6: Integrate the trail network with the surrounding roadway network, with a focus on improving connection between the trails and key points of interest, like village centers, schools, and residential neighborhoods.
  - Action 7: Improve rail trail crossings in areas identified as safety concerns, including but not limited to Sawyers Crossing Road and Matthews Road.

- Objective # 3: Coordinate and integrate the transportation systems of the Town of Swanzey with that of the region.
  - Action 1: Provide greater support systems to seniors by enhancing the volunteer driver network in the area.
  - Action 2: Consider ways to provide alternatives to the single occupancy gasoline powered automobile. Consider options such as ride sharing boards, commuter lots, an EV station, et
  - Action 3: Coordinate with the City of Keene to expand public transportation options.
  - Action 4: Participate in regional discussions regarding transportation improvements.
  - Action 5: Collaborate with NH DOT on improvements to State highways.
  - Action 6: Investigate potential locations for the creation of parking areas near rail trails that can also serve as commuter lots.

The preparation of this chapter has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section of Title 23, U.S. Code. The contents of this plan/study/report/document do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

Natural Resources

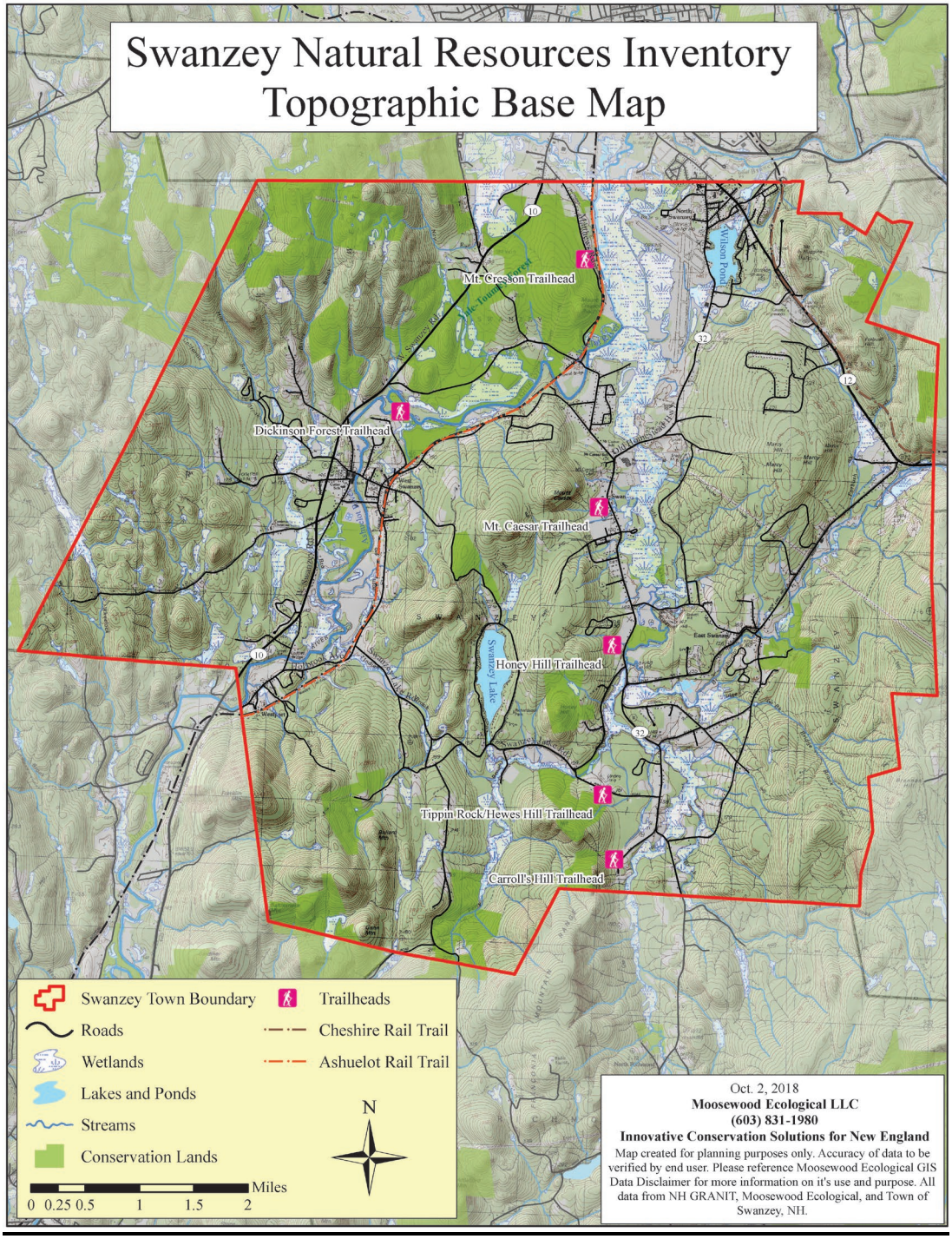
The natural resources chapter of the Master Plan provides an inventory of local environmental conditions related to topography, soils, water resources, floodplains, forest lands, farm lands, and wildlife habitat. Local environmental conditions play an important role in how a community develops over time. This section can help the Town identify those areas that are most suitable for development and higher intensity uses, and those areas that need special protection because of environmental factors. Areas of special concern may include steep slopes, wetlands, water bodies, floodplains, aquifers, and critical wildlife habitat.

View from Honey Hill (Source: Cheri Domina)

It is important to recognize that natural resources also contribute to the quality of life for residents and play an integral part in defining community character. Streams, rivers, walking trails, mountains, working farms, forests, wildlife, and open land all contribute to making a place unique and special to its residents. A sustainable community recognizes the importance of these natural assets and takes steps to protect them.

Since the Master Plan update in 2003, much has been learned about the impacts of global climate change on local natural resources. A study completed by the University of New Hampshire in 2014 on the potential impacts of climate change on southern New Hampshire notes that warmer temperatures are likely to result in an increase in invasive weeds, insects, and disease that will impact existing plant and animal communities. Annual precipitation is expected to increase along with the frequency of extreme precipitation events. Heavier rainfall events can result in farm crop failures, soil erosion, and increased runoff into bodies of water. As climate conditions

continue to evolve, the Town will need to anticipate how these changes will impact the environment and help ecosystems adapt.



The Master Plan community survey included several results that point to the importance of natural resources for Swanzey residents. Both "rural character" and "environment" ranked within the top choices of why residents have chosen to live in Swanzey. The survey also showed that

residents take advantage of and appreciate the many recreational opportunities associated with our local natural resources, including but not limited to hiking, canoeing, kayaking, fishing, and using the town beach at Swanzey Lake.

The Town and other local partners have completed several in-depth reports relevant to the community's natural resources in recent years. Several of these reports are incorporated into the Master Plan as appendices. A significant source for the information included in the Natural Resources chapter is the Natural Resources Inventory Phase I and II completed in 2019 and 2020 by Moosewood Ecological for the Swanzey Conservation Commission.

Topography and Soil Types

Topography

The topography of the land has an impact on the types of soil and vegetation that develop over time, drainage patterns, and erosion. Topography also influences the type of development that land can support. Land with slopes of 0-8% is generally suitable for most types of development. The more gradual slopes in this range are preferable for infrastructure development, such as roads, septic and sewer systems, and public water lines. As slopes increase to the 8-15% range, development begins to be constrained. Within this range, moderate and low-density residential development is still suitable, but commercial, industrial, or institutional uses can only be developed with careful planning. Generally, the 15-25% range is considered a moderately steep slope and it is advisable to limit these areas to low-density residential uses only. Slopes of over 25% should be restricted to open space and recreational uses.

Hewes Hills (Source: Cheri Domina)

The physical landscape of Swanzey includes numerous hills and small mountains, many of which include areas with steep slopes. As a result, the majority of residential and commercial

development has occurred within the Town's river valleys with only limited, primarily single-family residential development in areas with steeper slopes.

The Town has adopted the following regulations and standards to discourage the development of land with steep slopes. These regulations should be reviewed and updated as determined to be needed by the community:

- The Zoning Ordinance requires that steep slopes of 25 percent or greater be excluded when calculating the minimum lot size requirement in all Zoning Districts.
- The Subdivision Regulations require that new arterial and collector roads not exceed a grade of 5 percent. Local streets cannot exceed a grade of 8 percent.
- The Driveway Regulations prohibit driveways with a grade of 15 percent or greater for single-family and two-family dwellings. Driveways for commercial, industrial, and multi-family residential uses are restricted to grades of less than 8 percent.

Soil Types
Soil types also influence the suitability of land for development, especially in terms of its ability to support septic systems. Deep and well-drained soils are better able to support development as compared to wet soils or soils with less depth to the underlying bedrock. The USDA Natural Resources Conservation Services has mapped out hydric soils in communities, which includes poorly drained and very poorly drained soil types. Approximately 2,100 acres are classified as poorly drained soils and 1,100 acres are classified as very poorly drained soils. The New Hampshire Department of Environmental Services require that septic systems be setback a certain distance depending on how the wet the soil conditions are.

Areas with steep slopes are not able to support deeper levels of soil and the bedrock is often very close to the surface. Due to the geological history of Swanzey and the location of several river valleys in the community, there are many locations with soil conditions suitable for most types of development.

Construction Materials

For the purpose of the Master Plan, construction materials are defined as sand, gravel, stone, ledge, and loam. There were seven parcels of land for which Intents to Excavate were approved for the 2020 tax year. In addition, there are many inactive and semi-active pits used intermittently to maintain private roads, logging roads, and driveways.

Swanzey's current excavation ordinance follows State law regulation gravel banks (New Hampshire RSA 155-E). The Planning Board is the Town body delegated to review and approve excavation permits. The Town requires that a bond deemed sufficient to cover the reclamation of the pit by the Town in the event the developer is unable to do so. RSA 155-E requires grandfathered pits to comply with the operational and reclamation standards included in State law, but does not permit further review and regulation by the Planning Board (if the parameters of the pit's operation remain unchanged).

Excavation sites provide important materials for construction projects in the greater region, as well as providing a source of employment. However, earth excavation activities can have a negative impact on the environment. Potential environmental impacts associated with excavation include erosion, destruction of habitat, sedimentation, impairment of local waterways, and harm to the aquifer. It is critical the Town maintain a thorough review, permitting, and monitoring process to mitigate any potential hazards and encourage best management practices.

Floodplains

A floodplain is characterized as a flat area of land adjacent to a river or stream that is prone to flooding. The floodplain consists of two parts: the floodway and the floodway fringe. The main channel of the river or stream is called the floodway. The floodway fringe is the broader area adjacent to the banks of the river or stream that is subject to flooding during times of higher water. The floodway fringe is also referred to as the 100-year floodplain or the Special Flood Hazard Area.

The Federal Emergency Management Agency (FEMA) produces Flood Insurance Rate Maps for communities as part of the National Flood Insurance Program. The Flood Insurance Rate Maps identify all areas within a municipality that fall within the 100-year and 500-year floodplain. Flood Insurance Rate Maps and Flood Boundary and Floodway Map with the effective date of May 23, 2006 are used for flood insurance purposes and are on file at Swanzey Town Hall.

The Town of Swanzey participates in FEMA's National Flood Insurance Program. In order to participate in this program, the Town was required to adopt local floodplain regulations, which have been included in the Swanzey Zoning Ordinance. The floodplain regulations address the types of use and activities that may occur in the floodplain and development standards. Because these regulations are included in the Zoning Ordinance, all Swanzey residents can purchase flood insurance for their properties.

Water Resources

Surface Waters and Waterways

Water is a critical resource to support the health of local ecosystems, as well as being a resource for drinking, recreation, agriculture, and industry. Documenting the Town's water resources and ensuring their long-term protection is important for supporting environmental, community, and economic health. To this end, the Town has adopted a 125-foot primary structure setback requirement from Swanzey Lake, Wilson Pond, and 4th order or higher rivers and Streams (Ashuelot River, South Branch Ashuelot River, Ash Swamp Brook, and Martin Brook). In addition, all development on these bodies of water and waterways is subject to setback and vegetation buffer requirements established by the New Hampshire Department of Environmental Services.

Surface water refers to lakes, ponds, and perennial rivers and streams. There are two larger bodies of water in Swanzey: Swanzey Lake and Wilson Pond. Swanzey Lake has an approximate depth of 50 feet and is a mesotrophic lake. The Town owns and maintains Richardson Park located on Swanzey Lake, which includes a public beach for residents. There is also a public

boat launch on the southern end of Swanzey Lake. Wilson Pond is a shallow, warm water pond with a maximum depth of 17 feet. Public access for boating, fishing, and swimming on Wilson Pond is located off Old Homestead Highway.

Lakes and Ponds	Size (acres)
Swanzey Lake	108
Wilson Pond	72.4
Source: USGS topography & GRANIT hydrography datasets.	

Development around Swanzey Lake and Wilson Pond is primarily limited to single-family residential dwellings. There is a non-profit conference center and campground (Pilgrim Pines) and a commercial campground (Swanzey Lake Campground) on Swanzey Lake. Many of the houses that were developed around these bodies of water were originally seasonal cabins. In recent years, the Town has seen a process of these properties being redeveloped and reinvested in for year-round residences. Swanzey Lake and Wilson Pond provide important environmental, recreational, economic, and aesthetic value and the Town should continue using existing regulations and investigate new methods for protecting these resources.

Perry Brook (Source: Cheri Domina)

The following tables provide an inventory of perennial rivers and streams in the Town of Swanzey. Stream order is a classification system that indicates the level of branching in a waterway system. The most notable local waterways are the Ashuelot River and the South Branch Ashuelot River. The entire land area of Swanzey is located in the middle Connecticut River watershed and these rivers and streams all drain into the Connecticut River.

Rivers and Streams	Length (miles)	Stream Order
Ashuelot River	9.7	6th
South Branch Ashuelot River	12.1	5th
Ash Swamp Brook	0.3	4th
Martin Brook	3.6	4th
Wheelock Brook	1.2	3rd
Perry Brook	4.2	3rd
Falls Brook	1.4	3rd
California Brook	3.3	3rd
New Run Brook	2.0	2nd
Indian/Hyponecho Brook	3.0	2nd
Hill Brook	2.1	2nd
Forbush Brook	2.6	2nd
Bridge Brook	2.2	2nd
Bailey Brook	2.7	2nd
Source: USGS topography and GRANIT hydrography datasets		

The Ashuelot River Local Advisory Committee is responsible for preparing an advisory plan for the management and protection of the natural and cultural resources of the Ashuelot River corridor. The Ashuelot River Corridor Management Plan was last updated in 2006 and is included as an appendix to the Master Plan. The report provides a summary of issues, management goals and site/issue specific analysis and recommendations for the segment of the Ashuelot River contained within Swanzey.

Groundwater

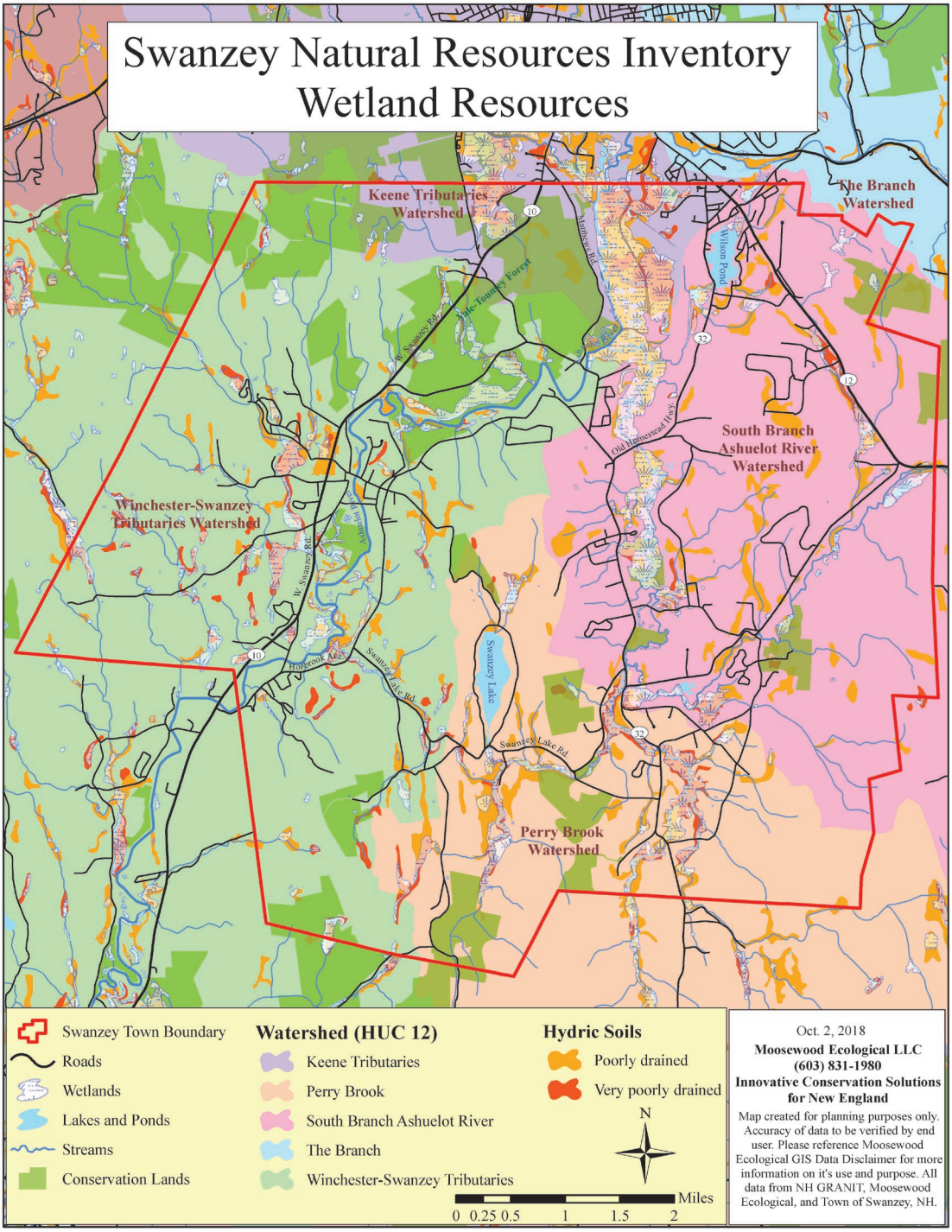
Groundwater is a vital resource for drinking water supplies. In 2017, the Town commissioned a Source Water Protection Plan, which is incorporated into the Master Plan as an appendix. Swanzey is fortunate to have highly productive aquifers that supplies clean drinking water to residents. Approximately two-thirds of Swanzey residents rely on private wells. These aquifers can be traced back to Lake Ashuelot, which covered the area between 10,000 – 20,000 years ago. Protecting the Town's groundwater resources is critical to ensure continued access to clean and safe drinking water for residents and businesses.

Wetlands

Wetlands are also an important part of the community's water and habitat resources and are essential for flood prevention. Wetlands include features such as marshes, wet meadows, swamps, bogs, and fens. In New Hampshire, wetlands are defined as, "an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal condition does support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (RSA 482-A:2). Based on an analysis completed by Moosewood Ecological, Swanzey has approximately 2,525 acres of wetlands throughout the community. Of this total, 180 acres are classified as lacustrine (lakes and ponds), and 2,345 acres are classified as palustrine (marshes, swamps, etc.).

The Town has adopted a Wetlands Conservation District as part of its Zoning Ordinance. The purpose of the District is to prevent the development of structures and land uses on wetlands that

would contribute to the pollution of surface and groundwater, and the destruction of wetlands because of the flood protection, groundwater recharge, and wildlife habitats they provide. The Town requires a 125-foot setback for septic system leach fields from wetlands. The Zoning Ordinance also requires that wetland areas be excluded when calculating minimum lot area requirements in all Zoning Districts. The Town's wetland regulations should be reviewed and updated based on the community's goals and current best practices.



Agricultural Lands

Like many New Hampshire communities, agricultural enterprises have declined over time in Swanzey. However, there are still several productive farms in the community. Areas with prime agricultural soils are generally located along the floodplains of the Ashuelot River, South Branch Ashuelot River, and Martin Brook. In addition to providing environmental and aesthetic benefits, farms provide local foods, offer employment opportunities, and support tourism. Swanzey has strong connection to its agricultural history and efforts should be made to support existing farms and encourage new agricultural enterprises.

Tippin Rock Farm (Source: Cheri Domina)

Forest Lands

Swanzey has an abundance of important forest lands that provide wildlife habitat and recreational opportunities. In addition, forest resources provide important employment opportunities. The largest tracts of unfragmented forest lands are generally located in the northwest, southwest, and southeast corners of the community stretching into the adjacent towns of Chesterfield, Winchester, Troy, and Richmond. Protecting large tracts of connected forestland is important to sustain adequate wildlife habitat areas and allow for the safe migration of wildlife.

Some of the largest, unfragmented tracts of forestland are owned by the Yale University School of Forestry and are located in the northwest sector of the Town along Route 10, Base Hill Road, Ash Hill Road, and Sawyers Crossing Road. Yale University uses this land for educational purposes for students pursuing professional careers in the management and policy of forest resources as well as conducting regular timber harvests. These forestlands are an important

resource for the community and the Town seeks to maintain its positive working relationship with Yale University.

The Town of Swanzey owns and manages the Mount Cresson Town Forest located off Matthews Road. The Town currently works with Meadowsend Timberlands to prepare management plans for the Town Forest. Mount Cresson is open to the public for recreational uses and includes a trail to the top of the mountain.

The Town of Swanzey owns and manages the Mt. Cresson Town Forest located off Matthews Road, as well as 204 acres on and around Mt. Caesar. Meadowsend Timberlands prepared management plans for these forests in 2019 and 2018 respectively, at the behest of the Swanzey Conservation Commission. The Commission maintains trails on both properties, and they are open to the public for recreational uses.

Conservation Lands

Several of the forest and agricultural parcels described in the sections above are conserved lands. In total, according to research completed by Moosewood Ecological in 2019, 3,372 acres of land in Swanzey are under some type of conservation protection. The Yale-Toumey Forest located in the northern part of the town represents 43 percent of this acreage (1,450 acres). However, it should be noted there is no conservation easement or deed restriction on the Yale Forest land that would explicitly protect these lands in perpetuity. For the remaining conservation land, the majority (1,234 acres) is protected by a conservation easement. A conservation easement is a legal agreement between a property owner and a land trust or government agency that permanently limits the use of the land to protect its conservation value. The remaining approximately 20 percent of conservation land are either protected by deed restrictions or are under fee ownership. Many of the fee ownership conservation lands are owned by the Town of Swanzey.

Following the completion of the last Master Plan update in 2003, the Town formed an Open Space Committee that developed A Plan for the Preservation of Open Space in 2004. This plan established criteria, goals, and recommendations for an open space protection plan. The plan recommended that the Town educate landowners about the topic, coordinate between landowners and land trusts, and acquire land or conservation easements.

Identified land conservation priority areas included the forested hills throughout Swanzey (for example, Mount Huggins, Mount Cresson, West Hill, Franklin Mountain). Another priority area for conservation was open fields and farmland. Specific examples included in the plan are the fields in the vicinity of Westport Road and Swanzey Lake Road, Bardwell Farm, and the fields along Rabbit Hollow Road. The Town should consider completing an update to the Plan for the Preservation of Open Space given the amount of time that has passed since the original plan was completed.

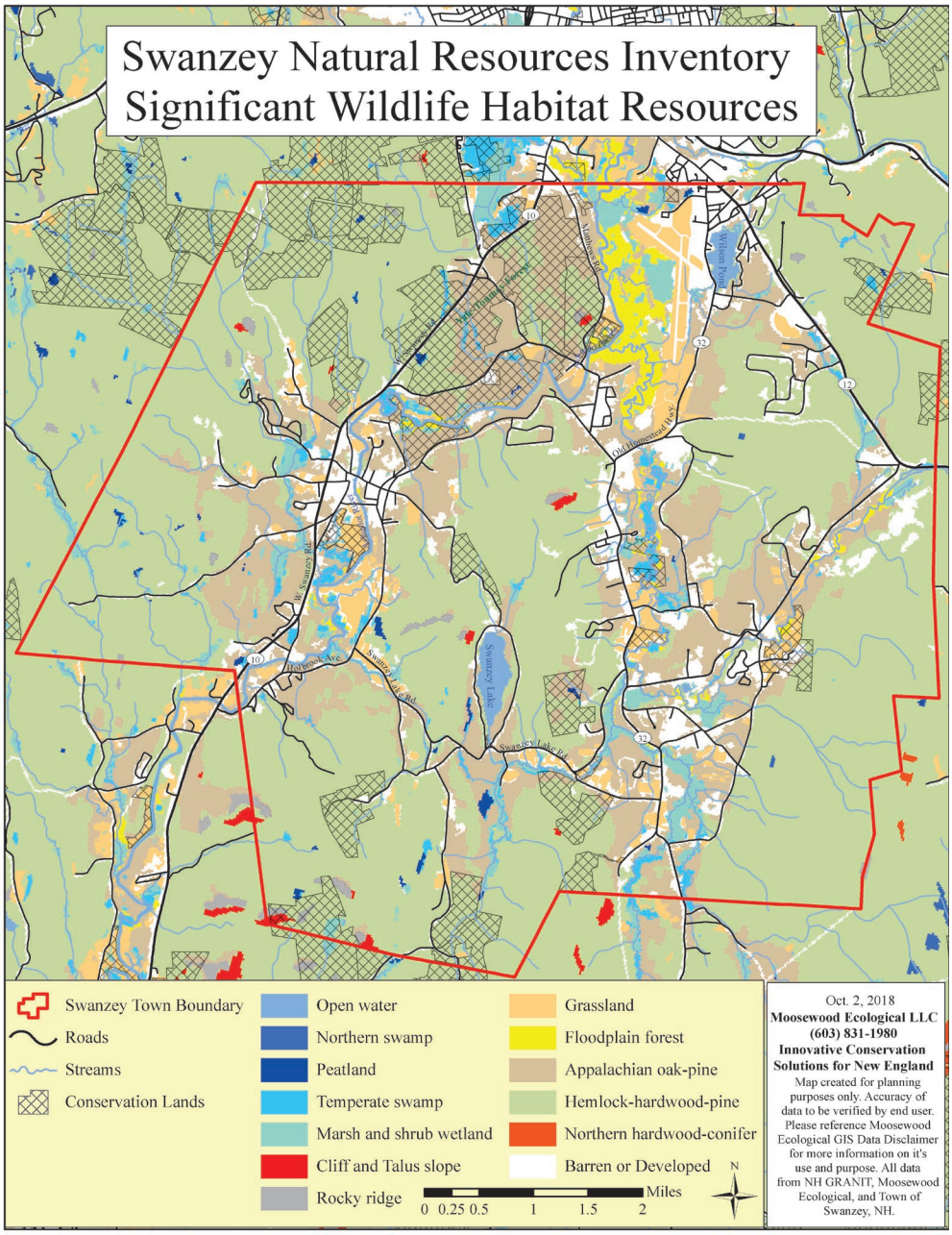
The Town has also adopted Conservation Residential Subdivision Regulations and it should continue to promote this approach to land development where appropriate to protect important forest and agricultural lands. Conservation subdivision design groups homes together on a

portion of a lot based on the natural features of a property. The undeveloped portion is then permanently protected from future development.

Wildlife Habitat and Species

The varied topography of Swanzey supports a wide variety of wildlife habitats. Based on the NH Fish and Game Wildlife Habitat Land Cover map from 2020, the principal habitats in Swanzey are Hemlock-Hardwood-Pine forests and Appalachian Oak-Pine forests. The Hemlock-Harwdood-Pine forests are largely found in the higher terrain in Town, while Appalachian Oak-Pine forests are more common in lower terrain. Grasslands, floodplain forests, and marsh and shrub wetland are also common around the water bodies and waterways in Swanzey.

An analysis by Moosewood Ecological identified 252 species, including 24 mammals, 208 birds, 7 reptiles, and 13 amphibians, that are supported by these habitats. Of this total, 41 species are identified as Species of Conservation Concern in the 2015 New Hampshire Wildlife Action Plan. Some examples of these species include Moose, Wood Turtle, Bald Eagle, and several song bird species.


Swanzey Natural Resources Inventory
Significant Wildlife Habitat Resources
Swanzey Town Boundary
Roads
Streams
Conservation Lands
Open water
Northern swamp
Peatland
Temperate swamp
Marsh and shrub wetland
Cliff and Talus slope
Rocky ridge
Grassland
Floodplain forest
Appalachian oak-pine
Hemlock-hardwood-pine
Northern hardwood-conifer
Barren or Developed
Miles
0 0.25 0.5 1 1.5 2
N
Oct. 2, 2018
Moosewood Ecological LLC
(603) 831-1980
Innovative Conservation Solutions for New England
Map created for planning purposes only. Accuracy of data to be verified by end user. Please reference Moosewood Ecological GIS Data Disclaimer for more information on it's use and purpose. All data from NH GRANIT, Moosewood Ecological, and Town of Swanzey, NH.

Natural Resources Goals & Objectives

For a list of the goals, objectives, and action items for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: Protect and preserve the Town's critical natural resource areas

- Objective #1: Maintain a balance between the Town's existing and future development needs and its natural environment.
    - Action 1: Pursue a Groundwater Protection Ordinance.
    - Action 2: Review Flood Plain Regulations and make updates as needed.
    - Action 3: Seek funding opportunities for the development of a watershed-based lake management plan for Swanzey Lake and Wilson Pond
    - Action 4: Review the Zoning Ordinance to identify the impact of setbacks from wetlands, rivers, and bodies of water
    - Action 5: Conduct an audit of current regulations and evaluate if and how they protect critical natural resources.
    - Action 6: Review and update ordinances and regulations to address storm water management associated with new development.
    - Action 7: Review and update the Planning Board's regulations for earth excavation activities.
    - Action 8: Review and update the Town's Source Water Protection Plan as needed.

- Objective #2: Support efforts to protect and conserve land with critical natural resources, large tracts of forests, open fields, and farm lands.
    - Action 1: Maintain partnerships with land conservation groups and adjacent communities to pursue conservation initiatives of common interest.
    - Action 2: Provide opportunities for land owners who are considering a land donation to learn about options and procedures for completing the transaction.
    - Action 3: Review and update A Plan for the Preservation of Open Space.
    - Action 4: Develop a policy to address when the Town will acquire land or conservation easements.
    - Action 5: Pursue community outreach and education efforts regarding the Town's natural resources.
    - Action 6: Review and update Zoning Ordinance to support agricultural and forestry activities.
    - Action 7: Regularly update and implement the plan for managing the Mount Cresson Town Forest.
    - Action 8: Update the Town's Hazard Mitigation Plan and work to seek solutions to the erosion problem along the Ashuelot River, particularly in the area of Pine Street.
    - Action 9: Educate land owners about best practices for invasive species control and implement best practices on Town-owned conservation lands.

Community Facilities

The community facilities chapter of the Master Plan provides an inventory of municipal buildings, properties, facilities, and equipment that serve the public and recommendations for their improvement. A map on the following page provides a visual illustration of each type of facility and its location in town. In addition to municipal facilities, this chapter addresses the public utilities that support residents and businesses, such as water, wastewater, electrical, and broadband, and which may be provided by private entities. Much of the information included in this chapter is drawn from the Swanzey Municipal Study completed by Scully Architects in 2014.

The following is a summary of the services provided by the Town:

- Public safety services in the form of police, fire, ambulance, and emergency management
- Maintenance of roads, bridges, dams, and cemeteries
- Operation of wastewater systems and treatment plant in West Swanzey
- Operation of the recycling center and transfer station
- Administrative services including licensing, tax collection, assessing, social services, and development permitting

The Town also owns and maintains several historical resources as well as several recreational facilities such as beaches, athletic fields, and trailheads. These facilities are discussed in more detail in the Historical and Recreational Resources section of the Master Plan.

The Town has an established collaborative planning process between the Capital Improvement Program Committee (CIPC), Department Heads, and the Board of Selectmen to help determine what improvements and purchases are needed and when they should be undertaken. The CIPC is appointed by the Board of Selectmen and is responsible each year for preparing a 6-year program of municipal capital improvement projects. Department heads submit annual recommendations to the committee on facility improvements and vehicle and equipment acquisition for the upcoming years. The committee compiles this information and makes a recommendation to the Board of Selectmen on when projects should be completed and how they should be financed.

As is the case with all communities, Swanzey must balance the need to provide services and facilities to support the safety and well-being of the pubic while managing the associated costs. The community survey completed for the Master Plan included a question asking residents what they like least about the town and would like to see changed. Approximately 20% of respondents indicated that “inadequate town facilities and services” was one of their primary concerns. While the survey did not specify which facilities and services are under-provided, the town will continue to work to provide improved facilities and services to meet the current and future needs of residents and businesses.

Community Facilities

Town Hall Facility

Swanzey Town Hall is located on Old Homestead Highway in Swanzey Center adjacent to the Monadnock School District campus and the Mount Caesar Union Library. The Town Hall was built in 1914 on the same site as the original 1796 meeting house. The first floor of the building is occupied by government offices, including administration, tax collection, assessing, finance, planning and economic development, human resources and social service, as well as the Town Clerk's office. The Swanzey Fire Station #2 is located on the lower level of the Town Hall building.

Swanzey Town Hall

The existing governmental offices occupy only approximately 3,750 square feet of the building and the footprint is limited in relation to the existing workload and space needs for municipal staff. In addition to these functional limitations, the 2014 Scully Architects report noted several code and structural issues in the building. The report indicates that if Town Hall were to remain in the existing building, it would need to triple its floor area based on a needs assessment analysis. This would require at a minimum the government offices take over the basement level where the Fire Station is currently located.

Fire Department

The Swanzey Fire Department consists of two full-time employees, the Fire Chief and Fire Inspector/Captain, and two part-time employees, the Deputy Chief and EMS Coordinator. In addition, the department has roughly 35 active and trained call firefighters, EMTs, and paramedics. The Fire Department maintains three active stations in the community, located in the villages of East Swanzey on South Road (Station #1), Swanzey Center on Old Homestead Highway (Station #2), and West Swanzey on Main Street (Station #3). The Fire Department's administrative offices are currently located in Station #3 in West Swanzey.

In addition to providing fire protection to the Town, the Swanzey Fire Department is a member of the Southwestern New Hampshire Fire District Mutual Aid, which is comprised of 70 member

towns. The Mutual Aid system serves as a dispatch center for police, fire and ambulance services for the member towns.

The Town is currently working on a proposal to replace Station #2, located in the lower level of Town Hall, with a new modern station. The current station is undersized and does not meet health and life safety code requirements. Modern fire trucks barely fit through the doors, under the ceiling, and between the columns in the truck bays. The firefighters' lockers and gear are in the truck bays with the diesel exhaust from the trucks. The diesel fumes from the trucks also go upstairs into the Town Hall where employees and members of the public are doing business. In addition to Station #2, the stations in East Swanzey and West Swanzey also need to have upgrades for Emergency Medical Services (EMS) supply decontamination and to address other building code issues.

The new Station #2 would be located in the north central area of town to improve response times to the largest call area in Swanzey (North Swanzey). Over the last several years, the community has developed a preliminary design and cost estimates for a fire station on Town-owned property further north on Old Homestead Highway and adjacent to the Keene Dillant-Hopkins Airport and the Town will continue to pursue the plans for this site.

The Town has also identified improvements that are needed for Station #3 in West Swanzey. These include installing a fire suppression system and providing a second means of egress from the second story where administrative offices are located. Both Station #3 and Station #1 in East Swanzey also need to be upgraded to include exhaust treatment systems so that the fumes from vehicles parked in the stations do not have an adverse impact on the health of firefighters.



West Swanzey Fire Station

The Town has arranged through a capital reserve fund to replace equipment for the Fire Department on a regular basis as recommended by the Fire Chief and the Capital Improvement Plan Committee. The Fire Department currently maintains the following equipment as shown in the table below:

Fire Department Equipment (2021)
2008 Pierce Sabre Engine
2000 International Heavy Rescue
2001 Pierce Arrow Engine
2010 Mack Tanker
2000 American LaFrance Ladder Truck
2019 Freightliner Commercial Chassis Engine
Ambulance
Yukon Rescue #1
Yukon Rescue #2
Yukon Rescue #3
Brush Truck
Water Rescue Boat & Trailer

Over the last three years, the Fire Department has seen an average of 1,000 calls for service per year. The highest number of service calls have been for rescue and emergency medical service incidents at approximately 70 – 80 percent of the total calls annually.

Currently, there are two separate fire hydrant systems in Swanzey operated by the West Swanzey Water Company and by the North Swanzey Water & Fire Precinct. It is important that the Town of Swanzey continue to work cooperatively with the West Swanzey Water Company and the North Swanzey Water & Fire Precinct regarding the use and maintenance of these systems.

The Fire Department operates a Rescue Squad, providing medical first response. A rescue vehicle is based in each of the East and West Swanzey Fire Stations. If transport is needed to the hospital in Keene, ambulance service is provided by the DiLuzio Ambulance Service, under a contractual agreement with the Town. The Fire Department acquired a used ambulance in 2020, which has allowed the Town to offer back up transport service if DiLuzio is not able to respond to a call.

Police Department

The Swanzey Police Department is a full service, community oriented agency. The mission statement for the department is to strive to improve the quality of life for all, by upholding laws, protecting lives and property, and providing a safe and secure environment. Presently there are 12 police officers and 2 full time Secretary-Dispatchers, which makes the Swaney Police Department one of the largest in Cheshire County.

The Swanzey Police Station is located on Eaton Road in Swanzey Center. The station includes a lobby, dispatch center, booking room, training room, sallyport and individual offices. The station was recently renovated in 2017 to provide additional interior spaces for improved functionality. The Capital Improvement Plan includes additional minor repair work on the station for 2024. No major renovation are currently planned for the station.

The Police Department usually plans to purchase one police cruiser every year for fleet maintenance. Cruisers are used for a period of three years before being replaced. The Police

Department's fleet includes 7 Ford Explorers used for patrol, details, and investigation, and one unmarked car.

Emergency Management
The Town's emergency management organization consists of the Board of Selectmen, Emergency Management Director, Fire Department, Police Department, Health Department, and Public Works Department. The Town completed an update to its Local Emergency Operations Plan in 2021. The purpose of this plan is to provide direction on how the emergency organization should respond to natural or man-made emergencies.

The Town's Hazard Mitigation Plan was updated in 2021. The purpose of the Hazard Mitigation Plan is to reduce long-term risk to human lives and property from natural hazards through implementing mitigation measures. Communities with adopted plan are eligible for federal funding through various federal assistance programs.

Public Works Department
The Public Works Department is located on Pine Street in West Swanzey across from the Swanzey Recycling Center. It employs a staff of eight full time and three seasonal workers. The full time staff maintains approximately 110 miles of roadway. In addition to maintaining roadways, the department is responsible for the maintenance of the Town's five dams, four covered bridges, and sidewalks in West Swanzey and Swanzey Center. In the summer months, the three seasonal workers provide maintenance of the Lane ball fields in East Swanzey, Brown Field in West Swanzey, Richardson Park on Swanzey Lake, West Swanzey AA Memorial Park, and the Town's six cemeteries. Additional information on the Town's roads and sidewalks can be found in the Transportation Chapter.

The department's equipment inventory consists of seven dump trucks with sanders and plows, two 1-ton pickups with plows, a grader, loader, wood chipper, backhoe, one ½ ton pickup, two sidewalk plows and other miscellaneous equipment. Money is set aside yearly from the department's budget for equipment maintenance as needed. Larger equipment purchases are budgeted for through the Capital Improvement Plan.

The Public Works building is significantly constrained for space. The facility inventory completed by Scully Architects determined the department's facility needs are approximately 13,500 square feet in size and the current facility is only 4,900 square feet. Specifically, the department needs covered garage space for 20 vehicles and the current facility only has 7 covered garage bays. In addition, there is insufficient office space and area for break room, restroom, and storage uses.

One unanswered question is whether the Public Works Department will eventually take over the existing water and sewer systems in Town. This would potentially affect future facility and staffing needs.

Solid Waste and Recycling

Swanzey operates a Transfer Station and Recycling Center on the site of its former landfill in West Swanzey on Pine Street. The facility is for Swanzey residential and business drop-off and is funded by income and town appropriations. The department has been working on a significant facility improvement plan that would include adding drive-through drop off lanes and improving the office, breakroom, and restroom facilities. These improvements are scheduled to be completed in 2022. Planning for the future of recycling and solid waste services, the Town will continue to monitor changes in demands and prices in the recycling market, increasing costs, and increasing and evolving environmental and disposal legislation.

Town Libraries

The Town of Swanzey has two public libraries, the Stratton Free Library on Main Street in West Swanzey and the Mt. Caesar Union Library on Old Homestead Highway adjacent to Town Hall. The Stratton Free Library was accepted by the Town in 2017 as a public library governed by an elected three-member board library trustees. Mt. Caesar Union Library operates as a nonprofit entity with one trustee elected by Swanzey voters annually. Both libraries receive operational funding from the Town. Stratton Free and Mt. Caesar Union Libraries offer programs such as reading, story hours, and inter-library loan programs, and both facilities are well patronized and supported.



Mt. Caesar Union Library

Carpenter Home

For many years, the Town operated an assisted living home known as the Carpenter Home at the historic Carpenter property located in Swanzey Center on Simineau Lane across from Town Hall. This facility provided high quality residential care services (assisted living) to its residents. In 2019, the Board of Selectmen voted to close the elderly care facility due to staffing shortages, difficulty keeping the home full of residents, and increased State licensing oversight and requirements. The Town is currently evaluating options for future uses for the Carpenter Home facility.

Monadnock Regional School District

The Town of Swanzey is a member of the Monadnock Regional School District (MRSD), along the communities of Fitzwilliam, Gilsum, Richmond, Roxbury, and Troy. MRSD facilities in Swanzey include the SAU 38 Administrative Center, Wilcox Building, the regional Middle School/High School, and two elementary schools. The Monadnock School District is a major employer in the Town, and has a large impact on daily traffic in Swanzey Center.

The three schools in Swanzey are Mt. Caesar Elementary School (pre-kindergarten, kindergarten, grades 1-3), Monadnock Regional Middle/High School (grades 7-12), and Cutler Elementary School (grades 4-6) in West Swanzey. Mt. Caesar Elementary and the Middle/High School, along with two administration buildings are situated on Old Homestead Highway in Swanzey Center on approximately 100 acres of land.



MRSD Administrative Building (foreground) and MRSD Middle School-High School (background)

In 2020, the Monadnock Regional School Board voted to move forward with a plan to consolidate the two elementary schools in Swanzey into one and renovate the district's three other elementary schools. Cutler Elementary in West Swanzey will be closing and students from this school would attend Mr. Caesar Elementary, which would receive an addition for the additional students. Voters in 2021 approved a warrant article to raise funds for engineering and design work on the consolidation plan. It is anticipated a bond issue for the consolidation plan will go before voters in 2023.

Other Agencies Working with the Town

Swanzey works with many regional, non-profit, and quasi-governmental agencies such as Home Health Care and Community Services (HCS), Southwestern Regional Planning Commission (SWRPC), Southwestern Community Services (SCS), and New Hampshire Municipal Association (NHMA) in such areas as health care, community planning, and affordable housing. The Town should continue to work with and support all outside agencies in the many areas that can benefit Swanzey residents and increase the effectiveness of Town government.

Public Utilities

Water Supply
Swanzey is fortunate to have highly productive aquifers that supplies clean drinking water to residents and businesses. Approximately two-thirds of Swanzey residents rely on private wells. Protecting the Town's groundwater resources is critical to ensure continued access to clean and safe drinking water.

The West Swanzey Water Company is a private company that provides water service to residents and businesses in the Village of West Swanzey. The water company was originally set up to support the Homestead Woolen Mill. The West Swanzey Water Company runs two wells on the west side of Route 10 to support the system.

The North Swanzey Water & Fire Precinct was established in 1936 and provides water service to properties in North Swanzey and along Matthews Road. The Precinct operates under RSA 52 as a Village District and properties within the district boundaries area are taxed at a slightly higher rate than other properties in town to support the Precinct operations. Its boundary lines are determined by the Selectmen.

While the West Swanzey Water Company and the North Swanzey Water & Fire Precinct function independently from the municipal government, the Town works collaboratively with these entities in a number of areas. The Town should continue to work with these entities and develop long-term plans for possible municipal control of these water systems in the event they are transferred to the Town.

Wastewater Treatment
The majority of the homes and businesses in Swanzey are serviced by individual septic systems. The Town has three separate wastewater systems that are overseen by the Sewer Commission, which is comprised of three elected members. The Sewer Commission oversees a full-time plant operated for the West Swanzey wastewater system, a part-time backup operator, and a part-time administrative assistant.

The village of West Swanzey is serviced by an aerated lagoon treatment plant with a design capacity of 160,000 gallons per day. Current flows are in the range of 60,000 to 70,000 gallons per day. A major upgrade to the West Swanzey plant was completed in 2001. Based on current flows and the capacity of the treatment plant, no major improvements are anticipated at this time. However, new requirements from the New Hampshire Department of Environmental Services on phosphorous levels within the treatment system may limit the plant's capacity going forward. The plant is operated by one full-time employee.

North Swanzey is serviced by a collection system and two pump stations. Wastewater in North Swanzey is pumped to the Keene Wastewater Treatment Plant, located on the Dillant-Hopkins Airport property. Swanzey owns 4.7 percent of the capacity of the Keene Plant, for a capacity of 280,000 gallons per day. Currently, the Town only sends approximately 35,000 – 40,000 gallons of wastewater to the Keene Plant per day.

The final system is a pass-through system that connects to the Keene collection system. The pass-through customers include Market Basket supermarket, Winchester Woods Apartments, and residential and commercial customers on Matthews Road and Greenwood Avenue.

One of the main goals of maintaining adequate sewage treatment facilities is to protect the aquifers that exist under much of Swanzey and to avoid pollution of the community's ponds, lakes and rivers. The Town should look to continue to expand the collection system in West Swanzey to take advantage of the excess capacity in the treatment plant. The Town should also continue to expand the system in North Swanzey that is connected to the Keene wastewater treatment facility.

Electricity

The main electricity supplier for the Town is Eversource, which was formerly Public Service of New Hampshire (PSNH). Three-phase power service is currently available in the following select areas in Swanzey:

- Route 10 From Keene city line to Tire Warehouse near Kempton Road
- California Street to Pond View Road
- West Street to Ford Road
- Pine Street/Railroad Street/Main Street/Prospect Street/ Spring Street
- Swanzey Street/South Winchester Street/Denman Thompson/Cobble Hill (to Route 10)
- Summer Street/Holbrook Ave
- Eaton Road (starting at Kendal Lane)
- Safford Drive
- Old Homestead Highway from Keene city line to Blake Road
- Carlton Road/Webber Hill/Flat Roof Mill Road
- Route 12 from Keene city line to Webb Depot Road
- Birch Road
- Lake Street
- Swanzey Factory to Depot Road
- Keene Dillant-Hopkins Airport and Keene Wastewater Treatment Plant

In 2019, the State legislature passed a law that set up a process for municipalities to establish Community Power programs. Community Power refers to aggregation programs where a municipality purchases electricity on behalf of all residential and business customers. Eversource continues to supply electricity and manage billing. One of the benefits of Community Power can be a reduction in utility costs because the town is pooling all customers for more competitive pricing. Other benefits include more local control over the source of electricity and the ability to increase the amount of electricity coming from alternative energy sources. It is recommended that Swanzey consider adopting a Community Power Plan as a way to reduce energy costs for customers and to increase the percentage of electricity used by the community sourced from alternative energy sources.

In March 2021, the Board of Selectmen approved the creation of a Community Power Committee responsible for reviewing different options, drafting a Community Power plan, and

soliciting public input on the community's vision and goals. The Community Power plan would need to be approved by voters at a future Town Meeting before being implemented.

Over recent years, the Town has seen an increase in interest from residents and businesses in installing roof-mounted or ground-mounted solar arrays. In 2019, voters approved a warrant article adopting the provisions in RSA 72:61-64, which provide for a property tax exemption from a property's assessed value for solar energy systems that are intended for use at the site. The Town should continue to support policies and regulations that encourage investment in alternative energy systems by residents and businesses.

Telecommunications Facilities

Federal law regulates the placement of cellular towers in Swanzey. The Telecommunications Act of 1996 preserved state and local regulatory authority for the placement, construction, or modification of wireless facilities. The Town's Zoning Ordinance regulates the siting of telecommunications facilities and the Planning Board has their own site plan review regulations specifically dealing with these facilities. The Town encourages new telecommunications facilities to be located on existing facilities, whenever possible and practicable. The purpose of the Town's regulations are to:

- Preserve the authority of the Town to regulate and provide for reasonable opportunity for the siting of telecommunications facilities.
- Enhance the ability of providers of telecommunications services to provide such services to the community effectively and efficiently.
- Reduce the adverse impacts such facilities may create on, including, but not limited to: aesthetics, environmentally sensitive areas, historically significant locations, health and safety by injurious accidents to person and property, and diminution of property values.

For the community survey question asking residents what they like least about the town and would like to see changed, approximately 42% of respondents indicated that inadequate cell phone coverage was one of their primary concerns. This finding points to the need to support improved cellular facilities in the community while still maintaining regulations that prevent adverse impacts. As cellular technology continues to evolve, the Town and Planning Board should review their regulations to ensure the regulations are being updated as needed.

Broadband

Internet service is currently provided primarily by Consolidated Communications, Spectrum (Charter), WiValley, and HughesNet. There are other providers as well, but these include satellite and cellular companies that have significant download cap limitations. The Town currently has uneven broadband access availability and speeds, especially for customers in more remote areas of the community. An unserved location is defined as not having access to at least 25 Mbps download/3 Mbps upload speeds.

The Town has identified improving broadband coverage as a priority for the community to support residents and for economic development purposes. Approximately 28% of the community survey respondents said that inadequate internet service was one of their primary concerns. In 2020, the Town successfully nominated a community-wide broadband improvement

project to be included in the Southwest New Hampshire Comprehensive Economic Development Strategy (CEDS. The CEDS is developed and approved by the Southwest Region Planning Commission. The inclusion of a priority project in the CEDS can be a requirement for certain federal grant programs.

Community Facilities Goals & Objectives

For a list of the goals, objectives, and action items for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: Provide community facilities and public utilities that adequately support the needs of current and future residents and businesses

- Objective #1: Maintain and upgrade Town facilities and equipment to adequately serve the needs of the public
  - Action 1: Relocate Fire Station #2 from the first floor of Town Hall to a new, modern facility in north/central Swanzey.
  - Action 2: Complete improvements to Town Hall to increase the amount of space for governmental offices, improve layout, and address Building Code issues.
  - Action 3: Position the Carpenter Home to be a community-centered facility.
  - Action 4: Complete improvements to the Public Works facility to address space needs for equipment and vehicle storage and improve administrative office layout.
  - Action 5: Complete upgrades to the Recycling Center to improve site operations and employee work space.
  - Action 6: Support capital reserve funds and other financing mechanisms for the regular updates to Town facilities, equipment, and vehicles to address operational needs and safety.
  - Action 7: Pursue grant opportunities to help support the maintenance and improvement of Town facilities and equipment and defray costs.

- Objective #2: Maintain and upgrade public and private utilities to adequately serve the needs of the public
  - Action 1: Develop a plan for the expansion of the wastewater system in West Swanzey and North Swanzey to support future development.
  - Action 2: Develop long-term plans for possible municipal control of the West Swanzey Water Company and the North Swanzey Water and Fire Precinct.
  - Action 3: Partner with the North Swanzey Water and Fire Precinct on the expansion of water lines to support future development in North Swanzey.
  - Action 4: Review and update the Town's regulations on telecommunication facilities based on changes in cellular technology to ensure the Town is supporting improved cellular coverage while maintaining regulations that prevent adverse impacts.
  - Action 5: Partner with broadband providers to improve broadband services in Town.
  - Action 6: Support efforts to increase the use of roof-mounted and ground-mounted solar arrays and other alternative energy systems for residential and commercial properties.

Historic and Recreational Resources

This chapter addresses the Town's historic and recreational resources, both of which play a significant role in helping to define the community. Residents ranked "rural character" and "small town atmosphere" as two of the top reasons why they chose to live in Swanzey and preserving the Town's history is important for maintaining the community's character. Heightened awareness and appreciation of the history of Swanzey helps efforts to preserve historic structures and neighborhoods along with working rural landscapes.

Along with rural character, the environment also ranked within the top choices of why residents have chosen to live in Swanzey. The community survey showed that residents take advantage of and appreciate the many recreational opportunities associated with local natural resources, including hiking, canoeing, kayaking, and fishing. The Master Plan includes a separate chapter devoted to protecting natural resources and this chapter addresses the recreational activities associated with these natural areas in town.

Historical Resources

The Town of Swanzey was settled in the 1730s at the same time the City of Keene was originally laid out. Swanzey was not officially chartered until 1753. At that time, Swanzey was known as Lower Ashuelot and Keene was called Upper Ashuelot. Prior to European settlement in the Colonial era, the Abenaki and Pequot people lived in the region for thousands of years and evidence from indigenous settlements have been found in Swanzey along the Ashuelot River.

The original town center was sited in what is today known as Swanzey Center, taking advantage of the Ashuelot River valley and associated farmland. By the end of the 18th century the town's population had grown to roughly 1,200. Swanzey Center continued to be the hub for government and religious activities into the 19th and 20th centuries, but the villages of West Swanzey and East Swanzey saw more population growth during this time as a result of industries being developed on the Ashuelot River and the South Branch Ashuelot River.

Manufacturing saw significant growth in particular in the village of West Swanzey beginning in the 1850s with the arrival of the Ashuelot Railroad. The railroad corridor helped attract other industrial activities that did not have to rely on the water power provided by the Ashuelot River. By the 1880s, West Swanzey was home to a woolen mill, two wooden box companies, two companies manufacturing buckets and pails, and a grist mill. Many of the historic residences and civic and religious buildings in West Swanzey were built during this era. Evidence of historic manufacturing activities and associated housing built during this era can still be seen in the villages of East Swanzey and North Swanzey as well. The following is a summary of some of the more prominent historic buildings, landmarks, and districts in the Town of Swanzey:

Whitcomb Hall

Whitcomb Hall is a 1916 Greek Revival-style building located on Main Street in West Swanzey that was built by local mill owner, George Whitcomb. For over 70 years, the building hosted many community activities, such as community suppers, union meetings, voting, and school plays. In 1988, Whitcomb Hall was closed due to building and fire code violations. In 2013,

concerned residents initiated the "Rebuild a Hall" campaign to rehabilitate the structure and completed Phase 1 in 2016. The first phase included opening the first floor of the building for public use and completing kitchen and restroom upgrades. A fund drive was initiated by Swanzey residents raising six-hundred thousand dollars which, along with a grant from the New Hampshire Land and Community Heritage Investment Program (LCHIP), was used to restore the second floor on 2018. The second floor of the building includes a large hall, stage, and balcony. In 2020, the second floor was open to public use. Today, Whitcomb Hall is used by the Town for public meetings and is also rented out for private events.

Whitcomb Hall

Golden Rod Grange Hall

The Golden Rod Grange Hall, built in 1916, is one of a group of historic buildings that date from the nineteenth and early twentieth centuries and make up the village of Swanzey Center. The Grange building is a rectangular, two-story building with clapboarded siding and a gable roof. The interior of the building included features commonly associated with Grange activities: a lodge room with a stage for presentations; a dining hall; and a kitchen. During the twentieth century, the building played an important role in supporting the local agricultural community and hosted agricultural fairs, Sunday Socials, church meetings, and the Old Homestead suppers, which fed 10,000 people through the years including 29 New Hampshire Governors.



Golden Rod Grange Hall

In 1992, the Swanzey Preservation Society was formed to work on the preservation of the Grange and to foster a broader appreciation of the history and heritage of the Town. A number of improvements were made to the building beginning in the mid-1990s, including foundation improvements, construction of an addition to provide an entrance, electrical updates, and replacing the building roof. In 2020, the Town had a Historic Building Assessment completed that looked at existing conditions and recommendations for rehabilitation. The Town is currently reviewing the report and determining next steps for the use of the Grange Hall, which is on the National Register of Historic Places.

West Swanzey Historic District

Whitcomb Hall anchors the larger West Swanzey Historic District. Other prominent civic historical buildings in this area include the Stratton Free Library on Main Street and the Stratton/Cutler School on South Winchester Street. There are also a number of notable historic residential properties such as Stratton Family residences at 12, 18, 27, and 33 Main Street, the H. Denman Thompson House at 45 Homestead Avenue, and the Orramon Snow house at 24 Railroad Street. Many of these historic residential homes have been preserved and maintained and greatly add to the rich character of West Swanzey.



Historic Buildings on Main Street, West Swanzey

Swanzey Civic Historic District

The Golden Rod Grange Hall is one of several buildings that make up the Swanzey Civic Historic District. All of the buildings are grouped around the historic intersection of Sawyers Crossing Road and Old Homestead Highway. In addition to the Grange, the other properties that make up the district include: Mt. Caesar Elementary School, Monadnock Regional Middle-High School, the Wilcox School, the administrative office building of the Monadnock Regional School District, Mount Caesar Union Library, Mount Caesar Cemetery, Town Hall, the Carpenter Home, and the Potash Bowl. Further south and north of the district are several prominent historic residences that help define a broader Swanzey Center Historic District.

Covered Bridges
There are four covered bridges located in the community: Carleton Covered Bridge in East Swanzey, Cresson Covered Bridge in Swanzey Center, Slate Covered Bridge in Westport, and Thompson Covered Bridge in West Swanzey. All four bridged are listed in the National Register of Historic Places.

Swanzey Historical Museum
The Swanzey Historical Museum originated with an interest to salvage and preserve a horse-drawn, steam-powered fire pumper, which served Swanzey in the early part of the 20th century. A fund-raising effort in the 1980s generated support to build a free-standing museum building on Route 10 to accommodate the restored fire pumper and many other Swanzey artifacts and documents. The Historical Museum maintains an accessible schedule during three seasons of the year, staffed entirely by volunteers. The goal of the Museum is the preservation of the primary materials of Swanzey history.

Swanzey Old Home Day
Old Home Day is an annual celebration of Swanzey's history and traditions that is held in Swanzey Center in July. The Town has created an Old Home Day Committee that helps organize this event each year.

Recreational Resources
The Town's recreational resources include facilities, open spaces, and natural areas. These amenities support active and passive recreational opportunities for community members. In addition, the Town provides recreational program activities for all ages. The following is a summary of municipal recreational facilities:

Richardson Park
Richardson Park is located on the east shore of Swanzey Lake and includes a public beach and recreational building. The public beach is limited to Swanzey residents only. The recreational building includes restroom facilities and a snack bar. During the summer months, the building is used for a Town-run youth camp.


Richardson Park

The building is in need of extensive renovations, including new restrooms and the Town is currently in the process of having upgrades completed. The building has excellent potential to be used for additional activities, such as meetings, workshops community events, and social gatherings. The Town should continue to budget for improvements for this facility in the capital improvements program.

Wilson Pond Beach
The Town maintains a public beach and boat launch on the southwestern shore of Wilson Pond off of Old Homestead Highway. The site includes a parking area, but no additional facilities. In addition to boating and swimming, the site is also used for fishing during the summer months and is an access point for ice fishing in the winter.

Lane Field
Lane Field is located on South Road in East Swanzey. The athletic fields are comprised of approximately 10 acres. The facility includes several baseball diamonds, playground equipment, and a pavilion. The Town currently partners with the Cal Ripken Baseball League for the use of the field during the summer season.

Brown Field
Brown Field is located in West Swanzey off of Route 10 and is adjacent to Cutler Elementary School and the Swanzey Historical Museum. The athletic field is approximately 9 acres in size and includes two softball diamonds and a food concession stand. In the past, the Town has set up a temporary ice rink in the parking lot at the site. The concession stand is currently unused because of several Building Code issues that need to be addressed.

West Swanzey AA Memorial Park
The AA Memorial Park is located in the village of West Swanzey on the west side of the Ashuelot River immediately north of the Thompson Covered Bridge. The Town acquired the property in 2014 and removed an existing building to create a recreational area. Current park amenities include a gazebo, benches, and grilling area. There is also a stairway that provides access to the river, but which is in need of repair.

In 2020, the Town was awarded a grant from the Land and Water Conservation Fund to complete improvements to the park, which will include a community pavilion, improved public access to the river for boat launching, and a half basketball court. The Town has contracted with an engineering firm to design the improvements and the project is anticipated to be constructed in 2021. There are additional improvements the Town may wish to consider for the park in the future, including the possible acquisition of additional land along the riverbank to the north in order to expand the size of the park.

Monadock Regional School District Facilities
The Monadnock Regional School District facilities include recreational amenities available for public use. These include playgrounds, athletic fields, tennis courts, and a track at the Regional High-Middle School.

Open Space and Natural Areas

There are numerous open space and natural areas in Swanzey that provide opportunities for hiking, running, skiing, snowshoeing, boating, hunting, fishing, and other activities. These include areas that are owned and maintained by the Town and private lands that are accessible to the public with easements. Some Town-owned land and Yale Forest is not permanently protected from development. The following is a summary of open space and natural areas in Swanzey that offer recreational opportunities for the public:

- Lakes and Ponds
  - Swanzey Lake: Richardson Park; public boat launch on south side of lake
  - Wilson Pond: public beach and boat launch on southwestern shore of pond
- Rivers and Streams
  - Ashuelot River: public boat launches at Cresson Bridge, West Swanzey AA Memorial Park, and off Route 10 at Winchester Town line
  - South Branch Ashuelot River
  - West Brook
- Open Space and Conservation Land
  - Mt. Caesar: 220-acre Town-owned property with several hiking trails located off of Old Homestead Highway
  - Carrol's Hill: 61-acre private property with a conservation easement allowing for public access (Monadnock Conservancy). Property is located on Westbrook Court and includes a 1-mile trail to a scenic overlook.
  - Mt. Cresson: 142-acre Town Forest land located off of Matthews Road. Property includes a 1.25 mile loop trail to the summit.
  - Muster Field property: 13-acre Town-owned property with frontage along the Ashuelot River and accessed from Pine Street.
  - Dickinson Memorial Forest: 70-acre parcel located adjacent to the Muster Field property and managed by the Society for the protection of New Hampshire Forests. Property is open to the public, but has limited access.
  - Horatio Colony Nature Preserve: This preserve is primarily located in Keene, but includes approximately 300 acres in Swanzey. The preserve can be accessed off Daniels Hills Road in Keene and by foot at the end of Forest Road in Swanzey.
  - Honey Hill: 122-Acre private property with easement allowing public access. The property includes a loop trail to the summit. Property is accessed off Old Homestead Highway via adjacent Town property.
  - Hewes Hill: 156-Acre private property with easement allowing public access. The property includes a trail to a 40-ton boulder known as "Tippin Rock." Property is accessed off Warmac Road.
  - Ashuelot and Cheshire Rail Trails
  - Gordon and Persis Brown Forest (easement)
  - Yale Tourney Forest is 1.930 acres in Keene and Swanzey, open to the public but not permanently protected from development.

Recreational Programming
Swanzey residents benefit from community recreation programming provided by part-time staff and volunteers. Most activities have been held in the summer months and are focused on children. The Town currently offers the following programs:

- Youth summer day camp at Richardson Park
- Soccer league
- Basketball
- Kickball
- Seasonal community events

The Town would benefit from providing more programming and facilities that are accessible to all age groups. Most of the programming offered currently serves Swanzey children. As noted in the Population & Housing Chapter, Swanzey's population is ageing and there is a need to offer more programs that encourage physical activity and social interaction for the elderly population. Swanzey benefits from being in a region with a wealth of local non-profit organizations that it could partner with to provide this type of programming as well.

Recreation Advisory Committee
The Recreation Advisory Committee is charged with researching, advising, and making recommendations to the Board of Selectmen on the future of the Recreation Department (all final decision making authority shall be retained by the Board of Selectmen), including the following:

- Serve as a sounding board, advisory panel and volunteers for the Recreation Director.
- Recommend the utilization of all Town recreation property.
- Assist in formulating a Town recreation master plan.
- Assist in providing recreation programs for the citizens of Swanzey.
- Assist in the preparation of the Recreation Department operating budget and capital improvement budget requests.
- Recommend the acquisition and development of recreation property facilities, and equipment.
- Cooperate with private groups and public officials in the development and promotion of recreation property.
- Make recommendations regarding a system of fees and charges for the use of Town recreation facilities and for participation in recreation programs.

Historic and Recreational Resources Goals & Objectives

For a list of the goals, objectives, and action items for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: Preserve, protect, and promote Swanzey's historical and recreational resources.

- Objective #1: Preserve and protect historic buildings, landmarks, and districts in Swanzey.
  - Action 1: Create a Heritage Commission having advisory and review authority regarding local cultural and historic resources.

- Action 2: Consider the creation of Historic Districts in Swanzey where appropriate.
- Action 3: Support existing efforts of the Swanzey Preservation Society, Library Trustees, and other community groups to preserve historic structures in town.
- Action 4: Develop and implement a plan for the future use of the Golden Rod Grange Hall property.
- Action 5: Ensure for the ongoing maintenance of Whitcomb Hall through the Capital Improvement Plan.

- Objective #2: Increase awareness and appreciation of Swanzey's historical resources.
  - Action 1: Use the Town's website as a resource for information on the Town's history, historic buildings, and historic districts.
  - Action 2: Consider offering walking tours of historic districts and providing open houses for municipal historical buildings.
  - Action 3: Consider installing interpretive signs and markers for historic building and other landmarks in Town.

- Objective #3: Establish and expand recreational opportunities for all age segments of the Swanzey population
  - Action 1: Complete improvements at Richardson Park to address building code and safety concerns.
  - Action 2: Develop a Recreation Plan that encourages healthful, positive experiences in Swanzey for residents of all ages and ability.
  - Action 3: Explore partnership opportunities with local non-profit organizations and other municipalities to increase programming options for Swanzey residents.
  - Action 4: Develop a plan to ensure trails on town-owned properties are regularly maintained.
  - Action 5: Maintain and improve boat launches on the Ashuelot River.
  - Action 6: Work with the Conservation Commission to identify land that might be put to recreational purposes, including town-owned properties and private properties with easements.
  - Action 7: Support the Conservation Commission in its monitoring of wetlands and open spaces on town-owned property.

- Objective #4: Promote and market recreational opportunities in the community.
  - Action 1: Update trail maps and distribute on Town's website, Town Hall, and at trail heads.
  - Action 2: Create a town-wide recreational map that includes hiking trails, recreational trails, boat launches, and fishing areas.
  - Action 3: Market recreational programming opportunities and promote programming provided by private non-profit organizations in the area.

Economic Development

The goal of economic development is to improve the well-being and resilience of a community. This is accomplished through programs and policies that help grow local wealth, diversify the economy, create and retain jobs, and expand the property tax base.

The Town believes in focusing on an asset-based approach to economic development that builds on local resources such as existing infrastructure, historic, cultural, and natural resources, industry clusters, and human capital. The success of any economic development strategy is closely linked to the goals and policies of the other chapters in the Master Plan, most notably land use, housing, transportation, community facilities/utilities, and natural resources. A community must pay attention to and invest in all of these different components to support a strong local economy.

Like many communities in New Hampshire, Swanzey's economic history is strongly connected to its natural resources. Since its founding, agriculture and industry anchored along local waterways defined commerce in Swanzey. Each of the original villages in the community had a principal industry or commercial enterprise. West Swanzey had the Homestead Woolen Mill and all of the ancillary businesses that supported it. East Swanzey had a bucket mill and the sawmill and logging operations to support it. North Swanzey had a chair factory and a vertically integrated dairy products operation and two hydroelectric plants. Finally, Westport had a rail depot and store.

In the 1950s and 1960s, the composition of local businesses began to shift as many of these historic industries began to restructure or cease operations. The community also began to see significant growth in its residential population at this time that corresponded with overall growth in Cheshire County and in particular the City of Keene. Today, Swanzey is home to a more diversified economy that includes manufacturing, professional offices, service trades, technology, retail, health care, automobile dealerships, and food processing businesses, as well as many long-term agricultural, lumbering, and construction businesses.

The results of the community survey completed for this Master Plan update indicate areas where improvements are needed in terms of economic development. Most notably, residents expressed a desire for more retail, commercial, and entertainment establishments in Swanzey. A lack of quality local employment options was also ranked high. In terms of utility services, residents noted areas of inadequate internet service and cell phone coverage as a problem, which may also be a deterrent for business development in underserved portions of the town.

Existing Conditions

The following section provides an overview of existing economic conditions in the Town of Swanzey. The most current U.S. Census data from 2012 estimated there were a total of 666 firms doing business in Swanzey. More recent data from the Census reported 1,882 jobs in the

community in 2017. As discussed in the Land Use chapter, the primary commercial and industrial areas in Swanzey are clustered around the Route 10, Route 12, and Route 32 (Old Homestead Highway) corridors. The villages of West Swanzey and North Swanzey along and immediately next to Routes 10 and 12 are also other areas with a significant number of local businesses. The following table shows the largest businesses in the community based on Town records. The largest sectors include government and education (Monadnock Regional School District, Town of Swanzey), retail services (Market Basket, Fenton Family Dealerships), and manufacturing (Nanotech, Mold Pro, and Port-O-Lite).

Large Employers in Swanzey	**Product/Service**
Monadnock Regional School District	Education
Fenton Family Dealerships	Automobile dealership
Market Basket	Supermarket
Nanotech	Precision machining systems
Mold Pro	Thermoplastic injection molding
Town of Swanzey	Municipal services
Powers Generator Service	Generator sales, service, installation
Keene Gas/Titan Propane	Propane sales, service
Port-O-Lite	Millwork
First Student	Bus transportation
Carlisle Wide Plank Flooring	Hardwood flooring

The local labor force in 2017 was comprised of 3,974 residents, which represented approximately 68 percent of the population aged 16 years or older. The following table shows the labor force by occupation type as of 2017. The largest occupation type for Swanzey residents is management, business, science, and art. Generally, this sector provides higher paying jobs. Service and sales occupations combined account for 36% of the labor force. Unfortunately, these occupations are typically some of the lower paying occupations.

Labor Force by Occupation (2017)

	Total Number of Employees	**Percentage of Labor Force**
Management, Business, Science and Art	1,459	37%
Service Occupations	541	14%
Sales Occupation	881	22%
Natural Resources, Construction and Maintenance	447	11%
Production, Transportation and Material Moving	646	16%
Total Labor Force	**3,974**	--

Source: US Census

Between 2000 and 2018, median household income for Swanzey residents increased by approximately 28 percent, which is generally consistent with the increase seen in Cheshire County as a whole. However, Swanzey and the region lagged in terms of household income growth as compared to the State of New Hampshire, which saw an increase of approximately 34 percent during this same time period. Median household income is a useful way to understand how much income residents have to spend on goods and services in the community and in turn support local businesses and the jobs that they provide.

Median Household Income

	2000	2010	2018	Percent Change (2000 – 2018)
Swanzey	$44,819	$52,053	$62,226	28%
Cheshire County	$42,382	$48,030	$59,186	28%
New Hampshire	$49,467	$63,277	$74,991	34%

Source: US Census

The following table shows the educational attainment for residents aged 25 or older as compared to Cheshire County and New Hampshire. The percentage of residents with a college degree or advanced degree is slightly below the Cheshire County average and even further below the state-wide average. There is a direct correlation between educational attainment and an individual's earnings potential and efforts could be made to encourage additional education and training through local institutions such as Keene State College, River Valley Community College, and Antioch University.

Educational Attainment for Residents Aged 25 or Older (2018)

	Swanzey		Cheshire County		New Hampshire	
	Total	Pct	Total	Pct	Total	Pct
Less than High School	502	9.4%	3,713	7.0%	66,510	6.9%
High School Graduate	1,951	36.6%	16,625	31.3%	269,202	27.7%
Some College or Associates Degree	1,532	28.8%	15,407	29.1%	277,457	28.6%
Bachelor's or Similar Degree	820	15.4%	10,349	19.5%	217,282	22.4%
Graduate or Professional	523	9.8%	6,939	13.1%	140,297	14.5%

Source: US Census

The following table provides the unemployment rate for Cheshire County, New Hampshire, and the United States over the past 5 years. Unemployment data specifically for the Town of Swanzey is not available, however the data for Cheshire County still provides a good sense of employment trends in our community.

Unemployment Rate

	2015	2016	2017	2018	2019
Cheshire County	3.2	2.7	2.6	2.6	2.6
New Hampshire	3.4	2.9	2.7	2.6	2.5
United States	5.3	4.9	4.4	3.9	3.7

Source: Bureau of Labor Statistics

Since 2015, New Hampshire has ranked in the top 5 states in the country in terms of the lowest unemployment rates. Cheshire County has trended consistently with the State, with some years having lower unemployment rates. While low rates indicate the local workforce is able to find job opportunities, they can also point to businesses having challenges filling vacant positions.

Land Valuation and Tax Rates

The Town completed a property reassessment in 2019 that resulted in an increase in the total land valuation to just over $600 million. Commercial and industrial properties account for approximately 10 percent of this total land value at $51,202,245. While these properties account for 10 percent of the land value in the community, they comprise approximately 7 percent of the total land area in Swanzey. This figure points to the importance of developing and sustaining a strong commercial and industrial sector in the community to support the overall tax base.

The following table provides information on annual local taxes over the past 10 years. The total tax rate is a combination of the municipal rate, Cheshire County rate, and the State and local education taxes. The community has sustained competitive tax rates over the years with an emphasis on fiscal responsibility.

Year	Total Land Valuation	Municipal Rate	County Rate	State Education	Local Education	Total Rate
2010	$580,079,144.00	$4.80	$3.02	$2.29	$14.37	$24.48
2011	$584,690,407.00	$4.95	$3.28	$2.31	$14.75	$25.29
2012	$585,861,401.00	$5.30	$3.06	$2.41	$13.19	$23.96
2013	$585,308,090.00	$5.28	$3.10	$2.28	$14.71	$25.37
2014	$540,475,297.00	$5.45	$3.37	$2.49	$15.01	$26.32
2015	$520,842,928.00	$5.90	$3.45	$2.39	$14.84	$26.58
2016	$519,845,155.00	$6.06	$3.50	$2.41	$16.90	$28.87
2017	$525,988,514.00	$6.16	$3.65	$2.27	$16.08	$28.16
2018	$527,433,556.00	$6.14	$4.18	$2.29	$17.08	$29.69
2019	$600,857,221.00	$5.80	$3.69	$2.00	$14.27	$25.76

Source: NH DRA

Land Use and Development Regulations

The Town's Zoning Ordinance provides for business opportunities in several zoning districts in the community: Business District, Commercial/Industrial District, Industrial Park District, Village Business District I, and Village Business District II.

- *Business District*: This district is intended to provide for the development of commercial uses that are oriented to the travelling public or are traffic generators of such size as to be more properly located on an accessible highway network. The Business District is located in several areas of the community including along Route 12, Route 32, Route 10, and Flat Roof Mill Road.
- *Commercial/Industrial District*: Located along Route 10 between the Keene city line and Forest Avenue, this district encourages general commercial and industrial development while minimizing strip development.
- *Industrial Park District*: Located along Safford Drive between Route 12 and Route 32, this district allows industrial activities in a park like setting. The district excludes service operations and retail activities unless accessory to a permitted use.
- *Village Business District I*: Located in the historic village of West Swanzey this district covers a compact area and is meant to encourage commercial and business uses that support the surrounding residential community. In addition, the Zoning Ordinance includes provisions to allow for the development of businesses more oriented to the roads and highways within the district.
- *Village Business District II*: Located in the historic village of West Swanzey this district covers the former Homestead Woolen Mill property. The district is similar to Village Business District I, but allows for a greater variety of commercial and industrial uses.

The Town has adopted Site Plan Review Regulations that govern the development and expansion of non-residential uses and multi-family residential dwellings. Most commercial projects that include new construction or an expansion are subject to Site Plan Review by the Swanzey Planning Board. The purpose of the regulations is to provide for safe and attractive development and guard against any conditions that would injure the health, safety, or prosperity of the community. The Site Plan Review regulations address specifically traffic and circulation, landscaping and screening, lighting, architectural design, and storm water drainage. In addition, the Planning Board has adopted Subdivision Regulations for development projects that require the subdivision of land. These regulations ensure that minimum standards are met in terms of the design of roadways and other public improvements.

Existing Municipal Economic Development Programs

The Town has adopted several economic development programs that help support its business community and encourage future development. These include a Tax Increment Financing District, Economic Revitalization Zones, and a Commercial and Industrial New Construction Tax Exemption.

Tax Increment Financing (TIF) is a tool that is used by municipalities to help stimulate economic growth in a specific geographical area. TIFs are used to finance public infrastructure projects using the anticipated increase in future property tax revenue that results from new development to pay off bonds. The Town currently has one authorized TIF District that encompasses 155 acres of land along Safford Drive between Routes 12 and 32. The District was originally authorized by voters in 1999 to facilitate business development in the Industrial Park District. Since that time, the Town has used TIF bonds to extend Safford Drive and connect Routes 12 and 32, and to construct sewer and water infrastructure. The Town has seen new development and redevelopment in the TIF District and surrounding areas as a result of this public investment, including the Moore Nanotechnology manufacturing company and at the Airport Business Center.

The Economic Revitalization Zone (ERZ) program offers short-term State business tax credits for projects that improve infrastructure and create jobs in designated areas of a municipality. ERZs are approved by the State of New Hampshire based on an application submitted by a municipality. The State law governing ERZs was amended in 2020 to extend this economic development program through the end of 2027. To qualify for the program, a business must demonstrate it has created at least one new full time job as a result of a new investment. The community benefits from this program as it helps expand the job base and in many cases increases property tax values. Swanzey currently has three designated ERZs: the area encompassing the Safford Drive TIF District, the Homestead Woolen Mills District in West Swanzey, and the entirety of the Keen Dillant-Hopkins Airport.

In 2020, Town voters approved the creation of a property tax exemption program for new commercial and industrial construction as allowed under NH RSA 72:81. This exemption applies only to the increase in property value associated with the new investment and only applies to municipal and local school property taxes. State education and county taxes are excluded from

the exemption. The Board of Selectmen is authorized to grant an exemption for a maximum of 50 percent of the increase in assessed value resulting from the improvement for a maximum period of 10 years. The percentage and duration of the exemption is granted on a per case basis based on the amount and value of the public benefit provided, as determined by the Board of Selectmen. In order to satisfy the public benefit requirement a minimum of one of the benefits listed below must be demonstrated:

1. Enhance economic growth and increase the Town's tax base
2. Creation of needed services or facilities not currently available in the Town
3. Redevelop and revitalize commercial or industrial area
4. Retain local jobs, increase local job base, and/or provide diversity in the job base

Public Infrastructure

Public infrastructure is critical in supporting businesses and stimulating economic growth. Swanzey benefits from having three State highways (Routes 10, 12, and 32) that traverse the community and provide easy connections to the larger State and Federal highway system. In 2018, the community began a process of assessing the condition of municipal roads and adopted a long-term plan for improving roads, including passing a $3 million bond in 2019 specifically for road reconstruction. Additional information on road infrastructure can be found in the Transportation Chapter of this Master Plan.

Water and sewer infrastructure in Swanzey is largely limited to North Swanzey, the village of West Swanzey, and along a short segment of Route 10 immediately south of the City of Keene municipal boundary. Water service in the village of West Swanzey is provided by the West Swanzey Water Company, a private entity that the municipality does not control. The lack of water and sewer infrastructure in the remaining areas of the community presents a limitation to new business development and the expansion of existing businesses, in particular in regards to water requirements for fire suppression.

Broadband internet is playing an increasingly important role in supporting local economic development. Fast and reliable internet is a minimum requirement for businesses as well as individuals who may be working remotely out of their homes. Further, broadband availability and speed is often a deciding factor for those considering purchasing a home in a community. As people's lives and the economy shift more and more to being online, communities that have comprehensive and reliable broadband service will be at a competitive advantage compared to their peers who do not have this infrastructure in place.

In 2020, the Town nominated and was successful in including three additional projects in the Southwest New Hampshire Comprehensive Economic Development Strategy (CEDS): a proposed West Swanzey water and sewer infrastructure improvement project, a fire pond project to improve fire suppression capacity for commercial properties, and a community-wide broadband improvement project. The CEDS is developed and approved by the Southwest Region Planning Commission. The inclusion of a priority project in the CEDS can be a requirement for certain federal grant programs.

Keene Dillant-Hopkins Airport

The Dillant-Hopkins Airport is located in North Swanzey and owned and operated by the City of Keene. The airport provides professional regional airport services and is less than an hour by air from all of the major commercial centers in the Northeast region, including Boston and New York City. Many local companies in the Monadnock Region regularly use the airport and this facility is a critical piece for the region's infrastructure.

The City of Keene has also established an Airport Development and Marketing Committee to take a proactive role in the development of the airport through the Airport Master Plan. The Airport Master Plan addresses development potential at the airport itself as well as adjacent land that would be suitable for business development. The Town of Swanzey is an active partner in collaborating with the City of Keene in implementing the Airport Master Plan.

Economic Development Advisory Committee

The Board of Selectmen formed an Economic Development Advisory Committee (EDAC) to provide input and advice to the Board on matters relating to economic development and to develop strategies to promote the Town. Specifically, the Board of Selectmen has tasked EDAC with the following responsibilities:

- Inventory businesses and seek ways the Town can support and encourage existing businesses to grow and recommend strategies to attract new economic activity.
- Inventory available properties and opportunities for economic development and develop recommendations on how to promote those properties and employment opportunities.
- Support Swanzey's community brand and strengthen our Town's identity in the region and state.

Current EDAC initiatives include acting as the Town's promotional agent for development of industrial/commercial properties in North Swanzey, including branding it as the Southwest NH Enterprise Zone. EDAC is currently comprised of up to seven residents.

Economic Development Partners

Many of the economic development initiatives undertaken by the Town are done in collaboration with local, regional, state and federal partners. Recognizing that many of the economic issues that Swanzey faces span municipal boundaries, the community has recognized the value these partnerships.

At the local and regional level, Swanzey has partnered with the towns of Hinsdale and Winchester in the past on efforts to market available properties in these three communities. Swanzey regularly works with the City of Keene on development issues related to the airport, the regional recreational rail trails that traverse both of our communities, transportation issues, and other related matters.

Swanzey is a member town of the Southwest Region Planning Commission (SWRPC), which includes a major work program in the area of community and economic development. The SWRPC's Economic Development Advisory Committee includes a representative from the Town of Swanzey. Another regional entity the Town collaborates with is the Monadnock Economic Development Corporation, which works to facilitate large public and private projects in the Monadnock region.

At the State level, the Town works with staff at the Department of Business and Economic Affairs on completing business visits and connecting local businesses to State resources.

Economic Development Goals & Objectives

For a complete list of the economic development goals and objectives for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: Provide a balance of business opportunities that meet the retail, service, and employment needs at a scale appropriate for the Town

- Objective #1: Provide the necessary infrastructure to support and grow the business community
    - Action 1: Review the needs of businesses for additional infrastructure, such as 3-phase power, broadband, public water, and public sewer
    - Action 2: Update CIP to plan and budget for public infrastructure to meet the needs of current and future businesses
    - Action 3: Develop a strategy for the use of Tax Increment Financing to construct public infrastructure to support private development
    - Action 4: Review existing broadband coverage and develop and implement a plan for improving local service

- Objective #2: Plan for a diverse mix of commercial and industrial uses
    - Action 1: Explore options for commercial nodal development and infill development opportunities along NH 10 and NH 12
    - Action 2: Review current ordinances and regulations to reduce impediments to business development
    - Action 3: Review current zoning to ensure adequate land area is zoned for commercial and industrial uses and in appropriate locations
    - Action 4: Develop a plan for expanding existing and establishing new Economic Revitalization Zones
    - Action 5: Promote the Town's New Commercial and Industrial Construction Exemption program

- Objective #3: Retain and expand the local workforce
    - Action 1: Partner with local businesses and higher education institutions to support job training programs for advanced manufacturing and other sectors
    - Action 2: Encourage opportunities for entrepreneurship, including home-based businesses
    - Action 3: Develop and implement a Business Retention and Expansion Program

- Objective #4: Market the Town's advantages and amenities to prospective businesses
    - Action 1: Update the Town's website to highlight the advantages of doing business and Swanzey and local amenities

    - Action 2: Collaborate with the NH Department of Business and Economic Affairs to recruit businesses to Swanzey and market available State resources

- Objective #5: Collaborate with local partners to improve the regional business environment
    - Action 1: Participate in economic development planning efforts led by Southwest Region Planning Commission and the Greater Keene Chamber of Commerce to improve regional business conditions
    - Action 2: Partner with adjacent municipalities on mutually beneficial public infrastructure and facilities projects

Land Use

The Land Use chapter of the Master Plan provides an overview of how the Town's land is currently being used and gives recommendations on how land use patterns should change in the future given the community's vision and goals. The Land Use chapter also examines anticipated growth in terms of additional housing units as well as commercial development and provides guidance on where this growth should occur. The objectives and goals in the Land Use chapter are primarily implemented through the Town's Zoning Ordinance, the Planning Board's Site Plan Review and Subdivision Regulations, and the Capital Improvement Program.This chapter is located towards the end of the Master Plan because it brings together all of the other components of the plan to make the most informed decisions about future land use patterns. For the purposes of this plan, future land use is forecasted out for a period of approximately 5 – 10 years.

As a way to help organize this chapter, the Master Plan takes a neighborhood-based approach to reviewing existing land use patterns and making recommendations for possible changes. The chapter is organized around existing population centers, commercial corridors, and remaining rural areas. Swanzey is comprised of five distinct population centers: Swanzey Center, West Swanzey, North Swanzey, East Swanzey, and Westport Village. The commercial corridors along Route 10 and Route 12 are also defining features in the Town and warrant special consideration in terms of land use. Outside of these historic settlement areas, the community is largely rural with single-family homes, farmland, and forestland.

Based on the Town's assessing records, 37 percent of the community's total land area is occupied by residential uses on approximately 3,100 separate lots. Looking specifically at these residential uses, single-family dwellings make up the vast majority comprising 2,968 properties. Commercial and industrial uses comprise 7 percent of the total land area on 321 parcels and public exempt properties (including municipal, state, and federal land) cover 6.7 percent of land area on 177 parcels. The remaining land area, comprising approximately 50 percent of the community, is comprised of managed and unmanaged forests, farmland, and wetlands.

Land Use	Lots	Acres	Pct of Total Land Area
Single-Family Residential	2,986	9,579	35.0%
Multi-Family Residential (2-family or more)	171	711	2.6%
Commercial & Industrial	321	1,922	7.0%
Farmland	23	639	2.3%
Forest and Wetlands	320	12,647	46.3%
Public & Institutional	177	1,835	6.7%
Total	3,998	27,333	--

The Existing Land Use Map on the following page shows the location of the different land uses in the community and should be used for reference while reviewing the Land Use chapter.

TOWN OF

SWANZEY

NEW HAMPSHIRE

EXISTING LAND USE MAP

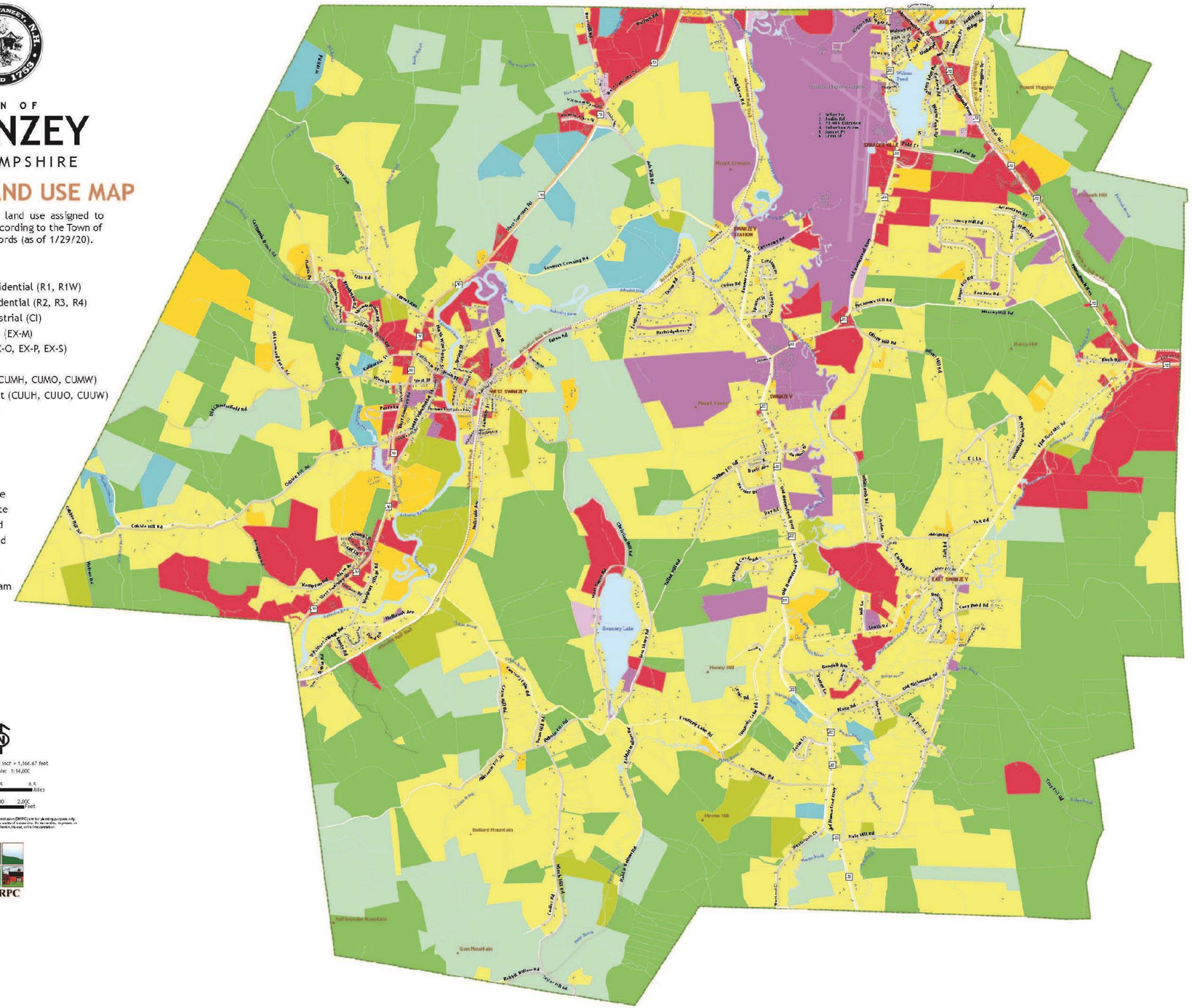
The map depicts the land use assigned to each parcel of land according to the Town of Swanzey assessing records (as of 1/29/20).

Description (Codes)

- Single Family Residential (R1, R1W)
- Multi-Family Residential (R2, R3, R4)
- Commercial/Industrial (CI)
- Municipal Exempt (EX-M)
- Other Exempt (EX-O, EX-P, EX-S)
- Farmland (CUFL)
- Managed Forest (CUMH, CUMO, CUMW)
- Unmanaged Forest (CUUH, CUUO, CUUW)
- Wetlands (CUWL)

Other Features

- Rail Trail
- Class I State Route
- Class II State Route
- Class V Town Road
- Class VI Town Road
- Private Road
- Perennial Stream
- Intermittent Stream



Relative Scale: 1 inch = 1,166.67 feet
Absolute Scale: 1:14,000

0 0.25 0.5 Miles

0 1,000 2,000 Feet

Data prepared by Southwest Region Planning Commission (SWRPC) are for planning purposes only. SWRPC warrants that data collected from multiple sources, of various scales of accuracy, for various months, may have been compiled, are provided on the data herein is based, and is interpretive.

SWRPC

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Based on the Master Plan community survey, residents indicated they appreciate Swanzey's small town atmosphere and rural character and would like to see these characteristics preserved. Residents also noted that they would like to see more employment, retail, commercial, and entertainments opportunities in town. This points to a desire to see a balanced approach to growth in the community that works to preserve existing natural resources and historic settlement patterns while also encouraging development in appropriate areas that meets the needs of current and future community members. Another question in the survey supports this conclusion as it found a clear majority of respondents wanted the town to prioritize a balance of open space, commercial/industrial development, and residential development going forward. This dedication to providing diverse land use types is important in supporting and sustaining a complete community that is attractive to a wide variety of residents, businesses, and visitors.

For residential uses, survey respondents were most in favor of seeing more single-family residential development. However, there was also support for more senior housing and condo/town home opportunities given the ageing demographics of the town and region. Condo and town home developments also provide housing opportunities for young professionals looking for entry-level home ownership opportunities. Respondents also indicated interest in cluster developments that preserve open space and allow for smaller lot sizes, accessory dwelling units, and mixed commercial/residential developments in business districts. Investing in a variety of housing choices makes sense for the community in order to attract new residents, ensure existing residents have other housing opportunities, and providing housing that is affordable.

In terms of commercial uses, survey respondents were most supportive of lower-impact businesses. Sit down restaurants, small retail stores, and professional offices all ranked high in terms of uses the town should be encouraging. In contrast, there was less support for warehousing, hotels, fast food restaurants, large retail stores, and self-storage facilities. A clear majority were also supportive or neutral when it came to encouraging new manufacturing uses, which would help address residents' goal of more employment opportunities.

Swanzey Center

For the purposes of the Master Plan, Swanzey Center is defined generally as the area along Old Homestead Highway from Sycamore Hill Road to Carlton Road and along Sawyers Crossing Road to the Cresson Covered Bridge. This includes side streets off Old Homestead Highway and Sawyers Crossing Road, such as Centerview Drive, Cresson Drive, Cedar Road, Talbot Hill Road, and Sawmill Drive.

Swanzey Center includes several governmental and educational facilities at the intersection of Old Homestead Highway and Sawyers Crossing Road. These include Town Hall, Fire Station #2, Mt. Caesar Union Library, Monadnock Regional Middle-High School, Mt. Caesar Elementary, and the Mondanock Regional School District administrative offices. The Swanzey Post Office is also located in this area on Old Homestead Highway at the intersection with Oliver Hill Road.

Swanzey Center is largely comprised of detached single-family dwellings. This area of town has one of the longest settlement histories and there are many historic properties, in particular on Old

Homestead Highway and Sawyers Crossing Road. There are also several newer residential subdivisions located off of these main roadways.

In addition to residential uses, there are several commercial establishments on the outskirts of Swanzey Center on Old Homestead Highway between Oliver Hill Road and Sycamore Hill Road including Neighbor's Market and gas station, Runway Fun Park, Sarah's Greenhouse, and the Cold River Materials excavation site. Finally, it is important to note the Town-owned Mount Caesar recreational area is located in Swanzey Center and accessed from Old Homestead Highway across from Town Hall.

In terms of zoning, most of Swanzey Center is located in the Residence District. Several properties on Old Homestead Highway on the east side of the South Branch Ashuelot River are located in the Business District. Generally, the existing land uses in Swanzey Center are consistent with current zoning and there are few examples of non-conforming uses.

Over the upcoming years, it is anticipated Swanzey Center will continue to be the main governmental and educational hub for the community. Most of the improvements to existing government and educational facilities should be able to be accommodated on existing sites. The Monadnock Regional School District is currently considering a plan that would close Cutler Elementary School in West Swanzey and consolidate this school with Mt. Caesar Elementary in Swanzey Center. If this plan is implemented, the Town anticipates there will be additional facility needs for the school district properties.

Most of the residential properties in Swanzey Center are fully developed and there are few opportunities for subdivisions of land that would allow for more substantial growth. Additional residential growth in Swanzey Center should be accommodated largely through in-fill development of single-family dwellings, two-family dwellings, and accessory dwelling units. Given the important historical character of the neighborhood, any new development should be sensitive to existing settlement patterns and architectural characteristics.

The existing commercial area of Old Homestead Highway and Oliver Hill Road could potentially accommodate additional low impact uses such as professional offices, retail, and personal services that serve the needs of residents in the area and support a smaller number of employees. The Keene Dillant-Hopkins Airport borders Swanzey Center on its northern side and business development in this area would need to take airport operations into consideration. A limiting factor for additional commercial development in the area is the lack of public water and sewer. Currently, public water and sewer lines end further north along Old Homestead Highway south of Safford Drive.

West Swanzey

West Swanzey comprises the historic village around the Ashuelot River and for the purpose of the Master Plan is considered to be located between North Winchester and South Winchester Street, and between Route 10 and Pine Street/Summer Street/Holbrook Avenue. The area of West Swanzey that is bisected by Route 10 is discussed separately in the Route 10 corridor section of this chapter.

West Swanzey is comprised of a diverse mix of land use activities due to the long history of this village area. The historic village includes a mix of single-family dwellings, multi-family dwellings, manufacturing businesses, commercial establishments, and governmental, educational, and religious institutions. The historic settlement pattern still evident today is clustered around the Ashuelot River and the former Homestead Woolen Mill and radiates out from there. Public facilities in this area include Fire Station #3, Stratton Free Library, and Whitcomb Hall on Main Street, Cutler Elementary School on South Winchester Street, the Town's Public Works Department and Transfer Station on Pine Street, and the West Swanzey Sewer Treatment Plant. Larger businesses in the area include MoldPro on Denman Thompson Highway and Port-o-Lite on Railroad Street.

Over recent years, the Town has taken significant steps to invest in infrastructure and facility improvements in West Swanzey. This includes the reconstruction of Main Street in 2015, the completion of the rehabilitation of Whitcomb Hall in 2020, the reconstruction of Pine Street in 2020, and the reconstruction of South Winchester, West, and Swanzey Streets in 2021. The road improvement projects for Main, South Winchester, West, and Swanzey Streets also have included improved pedestrian facilities such as expanded sidewalks and safer pedestrian crossings. The Town is also currently working on a project at the West Swanzey AA Memorial Park to improve access to the Ashuelot River and to construct a new community pavilion and half basketball court, anticipated to be constructed in 2022. Several of the recent improvements completed in the area were recommendations in the Plan NH charrette completed for West Swanzey in 2012.

The Town has adopted Village Business District Zoning I, which covers properties along Main Street, North Winchester Street, and Village Business District Zoning II, which covers the Homestead Woolen Mill property. These zoning districts allow for smaller lot size and for a greater mix of residential and commercial uses than other zoning districts in the community. However, because of this historic settlement of this area there are still numerous examples of existing land uses and properties being out of conformance with the Town's current Zoning Ordinance.

The village of West Swanzey is already densely settled and the Town does not anticipate significant growth in the village area in the upcoming years. Similar to Swanzey Center, residential development is expected to be more in-fill in nature, including single-family dwellings, two-family dwellings, small multi-family dwellings, and accessory dwelling units. One unknown factor that could contribute to additional residential growth is the repurposing of the Homestead Woolen Mill on South Winchester Street. In the past, the site has been discussed for possible residential uses and zoning permits multi-family residential uses on the property. If more significant growth is to occur in West Swanzey, it would mostly likely be on the outskirts of the village, for example the undeveloped land on Holbrooke Avenue south of Woodale Avenue.

In terms of commercial uses, there is limited land available for additional business development in the village itself and these activities are expected to occur more along the Route 10 corridor. There may be opportunities for smaller scale, neighborhood-serving commercial uses such as

retail, personal services, and home-based businesses within the village. These types of commercial enterprises should be encouraged given their compatibility with existing residential uses in the village and the convenience they would provide to residents.

The Town should consider further developing and refining the Village Business I & II Zoning Districts to help encourage infill development including multi-family residential and commercial uses that are at an appropriate scale for the primarily residential neighborhood. These districts could also be expanded to include a larger number of properties in the village of West Swanzey, which would bring many of the non-conforming lots more in compliance with lot size and frontage requirements.

North Swanzey

North Swanzey comprises several different distinct neighborhoods located in the northeastern section of town: Wilson Pond, North Swanzey, and the Safford Drive Industrial Park. Each of these areas are looked at separately below:

Wilson Pond

The Wilson Pond neighborhood refers to those properties with frontage on Wilson Pond and includes Lake Street, Wilson Pond Road, Waters Edge Road, Houghton Point, and Pitcher Point. The properties in this area are almost entirely residential and many were first developed in the early and mid-20th century as seasonal cabins. Many of the lots are small and are nonconforming under current zoning regulations due to lot size, frontage, and setbacks. Over recent years, the Town has seen new investment in many properties as smaller homes are renovated or reconstructed. The completion of a wastewater system project in the area in 2006 has helped support this investment and improved water quality. This trend is expected to continue over the upcoming years.

North Swanzey

The neighborhood of North Swanzey lies to the north of Wilson Pond between the Dillant-Hopkins Airport and Route 12. This neighborhood shares many similar qualities to West Swanzey in terms of settlement patterns, the mix of small scale commercial and residential uses, and the presence of a busier commercial corridor along Route 12. However, the homes in this area were constructed more recently than in the village of West Swanzey. The area of North Swanzey that borders Route 12 is discussed separately in the Route 12 corridor section of this chapter.

The area is zoned primarily Business District along Route 12 and Old Homestead Highway. The side streets located off these corridors are zoned Residence District. In particular, along Old Homestead Highway there are many long-term residential dwellings located in the Business District, which only permits single-family dwellings by Special Exception. Similar to the Wilson Pond area, many of the residential lots in this area of town are nonconforming due to their size and limited road frontage. Some examples of smaller scale businesses in the area include Park Place Veterinary Hospital, The Dinner Table, and Draeger Ignition Interlock. The area also has two multi-family residential properties, including Edgewood Apartments on Old Homestead Highway and Water View Apartments on Lake Street.

Growth in the neighborhood is anticipated to be modest because it is generally already built out. Because of some of the similarities between West Swanzey and North Swanzey, the Town should consider expanding the Village Business District I or a similar type of zoning district to include properties in this area. This zoning would support smaller lot sizes and a mix of residential and neighborhood commercial uses.

Safford Drive Industrial Park

The Safford Drive Industrial Park is located between Wilson Pond and Swanzey Center. Most of the industrial park is located along Safford Drive between Old Homestead Highway and Route 12, but there are additional businesses along Old Homestead Highway that are included in the districts. Safford Drive represents one of the major employment centers in Swanzey, and includes the following businesses: Nanotech, Carlisle, Powers Generator, Werner Tool, Baudelaire, and True North Network. All of the properties in the area are zoned Industrial Park District.

In 2015, the Town completed infrastructure improvements to the industrial park which included the extension of Safford Drive from Old Homestead Highway to Route 12. The Town also installed public water and sewer lines along the length of Safford Drive. There continues to be vacant land within the industrial park along Safford Drive and the Town continues to strongly promote these properties for additional industrial development. To help facilitate additional growth, existing zoning should be reviewed to ensure it is supporting development. As development occurs in the industrial park, the Town should continue to work on minimizing impact on adjacent residential areas.

East Swanzey

East Swanzey is located in the southeastern portion of the community and the original settlements in this area were along the South Branch Ashuelot River. Evidence of the historic bucket mill in East Swanzey can still be seen along South Road. For the purposes of the Master Plan, East Swanzey is generally considered to be located to the east of Old Homestead Highway, west of Hale Hill Road/Old Richmond Road, south of Carlton Road, and north of Hale Hill Road. East Swanzey includes Flat Roof Mill Road as well.

Historic residential properties in East Swanzey are largely centered around the South Branch Ashuelot River in the area where Carlton Road, South Road, Taft Road, Webber Hill Road, and Old Richmond Road all come together. Given the relatively flat terrain in the area, this area of town has seen several small subdivisions over the last several decades. These development patterns can be seen along Blake Road, Goodell Avenue, and South Road, for example. There are also examples of larger scale subdivisions as well, such as Woodland Heights off Flat Roof Mill Road and Eastfield Crossing off Old Richmond Road.

In terms of zoning, most of East Swanzey is located in the Residence District with areas on the periphery being located in the Rural/Agricultural District. There are a few properties on Flat Roof Mill Road closer to Route 12 that are zoned Business District and include existing commercial uses.

Over the upcoming years it is anticipated East Swanzey will continue to be a primarily residential neighborhood with limited commercial uses on the east end of Flat Roof Mill Road towards Route 12. Of the five villages in Town, East Swanzey likely provides the best opportunity for larger scale residential subdivisions given the amount of suitable land in the area. Even so, any new residential development is still expected to be relatively modest in scale.

Westport

Westport village is located in the southwest corner of Swanzey and extends into the adjacent Town of Winchester. Westport is generally located along Westport Village Road, Depot Road, and Holbrooke Avenue. The village was originally settled given its location on the Ashuelot River and the location of a trail depot. The neighborhood is primarily residential, but includes religious and community facilities as well. On the south side of the Ashuelot River, properties are zoned Residence District. Properties on the north side across from the Slate Covered Bridge are located in the Business District. Compared to other population centers, Wesport has a small number of residents and is geographically smaller in size.

Future development in Westport is expected to be primarily residential and in-fill in nature, including single-family dwellings, two-family dwellings, small multi-family dwellings, and accessory dwelling units. Additional growth in Westport village will be constrained by the Ashuelot River on the north side and the NH State Rail Trail corridor that runs just to the south of Wesport Village Road. This area of Town also has important historical properties and these qualities should be preserved as future development occurs.

Route 10 Corridor

NH Route 10 extends from the City of Keene to the Town of Winchester through Swanzey. Major development nodes on Route 10 include the Market Basket development just south of Keene, the Base Hill Road/Whittemore Farm Road business park area, the village of West Swanzey, and Westport Village Road/Kempton Road area.

The zoning along the corridor emphasizes commercial and business uses along the highway with residential districts located just off the corridor. The northern portion of the corridor is primarily zoned Commercial/Industrial District and the southern portion is zoned Business District. Despite this, there are a variety of different land uses located along the corridor, including retail, office, industrial, multi-family residential, single-family dwellings, and gravel excavation operations. The Yale University School of Forestry also owns large tracts of undeveloped land along either side of Route 10 in the northern section of the corridor.

In 2021, the Southwest Region Planning Commission (SWRPC) completed the Swanzey NH Route 10 Corridor Study with support from a Town-appointed Work Group. The goal of the study was to better understand the corridor including opportunities for improvements and challenges to proactively address. The Study included relevant information and recommendations for the Transportation, Economic Development, and Land Use Chapters of the Master Plan.

The Town's commercial corridors offer the best opportunities for future business and employment growth. New commercial development on Route 10 will likely occur where there are water and sewer utilities available, which is in the village of West Swanzey and at the northern end of the corridor. In particular, businesses need access to an adequate water supply for fire suppression purposes. The Town should explore opportunities, through land use regulations, increasing the amount of land zoned for commercial uses, and economic development programs and policies, to make it easier for businesses to develop on Route 10. Additionally, the Town should make contingency plans for if it eventually takes over the West Swanzey Water Company and what this would mean for the community in terms of development opportunities on Route 10.

Much of Route 10 is zoned Business District, which permits multi-family residential development by Special Exception. While higher density multi-family developments are appropriate for the Route 10 corridor, the Town should explore if there are locations on the highway that are more appropriate for this type of use than others to ensure adequate land is available for business development. For example, trying to cluster multi-family residential uses along with retail and service businesses at specific nodes along the corridor may be a beneficial approach. Nodal development could occur around the Market Basket development and in the village of West Swanzey, for example.

Route 12 Corridor

NH Route 12 extends from the City of Keene to the Town of Marlborough through Swanzey. Similar to Route 10, there are a variety of different land uses located along the corridor, including retail, office, industrial, multi-family residential, and single-family dwellings. Major development areas along Route 12 include the following:

- City of Keene line to Lake Street: Carrol Concrete, Waste Management, Pappagolo's Restaurant, Dunkin' Donuts, T-Bird Mini-Mart, Princeton Properties Apartments
- Lake Street to Cheshire Fairgrounds/Safford Drive: Sam's Outdoor Outfitters, Monadnock Ford, Salvation Army, Northeast Mountain Footwear, EZ Crete, Clearwater Pools, Hastings Dental
- Flat Roof Mill Road: Nissan of Keene, Honda of Keene, Toyota of Keene, Monadnock Harley-Davidson

The entire length of the Route 12 corridor is zoned Business District. However, this zoning designation only extends approximately 300 feet from the highway right-of-way line and there are several properties with frontage on Route 12 that are split between Business District and Rural/Agricultural District, which limits development potential. There are also several residential neighborhoods located directly off of Route 12, including Marcy Hill Road, Arrowcrest Drive, Mt. Huggins Drive, and Birch Road.

Like Route 10, this highway provides one of the best opportunities for future business and employment growth in Swanzey. New commercial development on Route 12 will likely occur where there are public utilities available, which is along the northern section of the corridor to approximately Safford Drive. The Town should explore opportunities, through land use

regulations, increasing the amount of land zoned for commercial uses, and economic development programs and policies, to make it easier for businesses to develop along Route 12.

The Town should also consider the most appropriate locations for multi-family residential development along Route 12 given that the corridor is zoned Business District, which permits multi-family residential development by Special Exception. Multi-family residential projects are more likely to be located at the northern end of Route 12 where public utilities are located. This is also the area of the corridor where more retail and services businesses are located, along with pedestrian facilities.

Rural Areas

Areas outside of the village centers and commercial corridors discussed above are largely rural in nature and primarily made up of single-family homes, agricultural uses, community facilities, and undeveloped forestland. This includes southern section of Old Homestead Highway, Swanzey Lake Road, Eaton Road, Matthews Road, Sawyers Crossing Road, Swanzey Lake, Hale Hill Road, Winch Hill Road, Forest Avenue, Cobble Hill Road, and West Street/Old Leonard Farm Road.

These areas of Town should largely be preserved to maintain their rural character and working landscapes. Permitted uses should primarily reflect current uses of the land, including low density residential, agriculture, and community facilities. Commercial uses and activities should be discouraged. It is important to note that there are also several active excavation sites in these areas of Swanzey. Earth excavation activities are covered in the Natural Resources chapter of the Master Plan.

The Town should consider creating new land use regulations to better protect unfragmented areas of open space and natural resource areas better than the current Rural/Agricultural Zoning District. A new zoning designation could also be appropriate for areas with steep slopes or large wetland areas. The Conservation Commission recently completed a Natural Resources Inventory, which could be used as a basis to help develop these regulations.

The Town should also recognize that the majority of land in the community is currently zoned Rural/Agricultural, limiting development potential. To be prepared for future growth, the community may want to identify areas it can proactively rezone to Residence District based on the availability of transportation infrastructure and where development has already occurred. This would help guide residential growth to areas where development is more suitable and would reduce the amount of land used up by development because the Residence District has a 1-acre lot size requirement compared to 3 acres for the Rural/Agricultural District.

Land Use Goals & Objectives

For a complete list of the land use goals and objectives for the community, please refer to the Implementation Chapter of the Master Plan.

Goal: Provide for a balanced approach to development that accommodates future residential, commercial, and industrial growth while preserving Swanzey's small town atmosphere, rural character, and natural resources.

Objective #1: Development should occur in areas suitable for growth in a compact manner and not be scattered throughout the Town.

- Action 1: Review land use regulations to provide zoning opportunities that are more reflective of existing development patterns in the Town's village centers.
- Action 2: Develop land use regulations to better conserve land that is located in remote areas of Town, has important natural resources, and/or has constraints (wetlands, steep slopes, etc.)
- Action 3: Evaluate options for land use regulations for commercial corridors that would encourage nodal development and discourage strip development.
- Action 4: Review and update Planning Board's Site Plan Review Regulations and Subdivision Regulations to reflect the land use priorities in the Master Plan.
- Action 5: Develop a Town policy on development on Class VI roads.
- Action 6: Convene annual meetings between the Planning Board, Zoning Board of Adjustment, Conservation Commission, Economic Development Advisory Committee, and Board of Selectmen to discuss land use issues.
- Action 7: Explore innovative land use controls that better facilitate development that meets the community's goals than traditional approaches to zoning.

Objective #2: Ensure the supply of diverse housing types that meets the needs of multiple generations and a range of income levels.

- Action 1: Conduct a housing assessment to better understand the community's future housing needs.
- Action 2: Review land use regulations and identify barriers for housing development.
- Action 3: Explore opportunities for regulations that allow smaller lot sizes and appropriately scaled multi-family residential uses in areas with public sewer or appropriate soils for on-site septic systems.
- Action 4: Determine appropriate locations for higher density multi-family residential projects and develop appropriate zoning to support these uses.

Objective #3: Promote opportunities for future business and employment growth.

- Action 1: Evaluate opportunities for expanding business and commercial zoning along the Route 10 and Route 12 corridor.
- Action 2: Review and update land use regulations to facilitate commercial and industrial development along the Route 10 and Route 12 corridors.
- Action 3: Review and update land use regulations to support neighborhood-serving commercial uses within established village centers.

Implementation Plan

The Implementation Chapter of the Master Plan is a chapter that ignites change and helps to continue the work that has gone into the Master Plan update. It is the mechanism that sets the wheels in motion for actions to be taken to implement it. The matrix below is a compilation of strategies that can be explored to help meet the goals and objectives in each chapter of this Master Plan. The strategies include the leadership of different members of the Town staff and Town Boards, Commissions, Committees, and organizations.

To maximize the success of this plan, it is suggested that there be an annual meeting between all of the parties identified in the leadership column of this matrix. This will keep the plan fresh and can be a catalyst for conversation and action.

The timeframe used for the "When" column is Short-term (1-3 years), Mid-term (4-6 years) and Long-term (7-10 years).

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Population and Housing			
Goal: To ensure that there is adequate housing for existing and future residents.			
Objective 1: Implement and administer the land use regulations so that there are no regulatory barriers to the provision of a range of housing types in a variety of price categories.			
Action 1: Conduct a regulatory review of Ordinances, Site Plan Review, and Subdivision Regulations.	Short Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 2: Assess the need for senior housing.	Short Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 3: Consider innovative approaches to increasing the housing stock with starter homes and workforce housing such as: infill development, mixed-use housing and adaptive reuse of existing structures.	Short Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 4: Explore areas in need of expansion of water and sewer infrastructure.	Medium Term	Planning Board, Board of Selectmen, Planning Dept., DPW	Grants: USDA, NH DES, CDBG; Town Budget
Transportation			
Goal: To provide for the safe and convenient circulation and movement of goods and people within the Town of Swanzey and to points beyond.			
Objective 1: Provide for adequate streets and street systems in all existing and future residential, commercial and industrial subdivisions.			
Action 1: Review driveway regulations to provide safer sightlines and standards for drainage.	Short Term	Planning Board, DPW, Planning Dept.	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Transportation (continued)			
Action 2: Invest in street and sidewalk maintenance and replacement on an annual basis through the capital improvement planning process.	Short Term	CIPC, Board of Selectmen, DPW	Town Budget, Bonding
Objective 2: Provide safe passage for cyclists and pedestrians.			
Action 1: Seek opportunities to make improvements to trail system	Short Term	RTAC, Board of Selectmen, DPW	Grants: NH RTP; Volunteers; Town Budget
Action 2: Identify areas that the town would like to incorporate amenities for pedestrians/bicyclists using Complete Streets concepts.	Short Term	Board of Selectmen, DPW, Planning Dept	Town Budget
Action 3: Identify areas that are in need of improvement for walkability. Determine options to make improvements, including but not limited to the area from Eaton Road to the Cresson covered bridge.	Short Term	Board of Selectmen, DPW, Planning Dept	Town Budget
Action 4: Consider development of wayfinding for populations centers with existing sidewalk networks/rail trails.	Medium Term	RTAC, Board of Selectmen, DPW	Grants: NH RTP; Town Budget
Action 5: Explore the possibility of a trail connector between the Cheshire Rail Trail and the Ashuelot Rail Trail.	Long Term	RTAC, Board of Selectmen, DPW	Town Budget
Action 6: Integrate the trail network with the surrounding roadway network, with a focus on improving connections between the trails and key points of interest, like village centers, schools and residential neighborhoods.	Long Term	RTAC, Board of Selectmen, DPW	Grants: MAST, RTP; Town Budget
Action 7: Improve rail trail crossings in areas identified as safety concerns, including but not limited to Sawyer Crossing Road and Matthews Road.	Medium Term	RTAC, Board of Selectmen, DPW	Grants, Town Budget
Objective 3: Coordinate and integrate the transportation systems of the Town of Swanzey with that of the region.			
Action 1: Provide greater support systems to seniors by enhancing the volunteer driver network in the area.	Medium Term	Planning Dept., SWRPC	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Transportation (continued)			
Action 2: Consider ways to provide alternatives to the single occupancy gasoline powered automobile. Consider options such as ride-sharing boards, commuter lots, an EV station, etc.	Long Term	Planning Dept., DPW, Board of Selectmen	Town Budget
Action 3: Participate in regional discussions regarding transportation improvements.	Short Term	Planning Dept., DPW, Board of Selectmen	Town Budget
Action 4: Collaborate with NHDOT on improvements to State highways.	Short Term	DPW, Board of Selectmen, Town Hall Admin.	Town Budget
Action 5: Investigate potential locations for the creation of parking areas near rail trails that can also serve as commuter lots.	Long Term	RTAC, DPW	Town Budget
Natural Resources			
Goal: Protect and preserve the Town's critical natural resource areas			
Objective 1: Maintain a balance between the Town's existing and future development needs and its natural environment.			
Action 1: Pursue a Groundwater Protection Ordinance	Medium Term	ConComm, Planning Board, Planning Dept.	Town Budget
Action 2: Review Flood Plain Regulations and make updates as needed	Medium Term	Planning Board, Planning Dept.	Town Budget
Action 3: Seek funding opportunities for the development of a watershed based lake management plan for Swanzey Lake and Wilson Pond	Medium Term	ConComm, Planning Dept.	Grants: NH DES
Action 4: Review the Zoning Ordinance to identify the impact of setbacks from wetlands, rivers, and bodies of water	Short Term	Planning Board, Planning Dept.	Town Budget
Action 5: Conduct an audit of current regulations and evaluate if and how they protect critical natural resources.	Short Term	Planning Board, Planning Dept.	Town Budget
Action 6: Review and update ordinances and regulations to address storm water management associated with new development.	Short Term	Planning Board, Planning Dept.	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Natural Resources (continued)			
Action 7: Review and update the Planning Board's regulations for earth excavation activities.	Long Term	Planning Board, Planning Dept.	Town Budget
Action 8: Review and update the Town's Source Water Protection Plan as needed.	Long Term	Planning Board, Planning Dept., Con Comm	Town Budget
Objective 2: Support efforts to protect and conserve land with critical natural resources, large tracts of forests, open fields, and farm lands			
Action 1: Maintain partnerships with land conservation groups and adjacent communities to pursue conservation initiatives of common interest.	Medium Term	Planning Dept., ConComm	Town Budget, Monadnock Land Conservancy
Action 2: Provide opportunities for land owners who are considering a land donation to learn about options and procedures for completing the transaction.	Short Term	Planning Dept., ConComm	Town Budget, Monadnock Land Conservancy
Action 3: Review and update A Plan for the Preservation of Open Space.	Medium Term	Planning Dept., ConComm	Town Budget
Action 4: Develop a policy to address when the Town will acquire land or conservation easements.	Long Term	Planning Dept., Board of Selectmen, Con Comm	Town Budget
Action 5: Pursue community outreach and education efforts regarding the Town's natural resources.	Short Term	ConComm	Town Budget
Action 6: Review and update Zoning Ordinance to support agricultural and forestry activities.	Medium Term	Planning Board, Planning Dept.	Town Budget
Action 7: Regularly update and implement the plan for managing the Mount Cresson Town Forest.	Medium Term	ConComm	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Natural Resources (continued)			
Action 8: Update the Town's Hazard Mitigation Plan and work to seek solutions to the erosion problem along the Ashuelot River, particularly in the area of Pine Street.	Medium Term	Planning Dept., Board of Selectmen	Grants, Town Budget
Action 9: Educate land owners about best practices for invasive species control and implement best practices on Town-owned conservation lands.	Short Term	Planning Dept., ConComm	Town Budget
Community Facilities			
Goal: Provide community facilities and public utilities that adequately support the needs of current and future residents and businesses			
Objective 1: Maintain and upgrade Town facilities and equipment to adequately serve the needs of the public			
Action 1: Relocate Fire Station #2 from the first floor of Town Hall to a new, modern facility in north/central Swanzey.	Short Term	Fire Department, Board of Selectmen, Town Hall Admin.	Grants, Town Budget, Bonding
Action 2: Complete improvements to Town Hall to increase the amount of space for governmental offices, improve layout, and address Building Code issues.	Medium Term	Board of Selectmen, Town Hall Admin.	Town Budget, Bonding
Action 3: Position the Carpenter Home to be a community-centered facility.	Short Term	Board of Selectmen, Town Hall Admin.	Grants, Town Budget
Action 4: Complete improvements to the Public Works facility to address space needs for equipment and vehicle storage and improve administrative office layout.	Medium Term	Board of Selectmen, Town Hall Admin.	Town Budget, Bonding
Action 5: Complete upgrades to the Recycling Center to improve site operations and employee work space.	Medium Term	Board of Selectmen, Town Hall Admin.	Town Budget, Bonding
Action 6: Support capital reserve funds and other financing mechanisms for the regular updates to Town facilities, equipment, and vehicles to address operational needs and safety.	Short Term	CIPC, Board of Selectmen, Town Hall Admin.	Town Budget, Bonding

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Community Facilities (continued)			
Action 7: Pursue grant opportunities to help support the maintenance and improvement of Town facilities and equipment and defray costs.	Short Term	Board of Selectmen, Town Hall Admin.	Grants
Objective 2: Maintain and upgrade public and private utilities to adequately serve the needs of the public			
Action 1: Develop a plan for the expansion of the wastewater system in West Swanzey and North Swanzey to support future development.	Medium Term	Board of Selectmen, Sewer Commission	Grants, Town Budget
Action 2: Develop long-term plans for possible municipal control of the West Swanzey Water Company and the North Swanzey Water and Fire Precinct.	Long Term	Board of Selectmen, Town Hall Admin.	Grants, Town Budget
Action 3: Partner with the North Swanzey Water and Fire Precinct on the expansion of water lines to support future development in North Swanzey.	Medium Term	Board of Selectmen, Town Hall Admin.	Grants, Town Budget, Bonding
Action 4: Review and update the Town's regulations on telecommunication facilities based on changes in cellular technology to ensure the Town is supporting improved cellular coverage while maintaining regulations that prevent adverse impacts.	Medium Term	Planning Board, Planning Dept.	Town Budget
Action 5: Partner with broadband providers to improve broadband services in Town.	Short Term	Board of Selectmen, Planning Dept.	Grants, Bonding
Action 6: Support efforts to increase the use of roof-mounted and ground-mounted solar arrays and other alternative energy systems for residential and commercial properties.	Short Term	Planning Board, Planning Dept.	Town Budget
Historic and Recreational Resources			
Goal: Preserve, protect, and promote Swanzey's historical and recreational resources			
Objective 1: Preserve and protect historic buildings, landmarks, and districts in Swanzey.			
Action 1: Create a Heritage Commission having advisory and review authority regarding local cultural and historic resources.	Short Term	Board of Selectmen	Town Budget

Goals, Objectives, and Actions (Strategies)	**When**	**Who**	**Potential Funding Source**
Historic and Recreational Resources (continued)			
Action 2: Consider the creation of Historic Districts in Swanzey where appropriate.	Long Term	Board of Selectmen	Town Budget
Action 3: Support existing efforts of the Swanzey Preservation Society, Library Trustees, and other community groups to preserve historic structures in town.	Short Term	Board of Selectmen, Town Hall Admin.	Town Budget
Action 4: Develop and implement a plan for the future use of the Golden Rod Grange Hall property.	Medium Term	Board of Selectmen, Town Hall Admin.	Town Budget
Action 5: Ensure for the ongoing maintenance of Whitcomb Hall through the Capital Improvement Plan.	Short Term	CIPC, Board of Selectmen, WH Committee	Town Budget
Objective 2: Increase awareness and appreciation of Swanzey's historical resources.			
Action 1: Use the Town's website as a resource for information on the Town's history, historic buildings, and historic districts.	Short Term	Town Hall Admin.	Town Budget
Action 2: Consider offering walking tours of historic districts and providing open houses for municipal historical buildings.	Medium Term	Board of Selectmen, Town Hall Admin.	Town Budget
Action 3: Consider installing interpretive signs and markers for historic building and other landmarks in Town.	Medium Term	Board of Selectmen, Town Hall Admin.	Grants, Town Budget
Objective 3: Establish and expand recreational opportunities for all age segments of the Swanzey population			
Action 1: Complete improvements at Richardson Park to address building code and safety concerns.	Short Term	Board of Selectmen, Recreation Dept.	Town Budget
Action 2: Develop a Recreation Plan that encourages healthful, positive experiences in Swanzey for residents of all ages and ability.	Medium Term	Recreation Dept.	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Historic and Recreational Resources (continued)			
Action 3: Explore partnership opportunities with local non-profit organizations and other municipalities to increase programming options for Swanzey residents.	Medium Term	Recreation Dept.	Town Budget
Action 4: Develop a plan to ensure trails on town-owned properties are regularly maintained.	Short Term	ConComm, Town Hall Admin.	Town Budget
Action 5: Maintain and improve boat launches on the Ashuelot River.	Medium Term	DPW	Town Budget
Action 6: Work with the Conservation Commission to identify land that might be put to recreational purposes, including town-owned properties and private properties with easements.	Medium Term	ConComm, Town Hall Admin., Recreation Dept.	Town Budget
Action 7: Support the Conservation Commission in its monitoring of wetlands and open spaces on town-owned property.	Short Term	ConComm, Town Hall Admin.	Town Budget
Objective 4: Promote and market recreational opportunities in the community.			
Action 1: Update trail maps and distribute on Town's website, Town Hall, and at trail heads.	Short Term	ConComm, Town Hall Admin.	Town Budget
Action 2: Create a town-wide recreational map that includes hiking trails, recreational trails, boat launches, and fishing areas.	Short Term	ConComm, Town Hall Admin.	Town Budget
Action 3: Market recreational programming opportunities and promote programming provided by private non-profit organizations in the area.	Short Term	Town Hall Admin., Recreation Dept.	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Economic Development			
Goal: Provide a balance of business opportunities that meet the retail, service, and employment needs at a scale appropriate for the Town			
Objective 1: Provide the necessary infrastructure to support and grow the business community			
Action 1: Review the needs of businesses for additional infrastructure, such as 3-phase power, broadband, public water, and public sewer	Short Term	Planning Dept., EDAC	Town Budget
Action 2: Update CIP to plan and budget for public infrastructure to meet the needs of current and future businesses	Medium Term	CIPC, Board of Selectmen, Town Hall Admin.	Town Budget, Bonding
Action 3: Develop a strategy for the use of Tax Increment Financing to construct public infrastructure to support private development	Long Term	EDAC, Board of Selectmen, Town Hall Admin.	Town Budget
Action 4: Review existing broadband coverage and develop and implement a plan for improving local service	Short Term	EDAC, Planning Dept.	Town Budget
Objective 2: Plan for a diverse mix of commercial and industrial uses			
Action 1: Explore options for commercial nodal development and infill development opportunities along NH 10 and NH 12	Medium Term	Planning Dept., Planning Board	Town Budget
Action 2: Review current ordinances and regulations to reduce impediments to business development	Short Term	Planning Dept., Planning Board, EDAC	Town Budget
Action 3: Review current zoning to ensure adequate land area is zoned for commercial and industrial uses and in appropriate locations	Short Term	Planning Dept., Planning Board, EDAC	Town Budget
Action 4: Develop a plan for expanding existing and establishing new Economic Revitalization Zones	Medium Term	Planning Dept., EDAC	Town Budget
Action 5: Promote the Town's New Commercial and Industrial Construction Exemption program	Short Term	Planning Dept., EDAC	Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Economic Development (continued)			
Objective 3: Retain and expand the local workforce			
Action 1: Partner with local businesses and higher education institutions to support job training programs for advanced manufacturing and other sectors	Long Term	EDAC, Local Businesses, MEDC, SWRPC	Grants
Action 2: Encourage opportunities for entrepreneurship, including home-based businesses	Medium Term	EDAC, Planning Board, Planning Dept.	Town Budget
Action 3: Develop and implement a Business Retention and Expansion Program	Short Term	EDAC, Planning Dept.	Town Budget
Objective 4: Market the Town's advantages and amenities to prospective businesses			
Action 1: Update the Town's website to highlight the advantages of doing business and Swanzey and local amenities	Short Term	Planning Dept.	Town Budget
Action 2: Collaborate with the NH Department of Business and Economic Affairs to recruit businesses to Swanzey and market available State resources	Medium Term	Planning Dept., Town Hall Admin.	Town Budget
Objective 5: Collaborate with local partners to improve the regional business environment			
Action 1: Participate in economic development planning efforts led by Southwest Region Planning Commission and the Greater Keene Chamber of Commerce to improve regional business conditions	Short Term	Planning Dept., Town Hall Admin.	Town Budget
Action 2: Partner with adjacent municipalities on mutually beneficial public infrastructure and facilities projects	Short Term	Board of Selectmen, Planning Dept., Town Hall Admin.	Town Budget, Bonding, Grants

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Land Use			
Goal: Provide for a balanced approach to development that accommodates future residential, commercial, and industrial growth while preserving Swanzey's small town atmosphere, rural character, and natural resources.			
Objective 1: Development should occur in areas suitable for growth in a compact manner and not be scattered throughout the Town.			
Action 1: Review land use regulations to provide zoning opportunities that are more reflective of existing development patterns in the Town's village centers.	Short Term	Planning Board, Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 2: Develop land use regulations to better conserve land that is located in remote areas of Town, has important natural resources, and/or has constraints (wetlands, steep slopes, etc.)	Short Term	Planning Board, Planning Dept.	Town Budget
Action 3: Evaluate options for land use regulations for commercial corridors that would encourage nodal development and discourage strip development.	Medium Term	Planning Board, Planning Dept.	Town Budget
Action 4: Review and update Planning Board's Site Plan Review Regulations and Subdivision Regulations to reflect the land use priorities in the Master Plan.	Short Term	Planning Board, Planning Dept.	Town Budget
Action 5: Develop a Town policy on development on Class VI roads.	Medium Term	Planning Board, Board of Selectmen, DPW	Town Budget
Action 6: Convene annual meetings between the Planning Board, Zoning Board of Adjustment, Conservation Commission, Economic Development Advisory Committee, and Board of Selectmen to discuss land use issues.	Short Term	Planning Dept.	Town Budget
Action 7: Explore innovative land use controls that better facilitate development that meets the community's goals than traditional approaches to zoning.	Medium Term	Planning Board, Planning Dept.	Grants: Plan NH (MTAG); Town Budget

Goals, Objectives, and Actions (Strategies)	When	Who	Potential Funding Source
Land Use (continued)			
Objective 2: Ensure the supply of diverse housing types that meets the needs of multiple generations and a range of income levels.			
Action 1: Conduct a housing assessment to better understand the community's future housing needs.	Short Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 2: Review land use regulations and identify barriers for housing development.	Short Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 3: Explore opportunities for regulations that allow smaller lot sizes and appropriately scaled multi-family residential uses in areas with public sewer or appropriate soils for on-site septic systems.	Medium Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Action 4: Determine appropriate locations for higher density multi-family residential projects and develop appropriate zoning to support these uses.	Medium Term	Planning Board and Planning Dept.	Grants: Plan NH (MTAG); Town Budget
Objective 3: Promote opportunities for future business and employment growth.			
Action 1: Evaluate opportunities for expanding business and commercial zoning along the Route 10 and Route 12 corridor.	Short Term	Planning Board and Planning Dept.	Town Budget
Action 2: Review and update land use regulations to facilitate commercial and industrial development along the Route 10 and Route 12 corridors.	Short Term	Planning Board and Planning Dept.	Town Budget
Action 3: Review and update land use regulations to support neighborhood-serving commercial uses within established village centers.	Medium Term	Planning Board and Planning Dept.	Town Budget

Appendices

Appendix A: Swanzey Master Plan Community Survey Results

Appendix B: Town of Swanzey Zoning Map

Appendix C: Town of Swanzey Natural Resources Inventory Phase I & Phase II

Appendix D: A Plan for the Protection of Open Space, Town of Swanzey

Appendix E: Source Water Protection Plan for Swanzey, New Hampshire

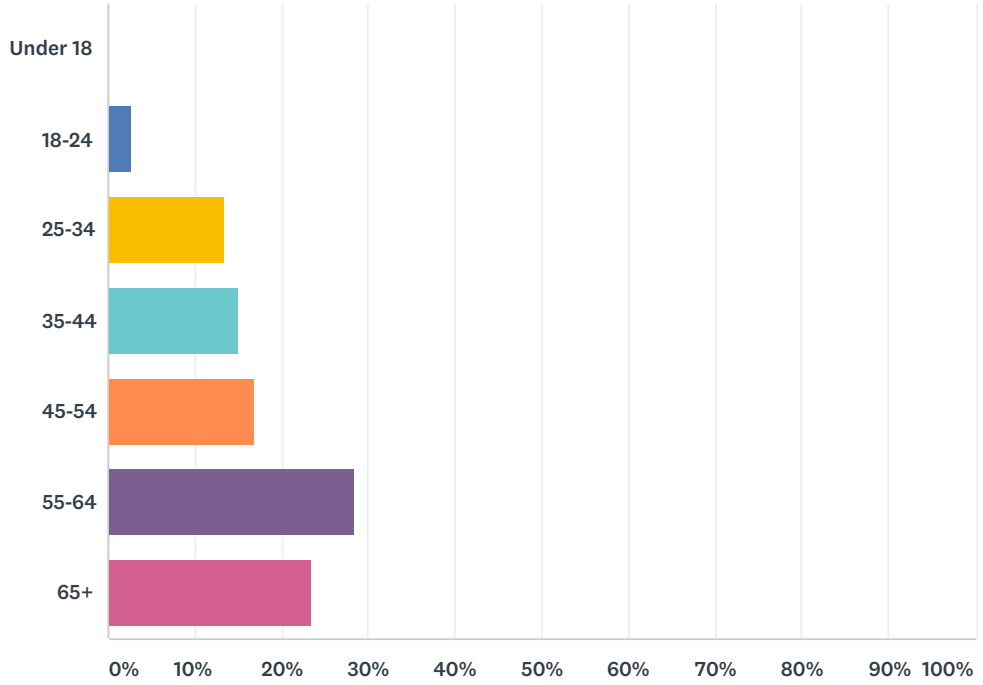
Appendix F: Ashuelot River Corridor Management Plan

Appendix A

Swanzey Master Plan
Community Survey Results

Q1 Which age range best describes you?

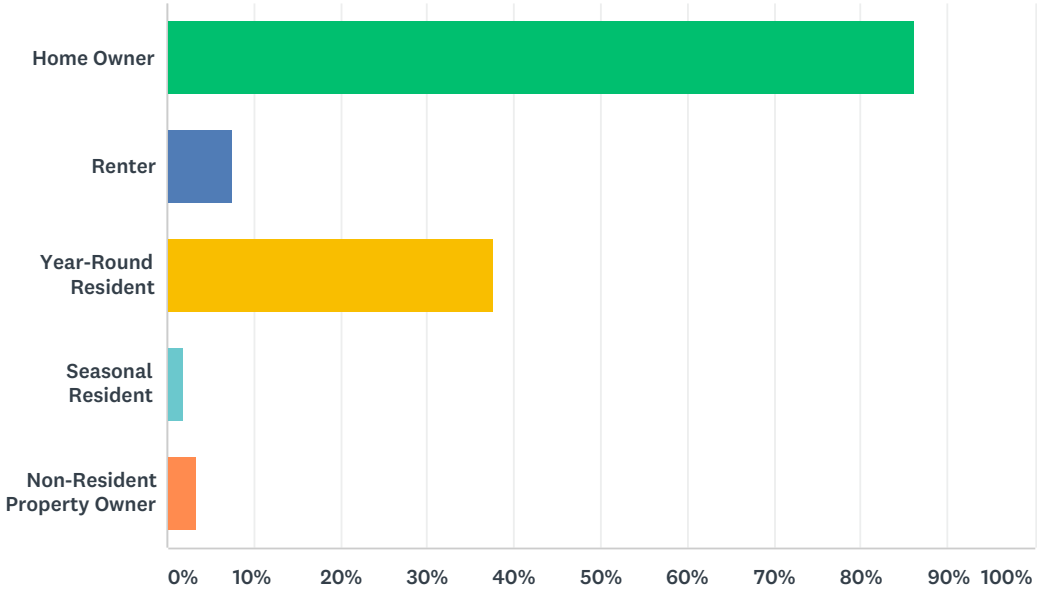
Answered: 414 Skipped: 2



ANSWER CHOICES	RESPONSES	
Under 18	0.24%	1
18-24	2.66%	11
25-34	13.29%	55
35-44	14.98%	62
45-54	16.91%	70
55-64	28.50%	118
65+	23.43%	97
TOTAL		414

Q2 Are you a (check all that apply):

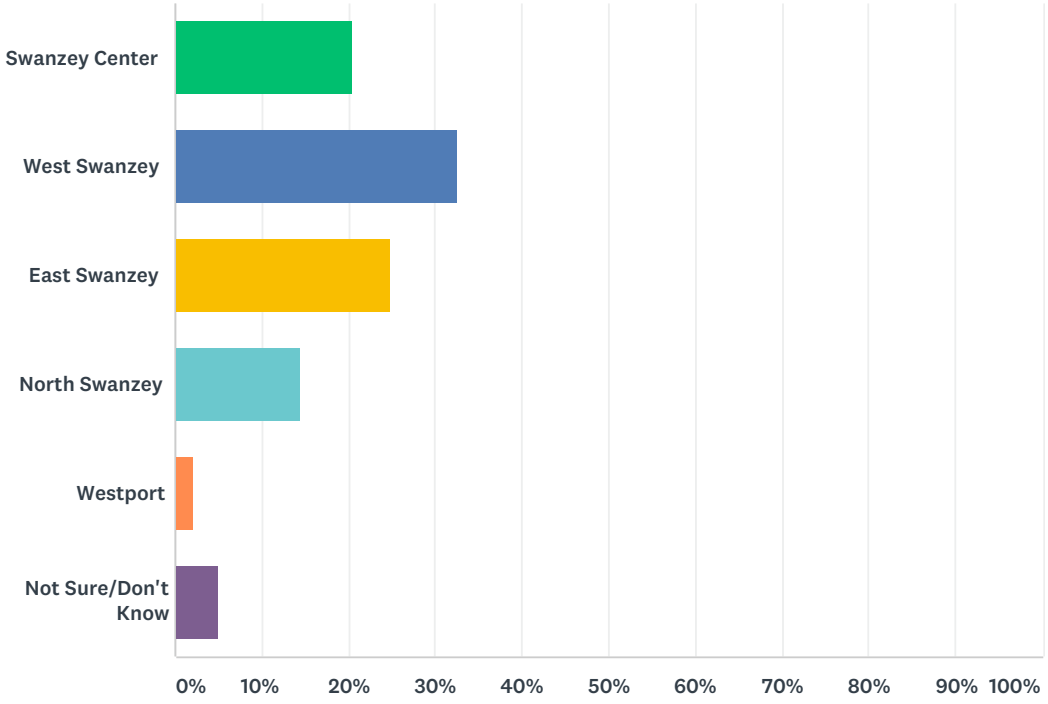
Answered: 412 Skipped: 4



ANSWER CHOICES	RESPONSES	
Home Owner	86.17%	355
Renter	7.52%	31
Year-Round Resident	37.62%	155
Seasonal Resident	1.94%	8
Non-Resident Property Owner	3.40%	14
Total Respondents: 412		

Q3 Where in Swanzey do you live?

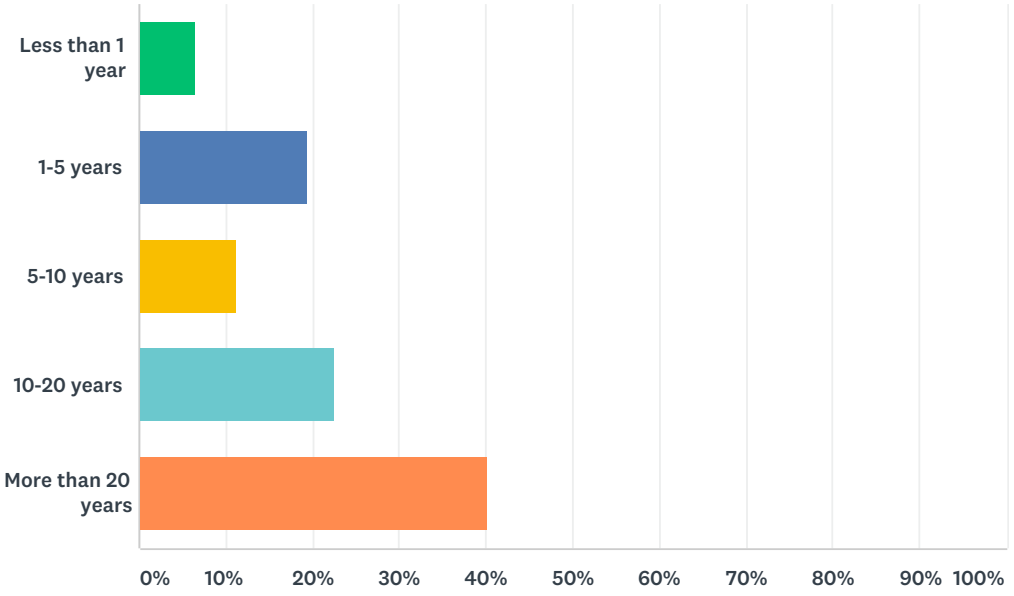
Answered: 413 Skipped: 3



ANSWER CHOICES	RESPONSES	
Swanzey Center	20.58%	85
West Swanzey	32.69%	135
East Swanzey	24.94%	103
North Swanzey	14.53%	60
Westport	2.18%	9
Not Sure/Don't Know	5.08%	21
TOTAL		413

Q4 How long have you lived in Swanzey (or if you are not a resident, how long have you owned property in town)?

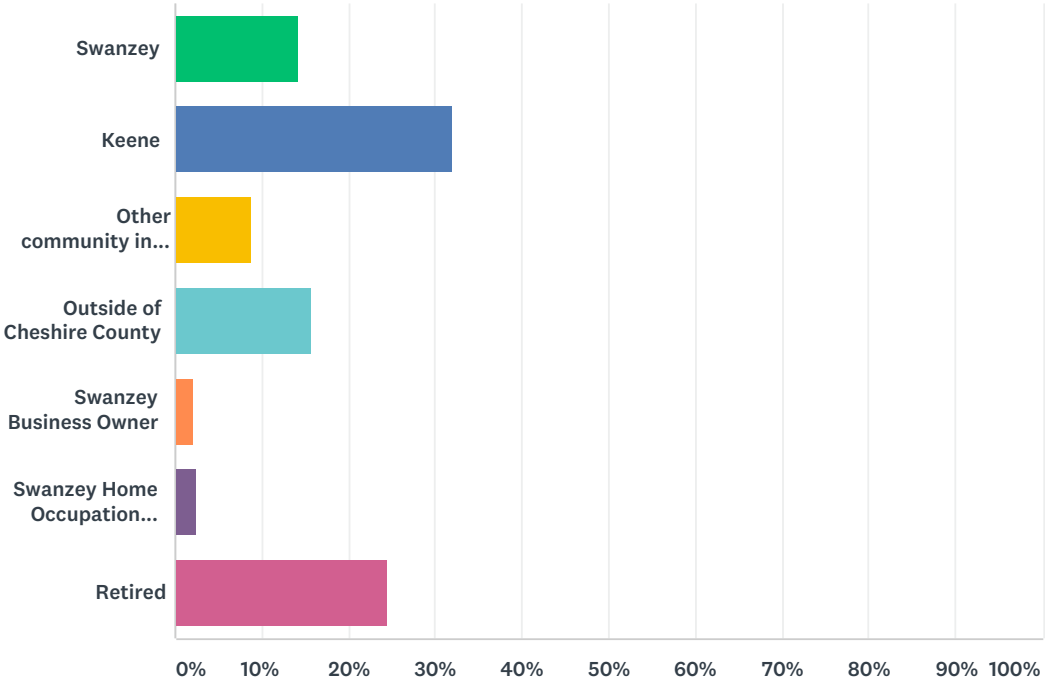
Answered: 413 Skipped: 3



ANSWER CHOICES	RESPONSES	
Less than 1 year	6.54%	27
1-5 years	19.37%	80
5-10 years	11.38%	47
10-20 years	22.52%	93
More than 20 years	40.19%	166
TOTAL		413

Q5 In what town do you work?

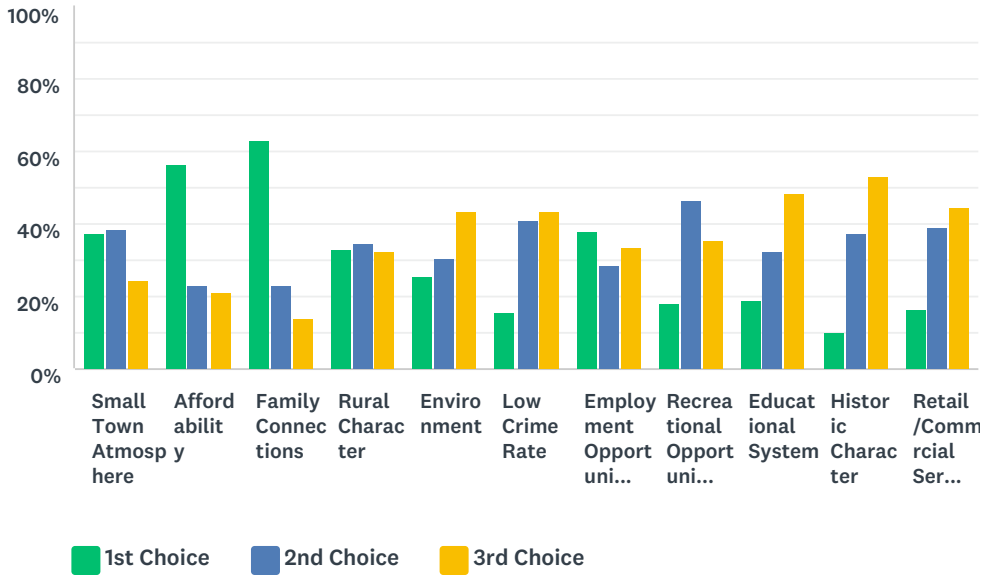
Answered: 412 Skipped: 4



ANSWER CHOICES	RESPONSES	
Swanzey	14.32%	59
Keene	32.04%	132
Other community in Cheshire County	8.74%	36
Outside of Cheshire County	15.78%	65
Swanzey Business Owner	2.18%	9
Swanzey Home Occupation Owner	2.43%	10
Retired	24.51%	101
TOTAL		412

Q6 Rank (in order) the following reasons why you live in Swanzey

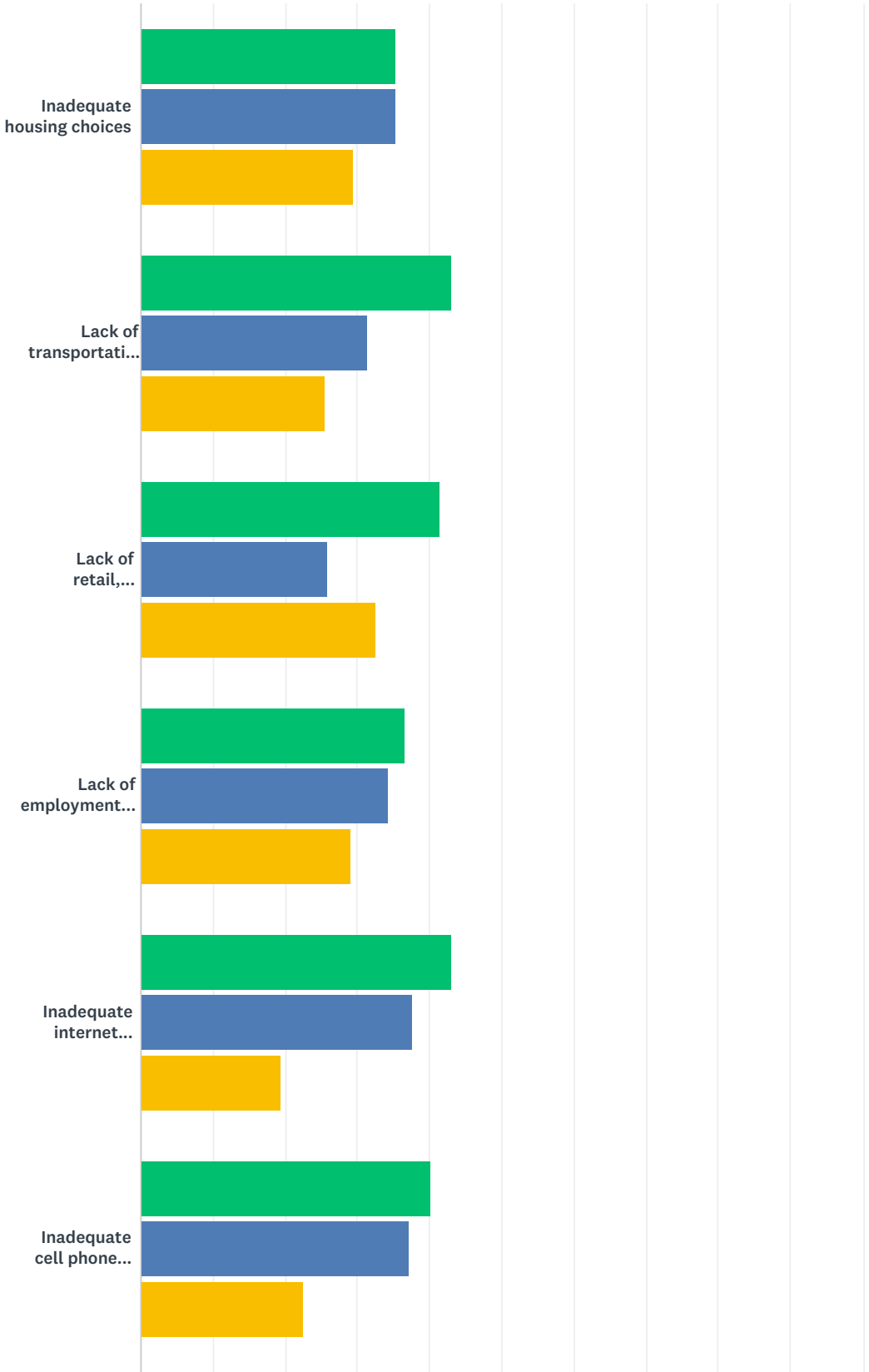
Answered: 402 Skipped: 14

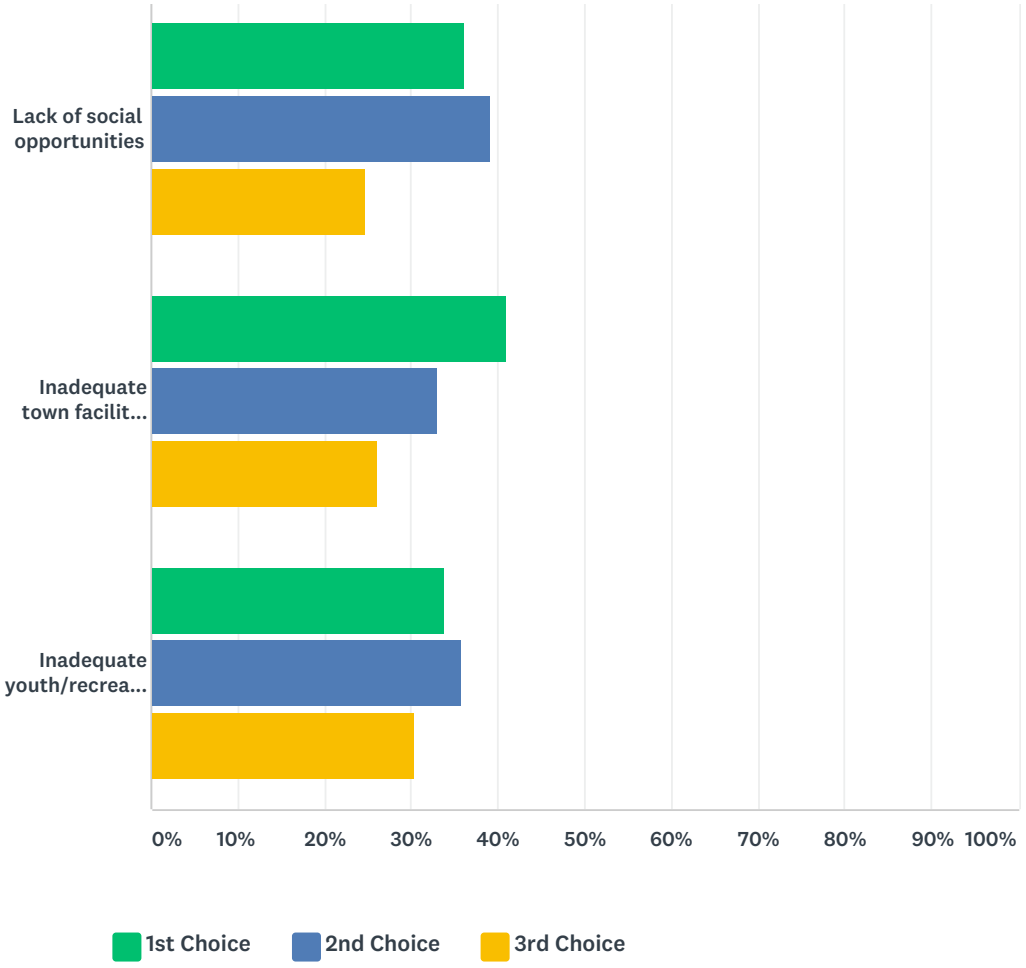


	1ST CHOICE	2ND CHOICE	3RD CHOICE	TOTAL
Small Town Atmosphere	37.39% 86	38.26% 88	24.35% 56	230
Affordability	56.38% 84	22.82% 34	20.81% 31	149
Family Connections	63.08% 82	23.08% 30	13.85% 18	130
Rural Character	33.00% 66	34.50% 69	32.50% 65	200
Environment	25.74% 26	30.69% 31	43.56% 44	101
Low Crime Rate	15.38% 18	41.03% 48	43.59% 51	117
Employment Opportunities	38.10% 8	28.57% 6	33.33% 7	21
Recreational Opportunities	17.78% 8	46.67% 21	35.56% 16	45
Educational System	18.92% 7	32.43% 12	48.65% 18	37
Historic Character	9.80% 5	37.25% 19	52.94% 27	51
Retail/Commercial Services	16.67% 3	38.89% 7	44.44% 8	18

Q7 Rank (in order) what you like least about our town and want to see changed

Answered: 336 Skipped: 80

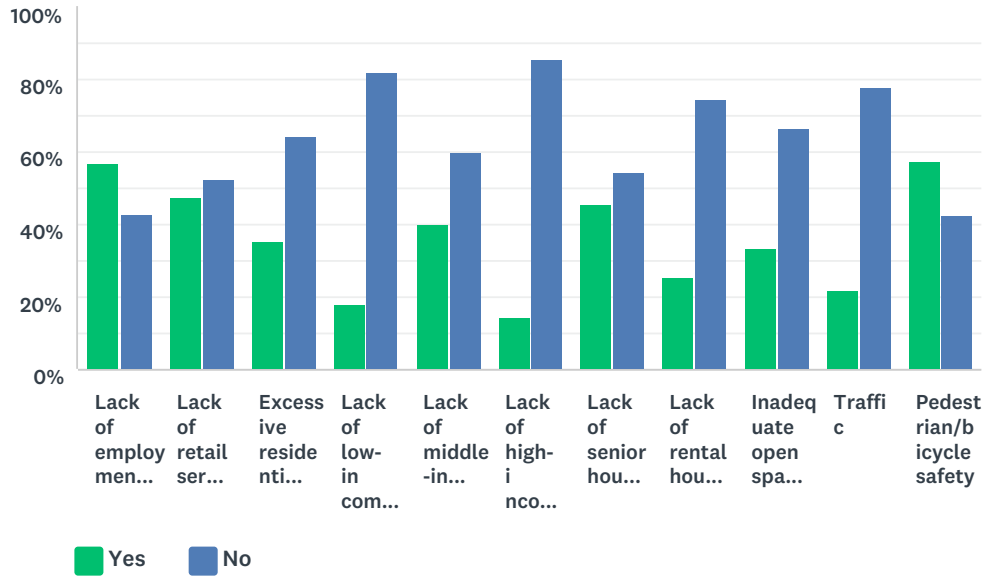




	1ST CHOICE	2ND CHOICE	3RD CHOICE	TOTAL
Inadequate housing choices	35.29% 12	35.29% 12	29.41% 10	34
Lack of transportation choices	43.02% 37	31.40% 27	25.58% 22	86
Lack of retail, commercial, entertainment establishments	41.48% 56	25.93% 35	32.59% 44	135
Lack of employment opportunities	36.56% 34	34.41% 32	29.03% 27	93
Inadequate internet service	43.01% 40	37.63% 35	19.35% 18	93
Inadequate cell phone coverage	40.14% 57	37.32% 53	22.54% 32	142
Lack of social opportunities	36.23% 25	39.13% 27	24.64% 17	69
Inadequate town facilities and services	40.91% 36	32.95% 29	26.14% 23	88
Inadequate youth/recreational programs	33.93% 19	35.71% 20	30.36% 17	56

Q8 Please indicate whether you believe the following issues face our town today

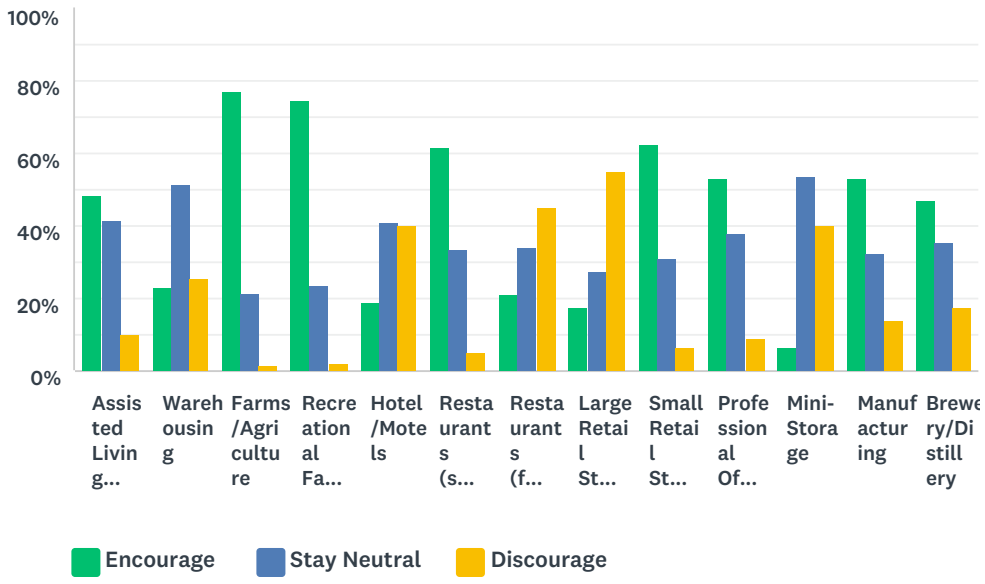
Answered: 403 Skipped: 13



	YES	NO	TOTAL
Lack of employment opportunities	56.82% 204	43.18% 155	359
Lack of retail services	47.41% 174	52.59% 193	367
Excessive residential development	35.47% 127	64.53% 231	358
Lack of low-income housing	18.16% 63	81.84% 284	347
Lack of middle-income housing	39.89% 140	60.11% 211	351
Lack of high-income housing	14.58% 50	85.42% 293	343
Lack of senior housing	45.61% 161	54.39% 192	353
Lack of rental housing	25.64% 90	74.36% 261	351
Inadequate open space/natural resources protection	33.43% 121	66.57% 241	362
Traffic	21.82% 79	78.18% 283	362
Pedestrian/bicycle safety	57.45% 212	42.55% 157	369

Q9 How should our town respond to growth in the following areas?

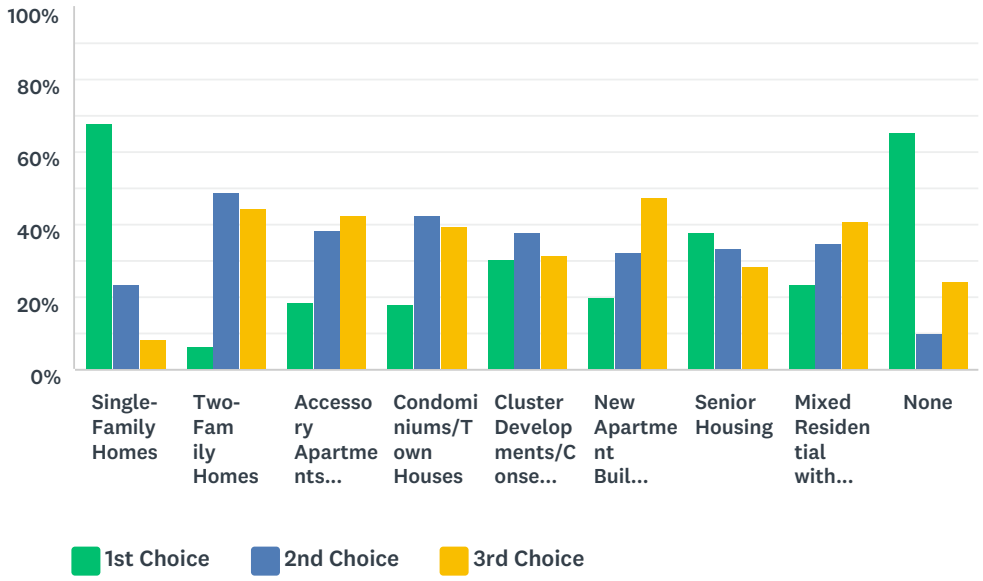
Answered: 404 Skipped: 12



	ENCOURAGE	STAY NEUTRAL	DISCOURAGE	TOTAL
Assisted Living Facility	48.45% 188	41.49% 161	10.05% 39	388
Warehousing	23.10% 88	51.44% 196	25.46% 97	381
Farms/Agriculture	77.04% 302	21.68% 85	1.28% 5	392
Recreational Facilities	74.68% 292	23.27% 91	2.05% 8	391
Hotel/Motels	19.02% 74	40.87% 159	40.10% 156	389
Restaurants (sit down)	61.28% 239	33.59% 131	5.13% 20	390
Restaurants (fast food)	21.03% 82	34.10% 133	44.87% 175	390
Large Retail Stores	17.53% 68	27.58% 107	54.90% 213	388
Small Retail Stores	62.60% 246	30.79% 121	6.62% 26	393
Professional Offices	53.23% 206	37.98% 147	8.79% 34	387
Mini-Storage	6.51% 25	53.65% 206	39.84% 153	384
Manufacturing	53.21% 207	32.65% 127	14.14% 55	389
Brewery/Distillery	47.04% 183	35.48% 138	17.48% 68	389

Q10 Rank (in order) the types of housing would you like to see our town encourage more of

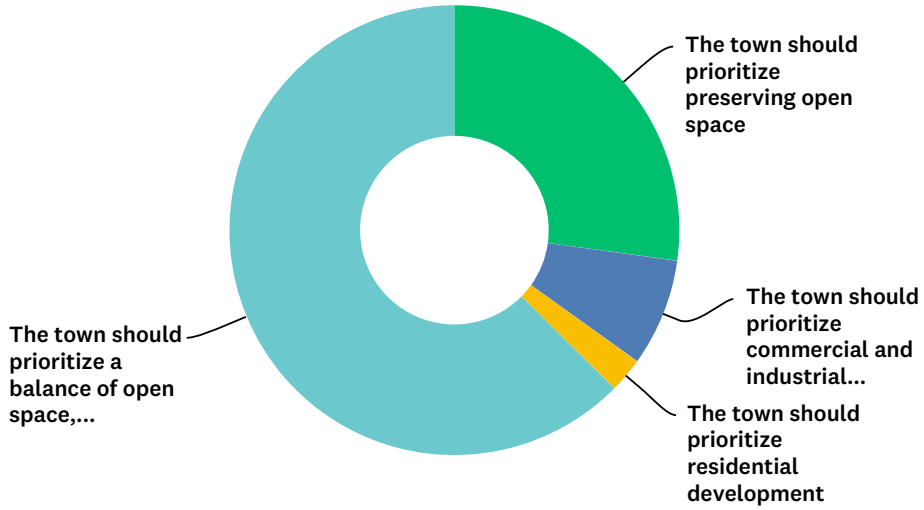
Answered: 366 Skipped: 50



	1ST CHOICE	2ND CHOICE	3RD CHOICE	TOTAL
Single-Family Homes	68.00% 153	23.56% 53	8.44% 19	225
Two-Family Homes	6.38% 3	48.94% 23	44.68% 21	47
Accessory Apartments with Single-Family Homes	18.75% 15	38.75% 31	42.50% 34	80
Condominiums/Town Houses	18.18% 18	42.42% 42	39.39% 39	99
Cluster Developments/Conservation Subdivision	30.49% 25	37.80% 31	31.71% 26	82
New Apartment Buildings	20.00% 8	32.50% 13	47.50% 19	40
Senior Housing	37.76% 54	33.57% 48	28.67% 41	143
Mixed Residential with Business	23.75% 19	35.00% 28	41.25% 33	80
None	65.69% 67	9.80% 10	24.51% 25	102

Q11 Which of the following statements best expresses your view on future land use in town (check one)

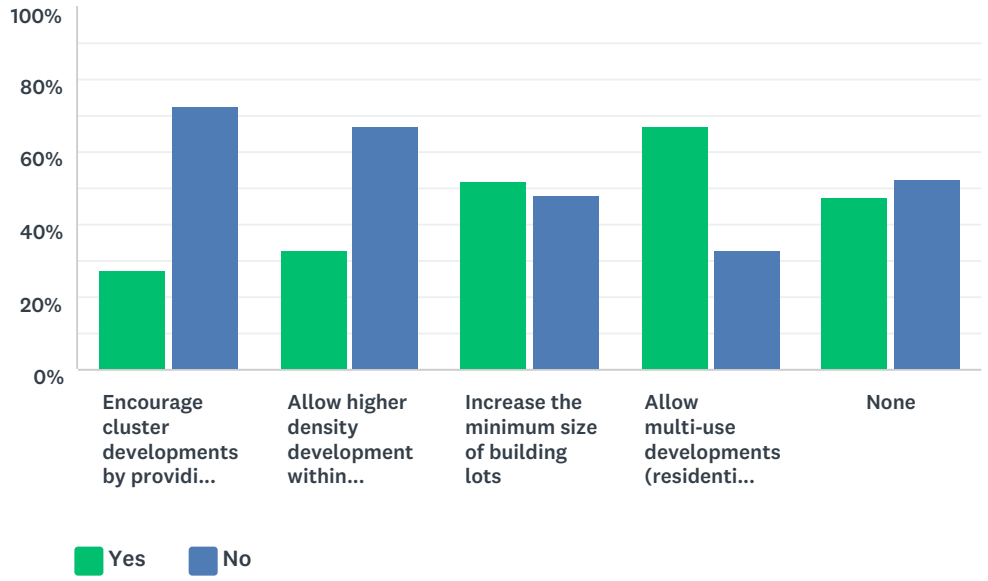
Answered: 401 Skipped: 15



ANSWER CHOICES	RESPONSES	
The town should prioritize preserving open space	27.18%	109
The town should prioritize commercial and industrial development	7.73%	31
The town should prioritize residential development	2.49%	10
The town should prioritize a balance of open space, commercial/industrial development, and residential development	62.59%	251
TOTAL		401

Q12 Which of the following methods for protecting open space would you support?

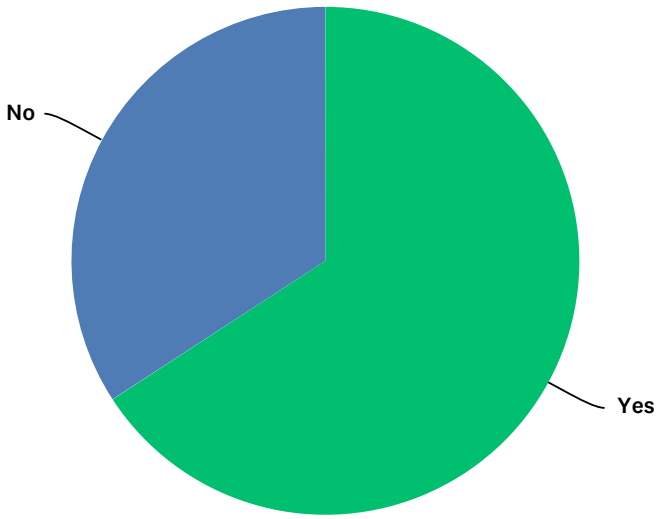
Answered: 400 Skipped: 16



	YES	NO	TOTAL
Encourage cluster developments by providing incentives to developers, like permitting more than the normally allowed number of lots	27.38% 92	72.62% 244	336
Allow higher density development within existing village centers	33.13% 109	66.87% 220	329
Increase the minimum size of building lots	52.20% 178	47.80% 163	341
Allow multi-use developments (residential and commercial) within existing business and commercial districts	66.86% 230	33.14% 114	344
None	47.69% 62	52.31% 68	130

Q13 Would you support the creation of a Heritage Commission with educational, advisory, and technical responsibilities for the Town's man-made cultural and historical resources (such as buildings)?

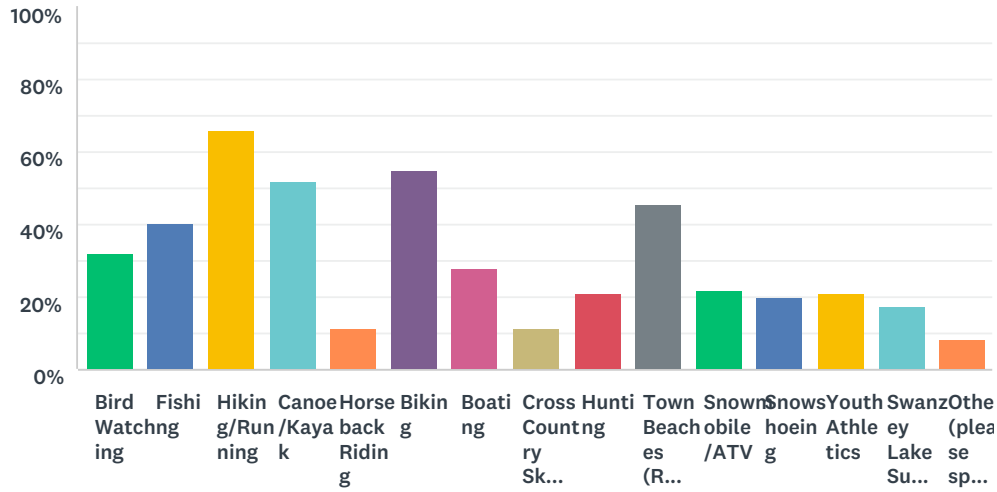
Answered: 398 Skipped: 18



ANSWER CHOICES	RESPONSES	
Yes	65.83%	262
No	34.17%	136
TOTAL		398

Q14 In what ways do you enjoy the town's recreational opportunities? (Please check all that apply)

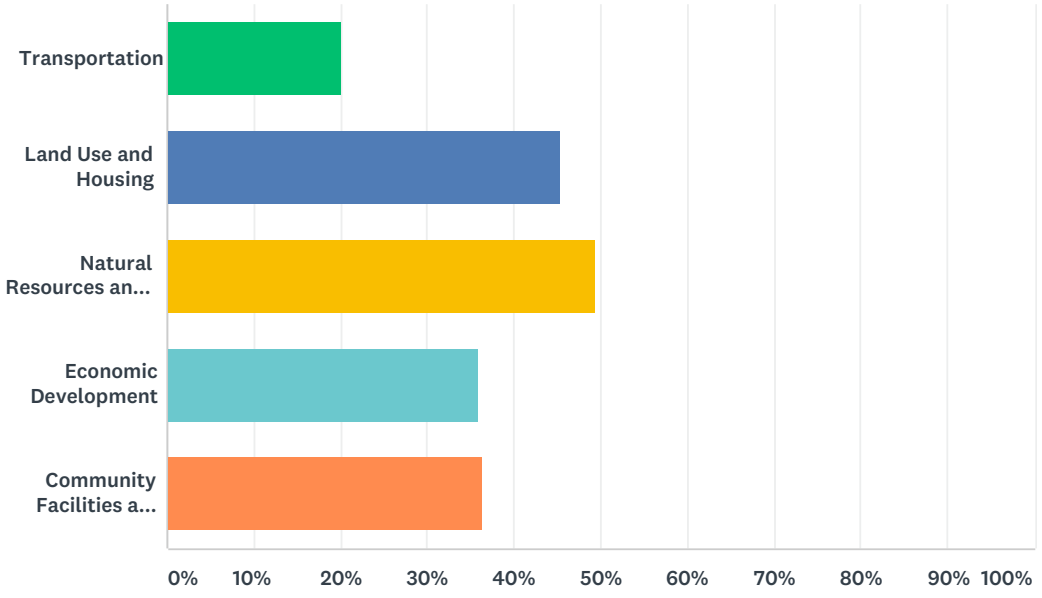
Answered: 384 Skipped: 32



ANSWER CHOICES	RESPONSES	
Bird Watching	32.03%	123
Fishing	40.36%	155
Hiking/Running	66.15%	254
Canoe/Kayak	51.82%	199
Horseback Riding	11.72%	45
Biking	54.95%	211
Boating	28.13%	108
Cross Country Skiing	11.46%	44
Hunting	20.83%	80
Town Beaches (Richardson Park)	45.57%	175
Snowmobile/ATV	21.88%	84
Snowshoeing	19.79%	76
Youth Athletics	20.83%	80
Swanzey Lake Summer Camp	17.45%	67
Other (please specify)	8.59%	33
Total Respondents: 384		

Q15 Later in the year, the Town will be holding a series of small focus group meetings on specific topic areas in the Master Plan listed below. This will be an opportunity for residents interested in a particular issue to learn more and provide direct input on that topic. We anticipate each of these focus groups will meet 2-3 times over several months. Town staff and the Planning Board will use the input provided by these groups to prepare the Master Plan update. Please indicate whether you would be interested in participating in any of the focus groups below and please provide your contact information. Additional information on the focus groups will also be provided on the Town's website.

Answered: 170 Skipped: 246



ANSWER CHOICES	RESPONSES	
Transportation	20.00%	34
Land Use and Housing	45.29%	77
Natural Resources and Recreation	49.41%	84
Economic Development	35.88%	61
Community Facilities and Historical Resources	36.47%	62
Total Respondents: 170		

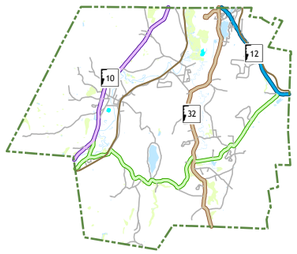
Q16 If you would like to receive additional information about the Master Plan update, please provide your contact information.

Answered: 93 Skipped: 323

ANSWER CHOICES	RESPONSES	
Name	97.85%	91
Company	0.00%	0
Address	94.62%	88
Address 2	0.00%	0
City/Town	95.70%	89
State/Province	95.70%	89
ZIP/Postal Code	94.62%	88
Country	0.00%	0
Email Address	98.92%	92
Phone Number	0.00%	0

Appendix B

Town of Swanzey Zoning Map



Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local

TOWN OF SWANZEY NEW HAMPSHIRE

ZONING MAP

Zoning Districts

- Business District
- Commercial/Industrial District
- Industrial Park District
- Residence District
- Rural/Agricultural District
- Village Business I District
- Village Business II District

Other Features

- Class I State Route
- Class II State Route
- Class V Town Road
- Class VI Town Road
- Private Road
- Tax Parcel Boundary
- Rail Trail
- Perennial Stream
- Intermittent Stream
- Swamp or Marsh
- Waterbody
- Reservoir

This map is the property of the Town of Swanzey.

Data sources include New Hampshire Department of Transportation, United States Geological Survey, and the Town of Swanzey. Zoning district boundaries have been modified to fit the Swanzey tax parcel boundaries and do not represent legal boundaries.

Zoning districts shown are approximations.

Data shown is the most current available as of March 2022.

The map was created Southwest Region Planning Commission in April of 2022.

Relative Scale: 1 inch equals 5 miles
Absolute Scale: 1:48,000

0 0.25 0.5 Miles

0 1,000 2,000 Feet

SWRPC

Maps prepared by Southwest Region Planning Commission (SWRPC) are for planning purposes only. SWRPC uses data from multiple sources at various scales of accuracies. No warranties, expressed or implied, are provided for the data herein, its use, or its interpretation.

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Appendix C

Town of Swanzey Natural Resources Inventory
Phase I & Phase II

TOWN OF SWANZEY
NATURAL RESOURCES INVENTORY
PHASE I

Prepared for:
Swanzey Conservation Commission



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TOWN OF SWANZEY
NATURAL RESOURCES INVENTORY
PHASE I

Prepared for:
Swanzey Conservation Commission

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Principal Ecologist

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December 2018

Cover Photograph The silver maple floodplain forests along the Ashuelot River are rare, providing critical habitat for a diverse array of plants and wildlife, some of which are species of conservation concern.

TABLE OF CONTENTS

Page

INTRODUCTION 1

WATER RESOURCES 10

ECOLOGICAL RESOURCES 19

AGRICUTURAL AND FOREST RESOURCES 27

CONSERVATION LANDS 34

RECOMMENDATIONS 36

LITERATURE RESOURCES 39

APPENDIX A – GIS DISCLAIMER 40

APPENDIX B – HABITAT SIZE REQUIREMENTS FOR WILDLIFE 42

INTRODUCTION

Population Growth and Development

New Hampshire's population has been growing at a rate that is twofold that of the other New England states. The population has doubled in the forty years leading up to the turn of the century in 2000, and there was a rise in population of 17.2% between 1990 and 2004 alone. This rate of growth is followed by VT (10.4%), RI (7.7%), ME (7.3%), MA (6.7%), and CT (6.7%). Furthermore, it has been projected that the state will experience an increase of 23% from 1997 to 2020. New Hampshire's development pressure will tax the state's natural resources if not managed with diligence.

The bulk of population growth is in the southern half of the state; however, 75% of conservation lands are located in the northern regions. This entrusts towns in the southern half of New Hampshire with the responsibility of managing their natural resources and biological diversity, and establishes citizens as stewards of the land, requiring the use of informed decision making to promote a more sustainable approach to land use planning.

Natural Resources and Land Use Planning

One of the first steps in planning for growth and development is to conduct a natural resources inventory (NRI). This effort helps to better understand what natural resources are within a town and where they are located. As such, an NRI is a list and description of the natural elements found within and adjacent to a town (or even a watershed or larger region). These can include such elements as wetlands, aquifers, ponds, rivers, forests, plants, soils, and wildlife. These data can be created from existing sources or from field-based assessments to better reflect the extent of natural resources within a community.

New Hampshire statutes mandate that communities shall create an NRI. This is generally the responsibility of the local Conservation Commission, whose purpose is "for the proper utilization and protection of natural resources and for the protection of watershed resources" of the town. In particular, RSA 36-A:2 continues to state that "Such commission shall conduct researches into its local land and water areas [and] … shall

keep an index of all open space and natural, aesthetic or ecological areas within the city or town … with the plan of obtaining information pertinent to the proper utilization of such areas, including lands owned by the state or lands owned by a town or city. It shall keep an index of all marshlands, swamps and all other wetlands in a like manner…"

An NRI can serve as the basis for developing innovative land use planning that can be adopted to help protect various resources, such as wetlands, wildlife habitats, and biological diversity. Biological diversity, or biodiversity, refers to the variety, variability, and complexity of life in all its forms and includes various ecological processes (for example, nutrient cycling, flooding, fires, wind events, and succession) that have helped to shape species over time.

Biodiversity includes various levels of ecological organization such as individual species and their genes that have evolved over time, as well as the many intricate plant and wildlife populations. It refers to even higher levels of organization including the assemblage of ecological communities[1] and even entire ecosystems, such as wetlands, woodlands, and rivers. Therefore, the concept of biodiversity engenders all levels of biological organization and the interactions of living organisms within their physical environments. It is at the heart of understanding the dynamics of biodiversity that we seek to develop protection strategies, helping to ensure a healthy environment for humans, as well as all other life forms.

Planning for the conservation of natural resources and biodiversity is not a new concept. It has helped in such efforts as the recovery of the American bald eagle; assisted in building preserves and managing other lands for species of conservation concern, as well as our most common species; aided in the identification of biodiversity hot spots; and helped to identify and protect critical wildlife habitats within our landscape. It has been a center piece for natural resources protection, restoration, and adaptive management for the past four decades.

This form of land use planning is not a static directory but one that is ever-changing. It is a vision that should be based on the principles of conservation biology and

[1] An ecological community is a group of two or more populations of different species found in the same place. For example, this would include the wetland bird community of Dillant-Hopkins Airport or the silver maple floodplain forest community along the Ashuelot River.

incorporates the current ecological structure of a given area (such as a town, a watershed, or an entire region). Thus, conservation planning strives to incorporate the socio-economic fabric of our world with that of the ecological structure. This effort can help build more sustainable and resilient New Hampshire communities far into the future as a result of implementing comprehensive land use planning that includes our natural environment and built infrastructure.

The need for this type of informed land use planning is becoming more evident. Ecosystems and their constituents have long been susceptible to long-term degradation from overexploitation and misuse of natural resources. This has led to a precipitous decline in several species, some even resulting in extinction altogether (such as the passenger pigeon and eastern elk). It has also led to the loss of critical habitats due to sprawling developments over time. While the past few decades certainly have seen a positive change in resource management and protection, there has been a distinct rise in conservation planning efforts within the 21st century, especially in New Hampshire.

Swanzey has recognized the need to incorporate its natural resources into the town planning process. The 2003 Master Plan addresses a variety of chapters concerning the environment and resource conservation, land use, and recreation. It includes some basic goals, such as:

> "It is our goal to protect ecological integrity and the purity of air, earth, and water of the 46 square miles for which we Swanzey residents are momentary stewards." Page 5

> "We encourage support of activities which 're-create' mind, body, and spirit of residents – whether physical exercise, cultural enrichment, historical and environmental awareness, solitude, and meaningful retreat." Page 5

The Master Plan continues to identify other goals, objectives, strategies, and recommendations relating to Land Use, Resource Conservation, and Recreation that address management and protection of natural resources.

In 2004, the Open Space Advisory Committee prepared and published A Plan for the Protection of Open Space, (aka, Swanzey Open Space Plan) with the purpose of helping to address many aspects of the 2003 Master Plan, particularly the aspect of land use planning. The Plan "sets forth criteria, goals, and recommendations for implementing an Open Space Protection Plan, and establishes a role for Town government in land conservation as a matter of public policy."

The Committee and other participants organized a list of numerous natural resources important for restoration and/or conservation. This included many elements that provide us many important ecological functions and societal values, such as:

- Recreation and public access
- Natural beauty
- Habitat diversity for native species
- Unfragmented habitat
- Historic and archeological areas
- Active agriculture and prime soils
- Community character
- Remoteness and sense of isolation
- Water supply and water quality
- Air quality

The Plan then provides a "preliminary list" of land conservation priorities, which include forested hills, river corridors, wetlands, open fields, and farmlands. It further addresses various recommendations and action steps to guide the conservation plan. The Swanzey Open Space Plan (2004) and Master Plan (2003) have contributed greatly to environmental awareness and community land use planning in Swanzey.

Statement of Purpose

The Swanzey Natural Resources Inventory (NRI) was initiated in March 2018. The overall scope of this project was to develop an enhanced Phase I NRI to support the

Town's natural resource protection efforts and provide a basis for informed land use planning. Goals of the project were 1) to engage the community in the NRI process through a community forum and public presentation, 2) to develop a series of NRI maps designed for educational and planning purposes, 3) to refine existing data for wetlands and grasslands, and to map potential vernal pools from aerial photography interpretation, and 4) to combine the various natural resources data and maps into a Phase I NRI report.

Community Outreach and Education

In cooperation with Moosewood Ecological, the Swanzey Conservation Commission held a community forum to engage residents in the public planning process. It was held on May 14, 2018 at Whitcomb Hall. This forum introduced the overall project background to the community, including the goals of each of the components. It also facilitated a discussion on growth and natural resources protection. This discussion focused on identifying the strengths and challenges of Swanzey's natural resources and its working landscape, as well as began to list some of its most significant natural areas.

As a final component of the NRI project, a public presentation was held on October 11, 2018, to discuss the findings of the NRI. Topics included wetlands, water bodies, groundwater, wildlife habitats, rare species, agriculture, and forest resources, as well as conservation lands in Swanzey. The many uses of an NRI were also illuminated during the presentation.

Swanzey's Physical Landscape

Swanzey covers approximately 46 square miles, or 29,440 acres, of mostly forested and hilly terrain (Figures 1 and 2). Its topography is highly variable, ranging in elevation from approximately 470 feet along the Ashuelot River and its floodplains to 1,417 feet on Franklin Mountain along the southwestern town boundary. Generally, the landscape becomes steep as one moves out of the Ashuelot River and South Branch Ashuelot River valleys in all directions.

The landscape is further characterized by the rolling hills of Forbush Hill, Marcy Hill, and Hewes Hill in the southeast; Gunn Mountain, Rattlesnake Mountain, and

Bullard Mountain in the southwest; West Hill in the northwest; and Mount Cresson and Mount Caesar rising abruptly from the Ashuelot River.

Major water bodies include Swanzey Lake and Wilson Pond. Extensive wetland systems grace many sections along rivers and streams, such as Ashuelot River, South Branch Ashuelot River, Martin Brook, Falls Brook, Forbush Brook, and Perry Brook. These varying landforms offer great diversity for wildlife and plant communities alike.

The most heavily developed parts of Swanzey include residential and commercial areas associated with the three main town centers, as well as the Dillant-Hopkins Airport located in the northern part of town. Moving away from these largely developed areas the town is mostly characterized by its rural setting that surrounds its economic centers.

The Topographic Base Map in Figure 1 provides a sense of some of Swanzey's hiking and rail trails. Six trailheads show the locations of various open spaces including Mt. Caesar, Carroll's Hill, Mt. Cresson, Dickinson Forest, Honey Hill, Tippin Rock/Hewes Hill. These six areas offer a total of 9 miles of trails available for all ages as they are family-friendly, and many are organized as loop hikes. Trail maps are located at some trailheads while the town's website provides maps for Carroll's Hill, Mt. Cresson, and Tippin Rock/Hewes Hill, as well as bike trails to explore covered bridges, the Ashuelot River Rail Trail, and the Cheshire Rail Trail. These rail trails are also shown on the topographic map.

The Parcel Base Map (Figure 3) provides an opportunity to better understand how Swanzey's landscape has become parceled, or divided into separate properties. This map demonstrates the relative size and distribution of properties throughout the town. To better understand acreage and ownership, as well as tax parcel and lot numbers, refer to the paper maps located at the Town Office or visit Swanzey's website at https://www.town.swanzey.nh.us

Swanzey Natural Resources Inventory
Topographic Base Map

Mt. Cresson Trailhead

Dickinson Forest Trailhead

Mt. Caesar Trailhead

Honey Hill Trailhead

Tippin Rock/Hewes Hill Trailhead

Carroll's Hill Trailhead

Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

Conservation Lands

Trailheads

Cheshire Rail Trail

Ashuelot Rail Trail

N

Miles

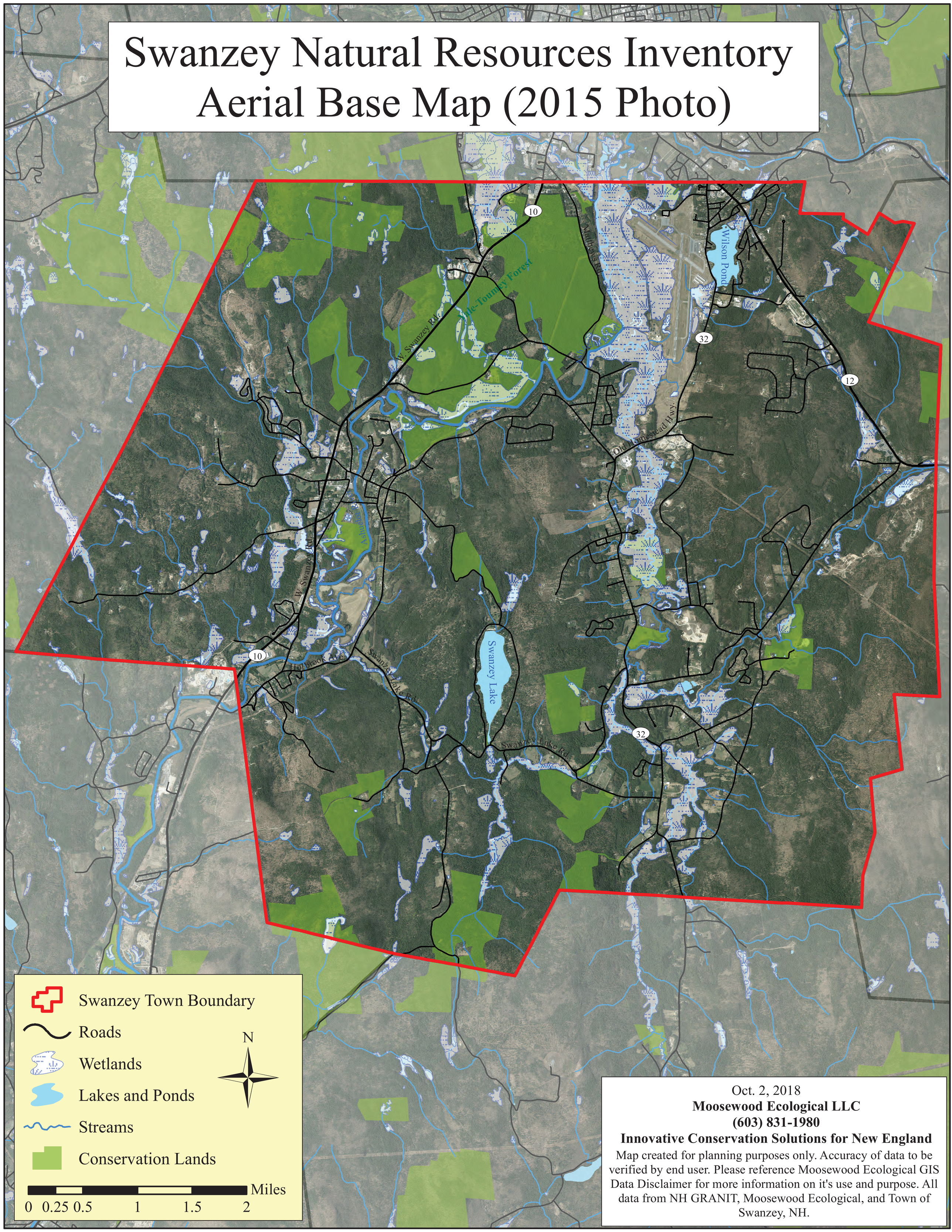
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Oct. 2, 2018

Moosewood Ecological LLC
(603) 831-1980
Innovative Conservation Solutions for New England

Map created for planning purposes only. Accuracy of data to be verified by end user. Please reference Moosewood Ecological GIS Data Disclaimer for more information on it's use and purpose. All data from NH GRANIT, Moosewood Ecological, and Town of Swanzey, NH.

Swanzey Natural Resources Inventory
Aerial Base Map (2015 Photo)



Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

Conservation Lands

N

Miles

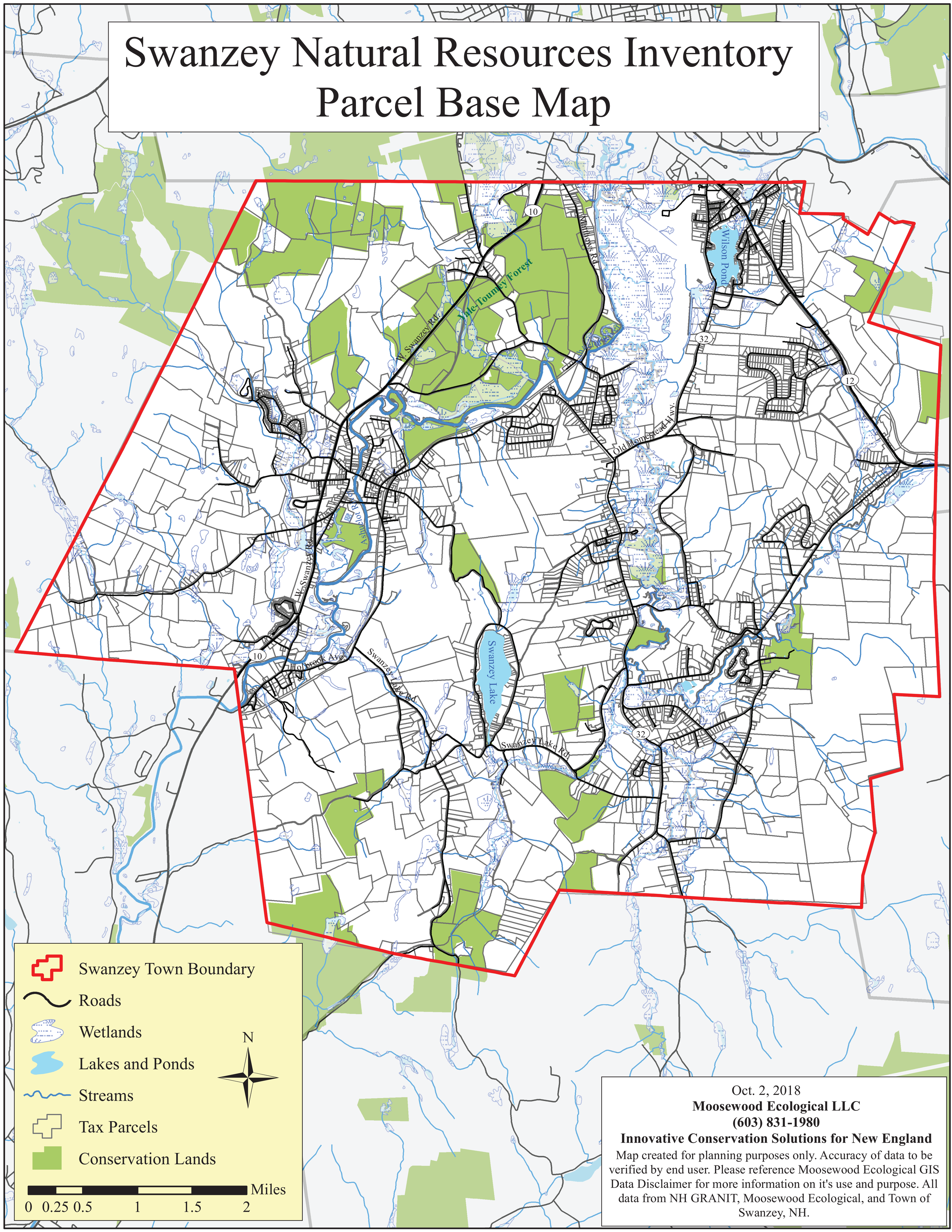
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Swanzey Natural Resources Inventory
Parcel Base Map



Oct. 2, 2018

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WATER RESOURCES

Water resources represent some of our most fragile ecosystems and are particularly sensitive to certain types of land use. Water resources comprise a variety of natural features, which include both surface water and groundwater resources. Such features include our streams, ponds, wetlands, and aquifers. In terms of their importance, these resources provide a variety of ecological functions and societal values, including:

- Water quality maintenance
- Flood control
- Wildlife and fisheries habitat
- Drinking water sources
- Recreation
- Visual quality and aesthetics
- Rare and endangered species habitat and natural communities
- Groundwater recharge and discharge
- Shoreline stabilization
- Educational and scientific value
- Overall biological diversity

Wetlands

Wetlands generally include familiar places such as marshes, wet meadows, beaver impoundments, swamps, fens, bogs, and other surface water bodies. As noted above, they perform a variety of ecological functions and values, such as providing significant habitats for wildlife and plants, maintaining good water quality, providing storage during a flood event, and sources for recreation. In New Hampshire, wetlands are defined by RSA 482-A:2 as "an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soils conditions." As such, wetlands are regulated by the NH Dept. of Environmental Services Wetlands Bureau as defined by RSA 482-A:2.

As part of this project, wetlands were revised to better reflect their representation in Swanzey. The US Fish and Wildlife Service's National Wetlands Inventory (NWI) and aerial photography interpretation were used for this revision. US Department of Agriculture's (USDA) Natural Resources Conservation Service hydric soils were also mapped to better understand the extent of wetlands within Swanzey. These combined datasets provide for a more balanced approach at wetlands mapping.

The NWI is a hierarchal system of classification that was designed to map wetlands throughout the United States. The purpose was to determine wetlands loss over time. It also serves as a systematic method for comparing wetlands within a defined geographic location (i.e., town or watershed). The NWI provides some very useful information including the type of wetland as well as its hydrology, associated plant communities, water chemistry, and other modifiers such as human dams and beaver influence.

Swanzey is estimated to have roughly 2,524.9 acres of wetlands dispersed throughout the Town (Table 1 & Figure 4). Lacustrine wetlands include lakes and ponds, whereas palustrine wetlands include familiar places such as marshes, swamps, and beaver ponds. The largest and most extensive wetlands can be found along the various streams and rivers. However, the landscape provides small pockets of isolated wetlands as well.

Table 1. Summary of wetlands in Swanzey.

Wetland Classification	**Area (acres)**
Lacustrine (total)	180.4
Palustrine (total)	2,344.50
Emergent	
Forested	
Scrub-shrub	
Unconsolidated Bottom	

SOURCE: Data developed by Moosewood Ecological LLC (2018).

To gain a better sense of the true extent of wetlands it is important to also consider hydric soils. Essentially, these are wetland soils, including poorly drained and very poorly drained soil types. These have been mapped by the USDA Natural Resources Conservation Service. Poorly drained soils are estimated to cover about 2,119 acres while

very poorly drained soils cover 1,125 acres. These are estimates and field checking is needed when appropriate.

Watersheds

All water resources reside in a particular watershed. A watershed is the area that drains to a common water resource. This may be a wetland, stream, or lake, and the land use within a particular watershed can have a direct effect on the quality and quantity of surface waters and the underlying aquifers. Land use planning that uses a watershed approach can have a great impact on a town's water resources. This is important since we all depend upon clean water to help sustain life. Swanzey is divided into 5 major watersheds (Table 2 and Figure 4).

Table 2. Summary of major watersheds in Swanzey.

Watershed	Total Area (acres)	Area in Swanzey (acres)
Keene Tributaries	21,637	2,033
Perry Brook	14,442	5,658
South Branch Ashuelot River	33,737	9,422
The Branch	33,935	33
Winchester-Swanzey Tributaries	28,590	11,866

SOURCE: USGS HUC 12 watersheds from GRANIT

Surface Water Bodies

Swanzey contains a variety of surface water bodies, including rivers, streams, ponds, and lakes, that are distributed throughout the Town (Figure 4). Not only do water bodies provide a multitude of human benefits such as fishing, hunting, boating, swimming, and nature watching, they are also extremely significant for diverse wildlife and plants that depend upon these resources for part or all of their life cycle needs. Generally, major threats to water resources include potential water quality degradation and habitat loss due to surrounding land uses, including unsustainable forestry and agricultural practices and land conversion associated with various types of developments.

Lakes and ponds in Swanzey cover approximately 180.4 acres, ranging in size from 72.4 acres to 108 acres (Table 3 and Figure 4). These have been recognized and

labeled as such by the NH Dept. of Environmental Services and the US Geological Survey. Swanzey Lake and Wilson Pond are included on the NH Dept. of Environmental Services Consolidated List of Water Bodies subject to the Shoreland Water Quality Protection Act under RSA 483-B. In addition, approximately 45 acres of ponded water behind the Ashuelot River dam impoundment is included in this list.

Table 3. Summary of lakes and ponds in Swanzey.

Lakes and Ponds	Size (acres)
Swanzey Lake	108
Wilson Pond	72.4

SOURCE: USGS topography and GRANIT hydrogrpahy datasets.

Approximately 125 miles of rivers and streams have been mapped in Swanzey (Table 4 and Figure 4). Fourteen of these have been identified by the U.S. Geological Survey by name. Of the many rivers and streams, four are listed on the NH DES Consolidated List of Water Bodies subject to the Shoreland Water Quality Protection Act under RSA 483-B. These include the Ashuelot River, South Branch Ashuelot River, Ash Swamp Brook, and Martin Brook (beginning at the junction of Falls Brook).

Table 4. Summary of rivers and streams in Swanzey.

Streams	Length (miles)	Stream Order
Ashuelot River	9.7	6th
South Branch Ashuelot River	12.1	5th
Ash Swamp Brook	0.3	4th
Martin Brook	3.6	4th
Wheelock Brook	1.2	3rd
Perry Brook	4.2	3rd
Falls Brook	1.4	3rd
California Brook	3.3	3rd
New Run Brook	2.0	2nd
Indian Brook	3.0	2nd
Hill Brook	2.1	2nd
Forbush Brook	2.6	2nd
Bridge Brook	2.2	2nd
Bailey Brook	2.7	2nd
Other Streams	74.1	1st - 3rd

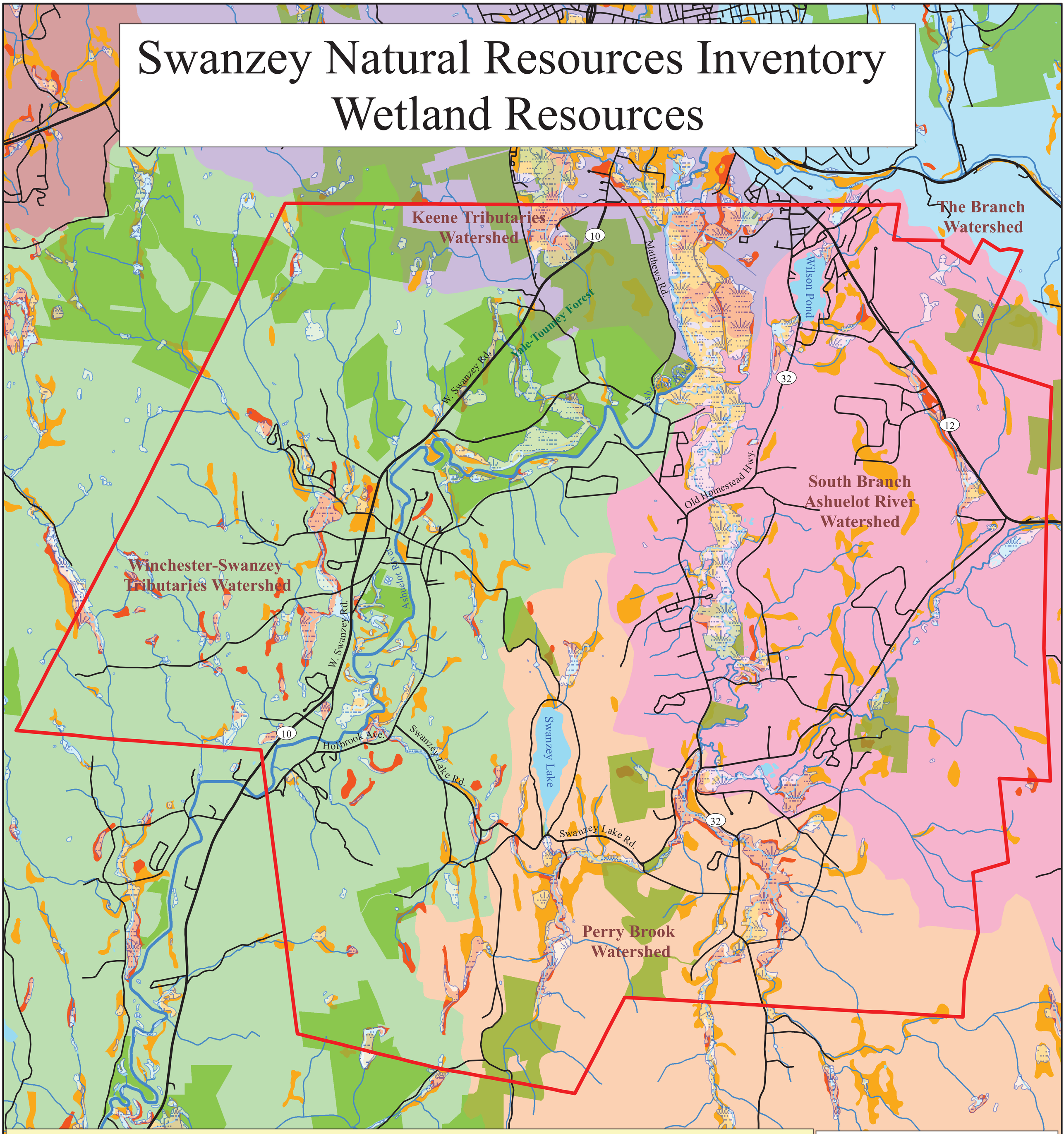
SOURCE: USGS topography and GRANIT hydrogrpahy datasets.

The Shoreland Water Quality Protection Act (RSA 483-B) is a state statute that was prepared to protect water quality for designated public waters. The Act establishes minimum standards for various setbacks from the reference line based on land use within the designated 250-foot buffer. For most new construction, as well as land excavating and filling, a state permit may be required (certain exemptions apply). As such, all great ponds (>10 acres), fourth order streams[2] or higher, and state-designated rivers have been identified by the NH Dept. of Environmental Services as water bodies that are subject to the Act.

For more details on the Shoreland Water Quality Protection Act, as well as certified administrative rules, refer to the NH DES at http://des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm

[2] Stream ordering is a hierarchy used to define the size of a stream. The smaller the stream order the smaller the stream. First order streams include the "starter" streams that can be found along the steep slopes of Swanzey. When two first order streams converge, they form a second order stream, and so on.

Swanzey Natural Resources Inventory
Wetland Resources



Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

Conservation Lands

Watershed (HUC 12)

Keene Tributaries

Perry Brook

South Branch Ashuelot River

The Branch

Winchester-Swanzey Tributaries

Hydric Soils

Poorly drained

Very poorly drained

N

0 0.25 0.5 1 1.5 2 Miles

Oct. 2, 2018

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Groundwater Resources - Stratified Drift Aquifers

Groundwater resources are stored in two main types of aquifers and can serve as sources for drinking water. Aquifers can be located within saturated areas of sand and gravel deposits or in fractured bedrock. In the past as glaciers melted, they left behind layers of coarse sediments including sand and gravel. The space between these sediments provides opportunity for groundwater storage and flow. Groundwater stored in *stratified drift aquifers* of this kind can serve as an excellent source for drinking water. Locating and protecting these geologic features can help to ensure a supply of clean drinking water for the community as these areas are vulnerable to contamination.

Swanzey contains approximately 7,791.9 acres of stratified drift aquifers (Table 5 and Figure 5). The largest and most significant aquifers are associated with the Ashuelot River on the west side of town, as well as with the South Branch of the Ashuelot River, Martin Brook, and Wilson Pond to the east. Smaller aquifers are associated with Perry Brook in the south-central section.

Aquifers are divided into categories based on *transmissivity*, or the rate at which water moves through an aquifer and is measured in square feet per day (ft^2/day). Therefore, higher rates of transmissivity correspond to a potentially higher yield of groundwater. Most of the aquifers in Swanzey have a transmissivity rate of 2,000ft^2/day or less, which corresponds to a potential yield of less than 75 gallons per minute. However, a few smaller areas are predicted to have a much higher yield.

While transmissivity takes into account the quantity of water moving through an aquifer system it does not reflect the quality of the source. To assist in addressing this issue and to identify potential future public water supplies for communities, the NH Dept. of Environmental Services and the Society for the Protection of NH Forests prepared a Potential Favorable Gravel Well Analysis (PFGWA). This technique analyzed stratified drift aquifers, affording the opportunity for town planners and water suppliers to determine quantity and quality constraints on aquifers. In doing so, the PFGWA creates buffers to eliminate all known and potential contamination sources and examines potential well yield to identify the most suitable areas for potential community wells. In effect, this effort is encouraging communities to take proactive measures at protecting

their most significant groundwater resources. As such, the higher yielding aquifers associated with the Ashuelot River, the South Branch of the Ashuelot River, and Martin Brook have been identified by the PFGWA. It was estimated that these sites could produce more than 75 gallons per minute with a few sites potentially producing more than 300 gallons per minute.

Table 5. Summary of aquifers and favorable gravel well analysis in Swanzey.

Groundwater Attribute	**Size (acres)**
Stratified Drift Aquifer Transmissivity Rates	
<2,000 feet^2/day	4,514.2
2,000-4,000 feet^2/day	3,151.3
>4,000 feet^2/day	126.4
Favorable Gravel Well Analysis	
>75 Gallons/Minute	1,344.4

Source: USGS stratified drift aquifers (GRANIT 2000) and NH DES favorable gravel well analysis (2011).

Swanzey Natural Resources Inventory
Groundwater Resources

Keene Tributaries Watershed

Winchester-Swanzey Tributaries Watershed

South Branch Ashuelot River Watershed

Perry Brook Watershed

Yale-Toumey Forest

Matthews Rd.

W. Swanzey Rd.

Wilson Pond

Old Homestead Hwy.

Ashuelot River

Holbrook Ave.

Swanzey Lake Rd.

Swanzey Lake

10

32

12

Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

Conservation Lands

Watershed

Favorable Gravel Well Analysis

Aquifer Transmissivity

less than 2,000 ft. sq./day

2,000 - 4,000 ft. sq./day

greater than 4,000 ft. sq./day

N

0 0.25 0.5 1 1.5 2 Miles

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ECOLOGICAL RESOURCES

Wildlife Habitats

The NH Fish and Game Department, in cooperation with other agencies, organizations, and individuals, produced the NH Wildlife Action Plan (WAP) in 2005 and revised it in 2015. This document was designed as a planning and educational tool for federal, state, and municipal governing bodies, conservation commissions, land trusts and other conservation organizations, natural resource professionals, and private landowners, as well as the general public, to promote the conservation and management of NH's biological diversity. The WAP provides a resource for developing informed land use decisions and land management planning. The intent was to ensure an adequate representation of various wildlife habitats are maintained across our landscape, keeping common species common in New Hampshire and working to prevent the loss of our rare and endangered species.

A total of fourteen wildlife habitats as recognized by the WAP were mapped for Swanzey (Table 6 and Figure 6). These habitats should be field verified to the extent possible to confirm the location, extent, and habitat type. Grasslands were refined based on 2015 aerial photography interpretation. Potential vernal pools were mapped using 2015 aerial photography interpretation (Figure 7). The WAP does recognize vernal pools an important wildlife habitat but has not mapped them for New Hampshire. Locations of this critical habitat can be predicted through aerial photography interpretation, providing the first step in learning about their distribution. However, they are best mapped using on-site field assessments and verification.

Table 6. Summary of wildlife habitats in Swanzey.

Wildlife Habitat	Size/Count	% of Town
Appalachian oak-pine	5,846 acres	20.15
Cliff and Talus	47 acres	0.16
Floodplain Forest	552 acres	1.90
Grassland	949 acres	3.27
Hemlock-hardwood-pine	16,609 acres	57.25
Barren or Developed	2,300 acres	7.93
Northern swamp	5 acres	0.02
Open water	228 acres	0.79
Peatland	75 acres	0.26
Rocky ridge	112 acres	0.39
Temperate swamp	554 acres	1.91
Marsh and shrub wetland	950 acres	3.27
Streams	125 acres	n/a
Vernal Pools	42 pools	n/a

Source: Refined wildlife habitats by Moosewood Ecological (2018) using Wildlife Action Plan data (2015), aerial photography (2015) interpretation, National Wetlands Inventory (2001), NH hydrography data (2006), from GRANIT

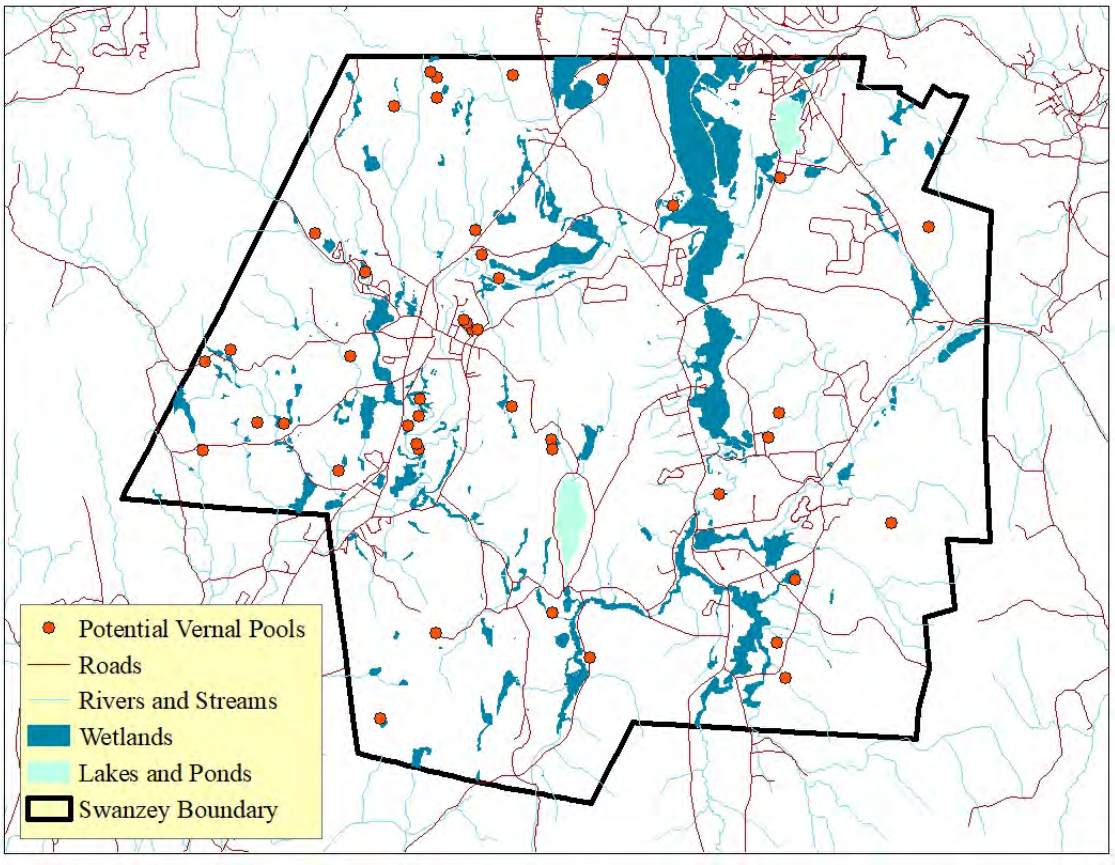
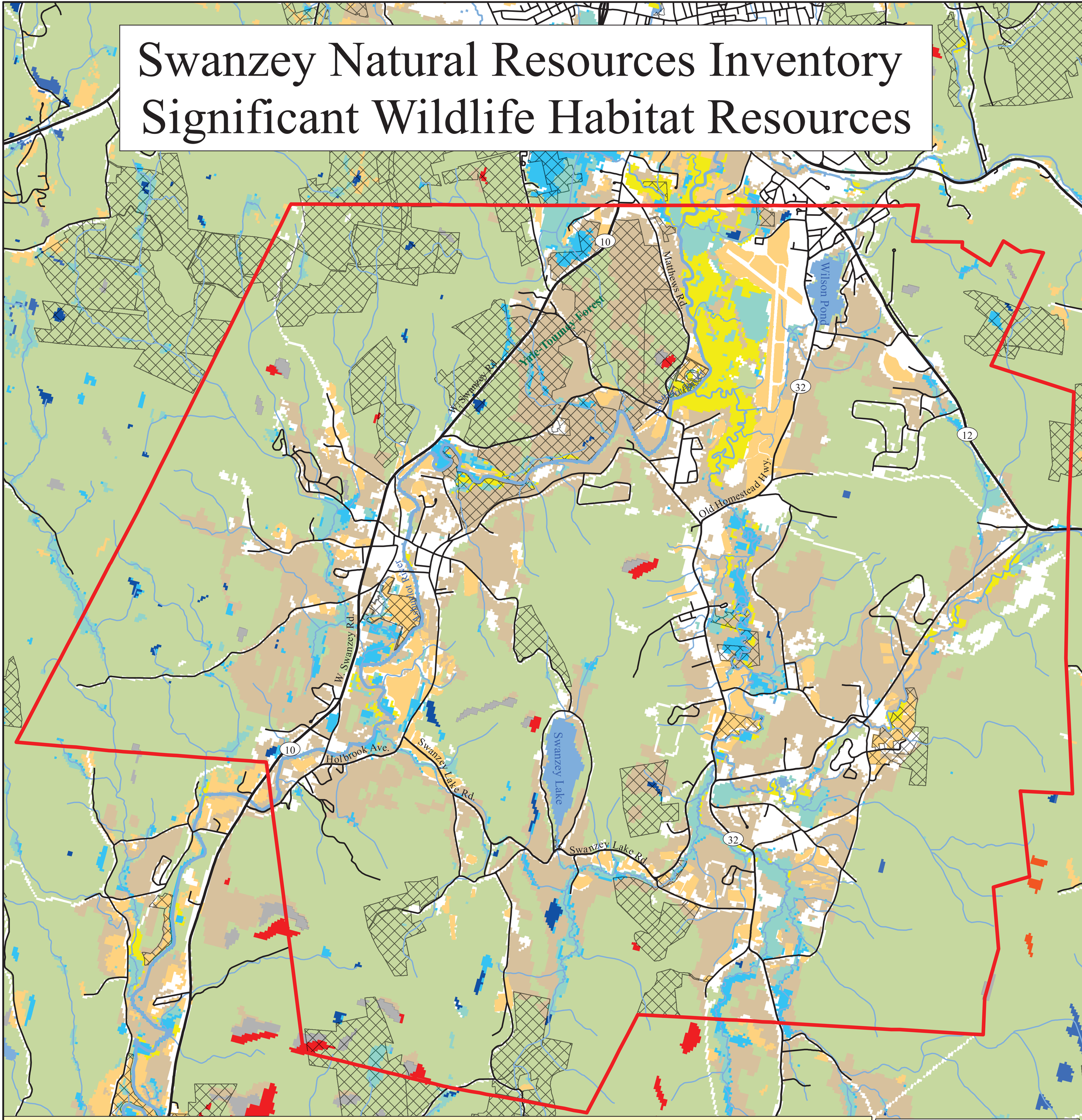


Figure 7. Potential vernal pools in Swanzey, NH.

Swanzey Natural Resources Inventory
Significant Wildlife Habitat Resources



Swanzey Town Boundary
Roads
Streams
Conservation Lands

Open water
Northern swamp
Peatland
Temperate swamp
Marsh and shrub wetland
Cliff and Talus slope
Rocky ridge

Grassland
Floodplain forest
Appalachian oak-pine
Hemlock-hardwood-pine
Northern hardwood-conifer
Barren or Developed

0 0.25 0.5 1 1.5 2 Miles

N

Oct. 2, 2018

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Known Rare Species and Exemplary Natural Communities

The NH Natural Heritage Bureau (NHNHB), a bureau within the Division of Forest and Lands, is responsible for locating, tracking, and facilitating the protection of rare species and exemplary natural communities. They have developed an extensive classification system for natural communities in New Hampshire and have ranked each according to rarity in the state, as well as globally. As such, the NHNHB maintains a list of known rare elemental occurrences (i.e., rare species and rare and exemplary natural communities) for each town in the state and can provide reports of occurrences that are documented for public conservation lands. However, data on rare elemental occurrences on private properties are not available to the public unless permission has been granted by the landowner to release such data.

The NHNHB has documented one exemplary natural community in Swanzey (Table 7). The rare silver maple floodplain forest can be found along the Ashuelot River. Currently, there is a restoration project that seeks to transform present-day hayfields into historic floodplains along the Ashuelot River. The Nature Conservancy is managing the project and working in cooperation with the Swanzey Conservation Commission and other partners. Floodplain forest natural communities are rare due to habitat conversion for agricultural fields, as well as residential and commercial development.

The NHNHB has documented two rare plants in Swanzey (Table 7). Both are considered as state-endangered; however, the northeastern bulrush is also included on the federally-endangered species list. The state of New Hampshire identifies this plant as an extremely high importance for conservation.

At least eight species of wildlife have been reported in Swanzey (Table 7). These include four species of grassland birds, wood turtle, northern leopard frog, American eel, and the state and federally-endangered dwarf wedge mussel. All of these wildlife species represent high importance for conservation.

While Table 7 provides a list of known rare species and exemplary natural communities in Swanzey it does not, however, represent a comprehensive survey of the town. It only represents data reported to the NHNHB. Therefore, additional investigations

are recommended as the Swanzey Conservation Commission moves forward with field assessments as part of refining the Natural Resources Inventory.

Table 7. Known rare species and exemplary natural communities in Swanzey, NH.

Rare Elemental Occurrence	Rarity Rank
Natural Communities	
Silver Maple-False Nettle-Sensitive Fern Floodplain Forest	S2
Plants	
Long-headed Windflower (*Anemone cylindrica*)	E
Northeastern Bulrush (*Scirpus ancistrochaetus*)***	E
Birds	
Eastern Meadowlark (*Sturnella magna*)**	T
Grasshopper Sparrow (*Ammodramus savannarum*)**	T
Horned Lark (*Eremophila alpestris*)**	SC
Vesper Sparrow (*Pooecetes gramineus*)**	SC
Reptiles	
Wood Turtle *(Glyptemys insculpta)****	SC
Amphibians	
Northern Leopard Frog (*Lithobates pipiens*)**	SC
Fish	
American Eel (*Anguilla rostrata*)**	SC
Mollusks	
Dwarf Wedge Mussel (*Alasmidonta heterodon*)**	E

Source: NH Natural Heritage Bureau database (2018) and Moosewood Ecological LLC (2018).

S2 - Imperiled due to a few occurrences

E - Endangered

T - Threatened

SC - Special Concern

* - High Importance

** - Very High Importance

*** - Extremely High Importance

Unfragmented Lands and Habitat Connectivity

Unfragmented lands are defined by the surrounding human infrastructure (roads and developed areas). Fragmentation of land can negatively affect species survival rates by increasing mortality, lowering breeding success, or causing species loss altogether. The degree of severity of fragmentation depends upon many aspects, such as the size and

shape of unfragmented blocks, the species or community in question, the extent of loss of natural habitats, intensity of human use, and colonization of invasive species.

The NH Wildlife Action Plan (WAP) developed an unfragmented lands analysis. However, this data layer has inherent errors. As such, the unfragmented lands were revised to more accurately reflect Swanzey's landscape (Figure 8). For the purposes of this project, fragmenting features were defined as 500 feet on either side of existing roadways, including all state and town roads but excluding Class VI roads and trails, as well as private driveways. This assumes that most development occurs within 500 feet of roadways. Unfragmented blocks of land include a variety of natural habitats such as forests, wetlands, streams, and ponds but also can include human-modified areas such as agricultural lands and shrublands.

Large blocks of unfragmented areas are widely known to support greater biodiversity than smaller blocks. As forest blocks become smaller due to the construction of roadways and developments their biodiversity generally decreases. This fragmentation affect has less immediate impact on generalist species or those with small home ranges (such as gray squirrel, raccoon, many amphibians, and small rodents) while affecting and potentially eliminating area-sensitive specialists that need large forested blocks in order to maintain their home ranges and for long-term survival (such as bear, bobcat, moose, various reptiles, wood thrush, and goshawk). Appendix B provides a general list of habitat block size requirements for wildlife to help illustrate this point.

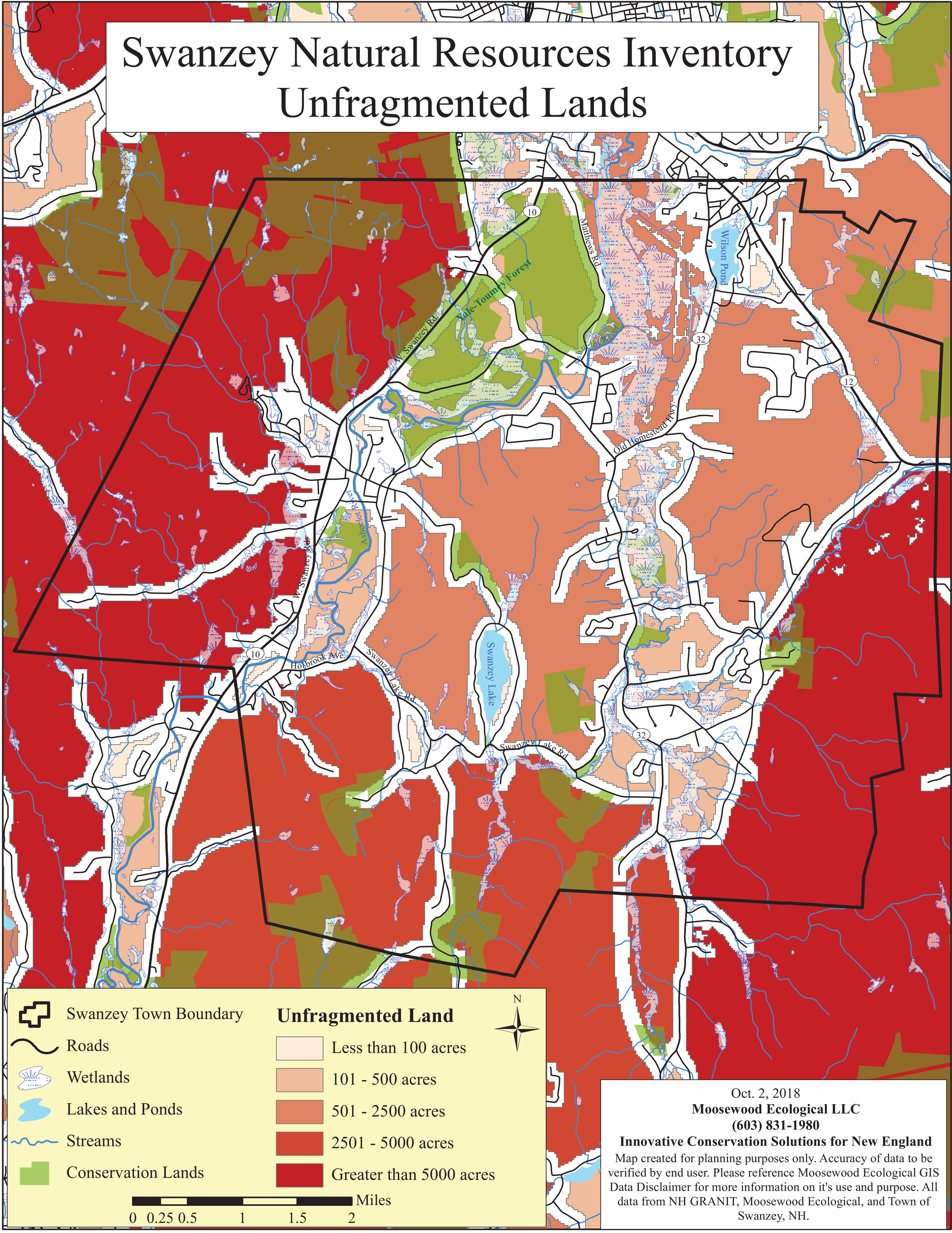
Large landscapes also provide for wildlife movement and habitat connectivity. By maintaining connectivity between critical habitats, it is be possible to provide permanent wildlife corridors within the built environment. Wildlife travel corridors function as areas that one or many species may use to move from one habitat to another. This movement can be based on traveling to various areas for feeding, breeding, nesting, or shelter.

Wildlife must be able to travel safely throughout the landscape in order to meet their biological needs. Many depend upon a variety of habitats for their survival and may utilize many natural features for travel. These include features such as riparian zones of wetlands, ponds and streams, ridgelines, utility right-of-ways, and forest patches acting as a safe route between two or more habitats. A variety of wildlife can be associated with

these corridors, including otter, muskrat, fox, coyote, bobcat, deer, moose, fisher, mink, and bear.

Wildlife corridors are not only significant for mammals but equally as important for amphibians, reptiles and migratory birds. Both amphibians and reptiles begin to move from their wintering habitats to their respective breeding and nesting grounds in the spring. This is the time of year that most mortality can be noticed as these species travel across roadways in search of suitable habitats. This affect can often be exacerbated as the same individuals must return back to their wintering habitats. Thus, there is a great significance in maintaining habitat connectivity, as well as understanding where these patterns of movement are taking place. This latter point can be a very important educational tool for community education and awareness about corridors across roadways. It can provide a means to adjust transportation patterns to help eliminate potential road mortality, or identify sites for road modifications to allow wildlife to safely cross.

Swanzey Natural Resources Inventory
Unfragmented Lands



Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

Conservation Lands

Unfragmented Land

Less than 100 acres

101 - 500 acres

501 - 2500 acres

2501 - 5000 acres

Greater than 5000 acres

N

Miles

0 0.25 0.5 1 1.5 2

Oct. 2, 2018

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AGRICULTURAL AND FOREST RESOURCES

Swanzey is rich with important soils for both forest management and agriculture. These areas represent some of the best soils for the production of forest products and food, feed, and fiber from farming. These natural resources can help provide us with insight into the potential production within the working landscape.

Important Agricultural Soils

In response to the Farmland Protection Policy Act of 1981[3], agricultural soils were mapped by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Based on a variety of physical and chemical properties (i.e., drainage, texture, hydric regime, pH, erodibility factor), these soils have been identified as being among the most productive lands for many types of farming practices. These include prime farmland soils, farmland soils of statewide significance, and farmland soils of local significance. Each is defined below by the USDA NRCS:

Prime Farmland

- Soils that have an aquic or udic moisture regime and sufficient available water capacity within a depth of 40 inches to produce the commonly grown cultivated crops adapted to New Hampshire in 7 or more years out of 10.
- Soils that are in the frigid or mesic temperature regime.
- Soils that have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches.
- Soils that have either no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to New Hampshire to be grown.
- Soils that have a saturation extract less than 4 mmhoc/cm and the exchangeable sodium percentage is less than 15 in all horizons within a depth of 40 inches.
- Soils that are not frequently flooded during the growing season (less than a 50% chance in any year or the soil floods less than 50 years out of 100.)

[3] As defined by the USDA NRCS: "The Farmland Protection Policy Act of 1981 was established to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses.

- The product of the erodibility factor times the percent slope is less than 2.0 and the product of soil erodibility and the climate factor does not exceed 60.
- Soils that have a permeability rate of at least 0.06 inches per hour in the upper 20 inches.
- Soils that have less than 10 percent of the upper 6 inches consisting of rock fragments larger than 3 inches in diameter.

Farmland of Statewide Importance

These soils refer to land that is not prime or unique but is considered farmland of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Criteria for defining and delineating farmland of statewide importance are determined by a state committee chaired by the Commissioner, New Hampshire Department of Agriculture, Markets and Food, with members representing the University of New Hampshire Cooperative Extension, New Hampshire Association of Conservation Districts and the New Hampshire Office of State Planning. The NRCS State Soil Scientist serves on this committee in an advisory capacity. The original criteria were established on June 20, 1983. It was updated on December 7, 2000.

Soils of statewide importance are soils that are not prime or unique and:

- Have slopes of less than 15 percent
- Are not stony, very stony or bouldery
- Are not somewhat poorly, poorly or very poorly drained
- Includes soil complexes comprised of less than 30 percent shallow soils and rock outcrop and slopes do not exceed 8 percent.
- Are not excessively drained soils developed in stratified glacial drift, generally having low available water holding capacity.

Farmland of Local Importance

Farmland of local importance is farmland that is not prime, unique or of statewide importance, but has local significance for the production of food, feed, fiber and forage.

Criteria for the identification and delineation of local farmland are determined on a county-wide basis by the individual County Conservation District Boards. The original criteria were established on June 20, 1983. Updates are noted according to the county initiating the update. The criteria for soils of local importance in Swanzey are as follows:

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Important agricultural soils cover approximately 9,798 acres, or roughly 34% of Swanzey (Table 8 and Figure 9). These soils are widely distributed throughout the town. Prime farmland soils make up about 16% of the total acreage of agricultural soils while farmlands of local and statewide significance represent 84% of these soils.

Table 8. Summary of important soils for farm production in Swanzey.

Important Soil Type	Size (acres)	% of Town
Prime Farmland Soils	1,600	5.5
Farmland Soils of Statewide Significance	740	2.6
Farmland Soils of Local Significance	7,458	25.7

SOURCE: GIS Analysis (Moosewood Ecological 2018) of USDA Natural Resources Conservation Service soils.

Swanzey Natural Resources Inventory
Agricultural Resources

10
32
12
Matthews Rd.
Wilson Pond
Yale-Tolles Forest
W. Swanzey Rd.
Old Homestead Hwy.
Ashuelot River
W. Swanzey Rd.
Hobbrook Ave.
Swanzey Lake Rd.
Swanzey Lake
Swanzey Lake Rd.
10
32

Swanzey Town Boundary
Roads
Wetlands
Lakes and Ponds
Streams
Conservation Lands
Grasslands and Active Farmlands
Prime Farmland Soils
Farmland Soils of Local Importance
Farmland Soils of Statewide Importance

N

0 0.25 0.5 1 1.5 2 Miles

Oct. 20, 2018

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Important Forest Soils

Forest resources within New Hampshire are significant for many reasons. They provide sources of employment, a multitude of forest products, promote local economies, recreation and tourism, provide clean air, mitigate the effects of climate change, and provide substantial habitats for wildlife and plants, as well as diverse ecological functions (such as nutrient cycling, carbon sequestration, and water quality maintenance through sediment trapping). For these reasons, it is important to maintain large tracts of forests and to better understand where important forest soils exist in Swanzey.

The USDA Natural Resources Conservation Service has mapped the distribution of important forest soils and has classified them according to their capacity to grow trees. These soils signify areas as providing the most productive lands for timber production. The NRCS has identified three soils groups within this category and have described each as follows:

Forest Soil Class IA

This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as red oak, beech, sugar maple, red maple, white birch, yellow birch, aspen, and white ash in varying combinations with red spruce, hemlock, and white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.

Forest Soil Class IB

The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially

those which are heavily cutover, are commonly composed of a variety of hardwood species such as red oak, red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with white pine, red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.

Forest Soil Class IC

The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Successional trends on these coarse-textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., hemlock and red spruce. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.

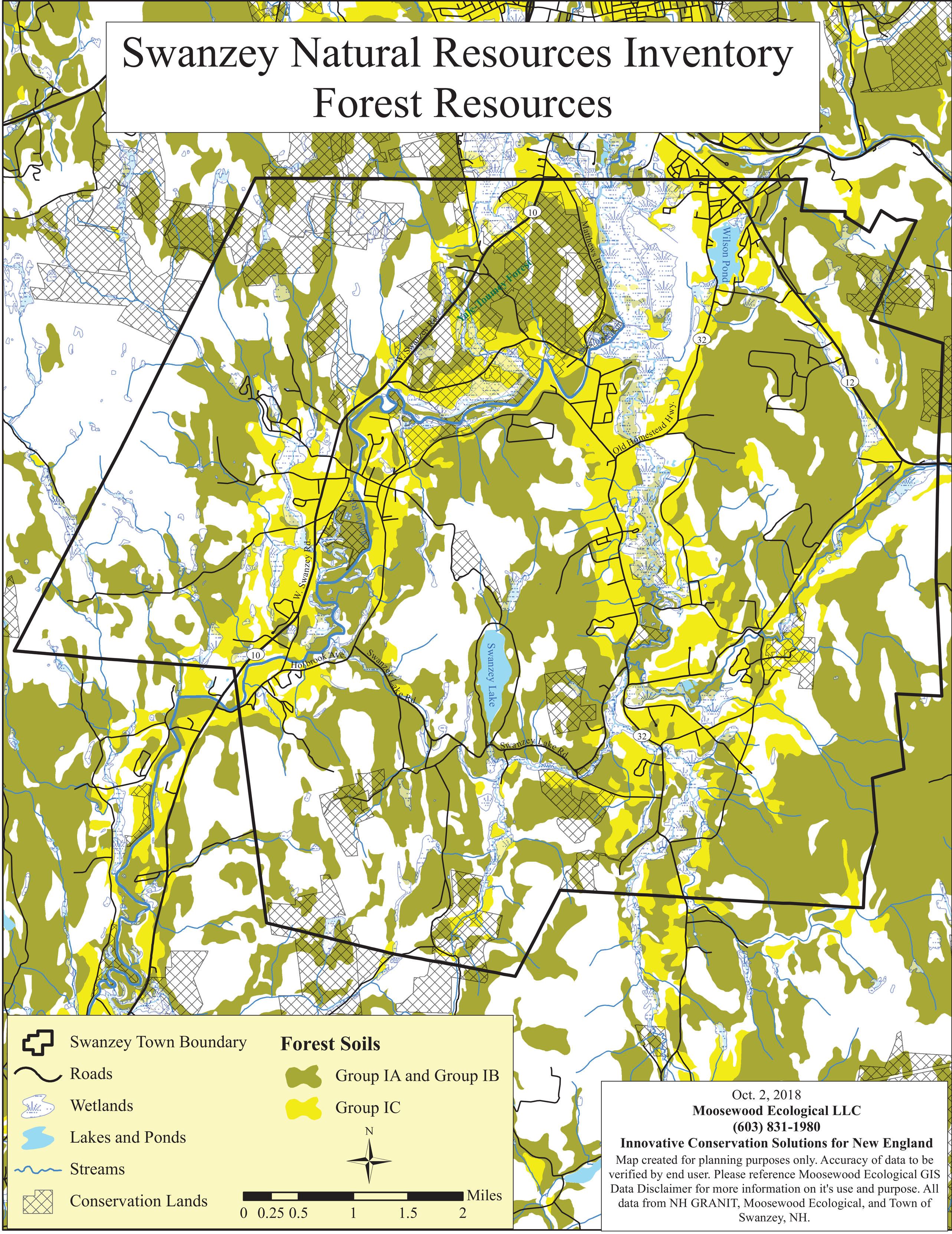
Important forest soils represent nearly 17,024 acres, or approximately 65% of Swanzey (Table 9 and Figure 10). Forest soil groups IA and IB make up the majority of this resource and are most ideally suited for hardwood production. Soil group IC appears to be more restricted to stream drainages where outwash sands and gravels were deposited by glacial activity about 11,000 years ago. Group IC soils types are suited for softwood production, mainly white pine.

Table 9. Summary of important forest soils for timber production in Swanzey.

Important Soil Type	Size (acres)	% of Town
Hardwood Production (Groups IA and IB)	12,385	47
Softwood Production (Group IC)	4,639	17.8

SOURCE: GIS Analysis (Moosewood Ecological 2018) of USDA Natural Resources Conservation Service soils.

Swanzey Natural Resources Inventory
Forest Resources



Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

Conservation Lands

Forest Soils

Group IA and Group IB

Group IC

N

0 0.25 0.5 1 1.5 2 Miles

Oct. 2, 2018

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CONSERVATION LANDS

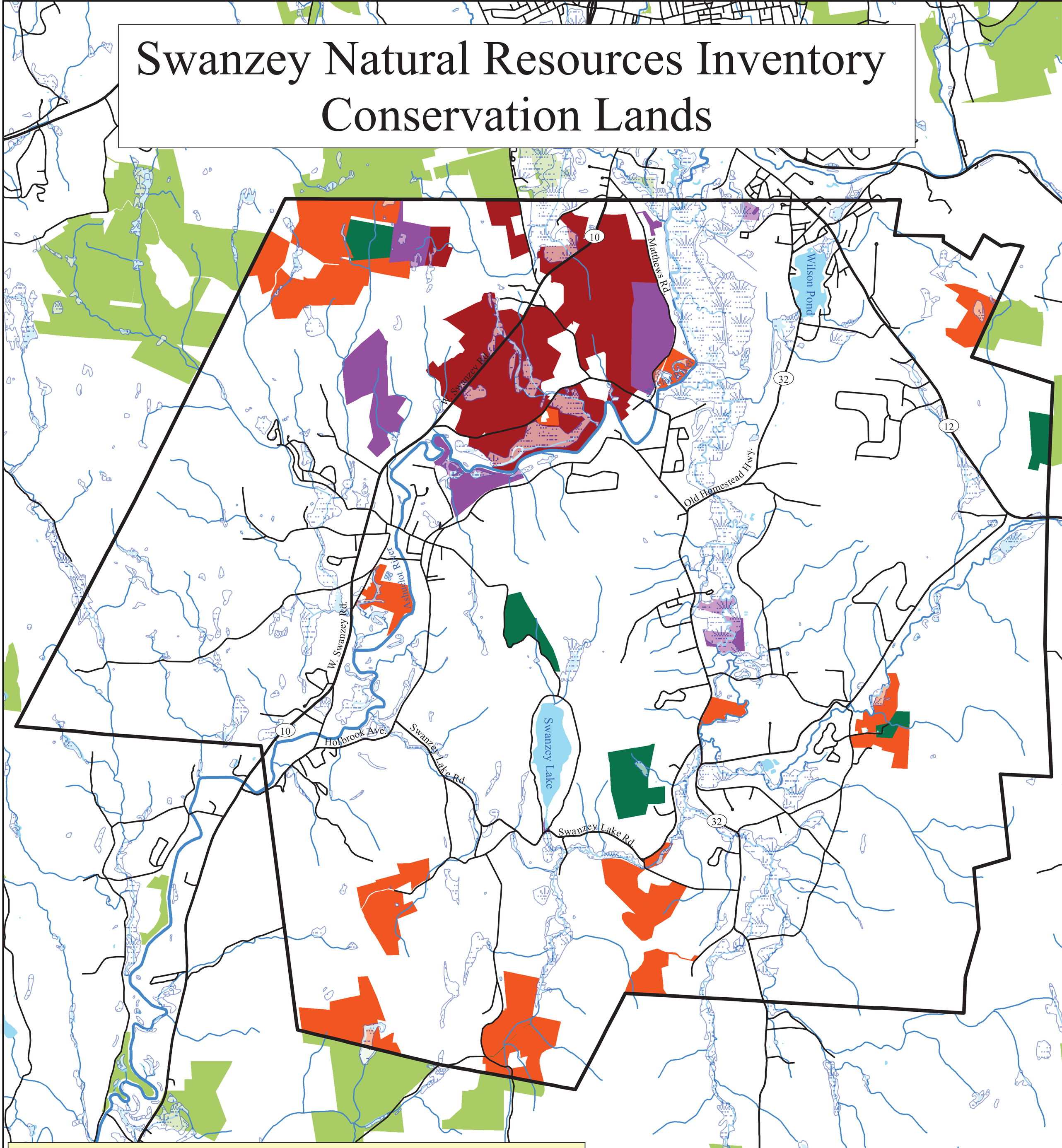
There are approximately 3,372 acres of conservation and town-owned lands in Swanzey (Table 10 and Figure 11). The Yale-Toumey Forest represents 43% of these lands; however, there is no explicit form of permanent conservation yet the Yale-Toumey Forest is generally recognized by the public as being conserved. Nearly 37% of conservation lands are privately-owned and protected by conservation easements. The remaining 20% of conservation lands are held under fee ownership and deed restrictions.

Table 10. Conservation lands by protection type in Swanzey.

Protection Type	Acres
Conservation Easement	1,234
Deed Restriction	155
Fee Ownership	533
Yale-Toumey Forest	1,450

SOURCE: GRANIT Conservation Lands database (2018) and Monadnock Conservancy (2018)

Swanzey Natural Resources Inventory
Conservation Lands



Swanzey Town Boundary

Roads

Wetlands

Lakes and Ponds

Streams

0 0.25 0.5 1 1.5 2 Miles

Protection Type

Conservation Easement

Deed Restriction

Fee Ownership

Yale-Toumey Forest

Conservation Lands

N

September 14, 2018

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RECOMMENDATIONS

The information provided herein, including the various maps, can be used when considering the adoption of various land use planning techniques or when working with willing landowners on resource protection efforts. The data used to develop this information represents the most current, readily available data to better understand Swanzey's natural resources. As such, there are some basic guidelines that the town can use to promote innovative and informed land use planning.

- Protect large unfragmented blocks, especially those with high quality habitats located within close proximity of one another and with limited barriers for wildlife movement;
- Protect known rare species populations;
- Protect representative examples of critical habitats for known rare species;
- Protect rare and representative examples of natural communities;
- Protect intact wetland and stream riparian buffers and promote the restoration of degraded areas;
- Support voluntary and regulatory approaches at natural resources protection;
- Build upon existing contiguous protected lands;
- Connect protected lands and other critical habitats with upland, aquatic, and/or riparian corridors;
- Better understand wildlife movement patterns to identify and design the most effective conservation corridors; and
- Promote community education and outreach regarding Swanzey's biodiversity and the importance of long-term protection strategies.

The following general recommendations were based on the findings of the project. These are considered as the next Actions Steps that Swanzey could consider while proceeding with community land use planning and education.

1. Continue with Swanzey's NRI efforts by engaging in the Phase II project that seeks to conduct various site assessments. The purpose of these assessments should focus on collecting ecological information such as biodiversity, natural communities, invasive plants, and small-scale habitats (such as vernal pools, dens, talus slopes, heron rookeries, and turtle nesting areas), as well as verify the extent of the Wildlife Action Plan habitats. Other elements could include mammal tracking to understand corridors and connectivity and wetlands evaluations. Community outreach and education should also be a component of the Phase II NRI.

2. Conduct a Parcel-based Ecological Assessment. This is a computer-based model that ranks parcels based on their natural resource values. The assessment can assist with conservation planning and working with willing landowners interested in land protection.

3. Update the Swanzey Open Space Plan developed in 2004 to include newly acquired natural resources data. This will help to revise Swanzey's conservation planning efforts and enhancing conservation focus areas while reviewing how the current plan has been helpful, how can it serve Swanzey better, and what projects have been accomplished.

4. Incorporate the NRI into the Swanzey Master Plan adopted in 2003. This provides a vision for the town from which adaptive land use planning can be adopted. Build public support for the NRI through informational sessions, published materials, and other means of community education and outreach. This will help to inform the community about its natural resources and future planning.

5. Conduct an audit of current zoning regulations to better understand if and how they protect critical natural resources. This effort can illuminate certain land use planning techniques that Swanzey might want to consider adopting in an effort to develop informed land use decisions for a more sustainable future. This could

identify ways to use land more efficiently, encourage more compact development, and allocate specific areas for conservation and development.

6. Continue to work with adjacent communities on similar conservation initiatives of common interest. It would be helpful to meet annually with the Conservation Commissions within each of the adjacent communities to build strong relationships and create open lines of communication, as well as to inform these communities about Swanzey's conservation planning efforts.

7. Continue with community outreach and landowner education regarding Swanzey's natural resources and conservation planning. This can be accomplished in many ways, including workshops, hikes, and printed materials such as brochures and maps to help landowners with resource protection and management. A subcommittee of the Conservation Commission could be developed to focus on outreach and education efforts.

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APPENDIX A

MOOSEWOOD ECOLOGICAL GIS DATA DISCLAIMER

Moosewood Ecological LLC GIS Data Disclaimer

A variety of existing and newly created data layers were used to prepare the Natural Resources Inventory (NRI) maps. These existing data have been developed by numerous government agencies and other sources. They have been produced specifically for the town, the state of New Hampshire, or the entire United States using *remote data*. These sources of remote data were developed from the interpretation of satellite imagery and aerial photography. The data were produced at various scales and therefore, represent different degrees of errors, omissions, and inaccuracies.

The NRI maps are for education and planning purposes only. They are suitable for general land use planning. However, they are not suitable for detailed site planning and design, including wetlands delineations and other jurisdictional determinations. As such, boundaries of all habitats, including wetlands, and parcels are approximate locations and should be field verified. The accuracy of the data is the end user's responsibility, and Moosewood Ecological LLC cannot be responsible for the accuracy and completeness of the data. Moosewood Ecological LLC makes no warranty, expressed or implied, as to the accuracy or completeness of the data. Furthermore, Moosewood Ecological LLC shall assume no responsibility for any errors, omissions, or inaccuracies in the information provided.

APPENDIX B

HABITAT BLOCK SIZE REQUIREMENTS FOR WILDLIFE

1-19 Acres	20-99 Acres	100-499 Acres	500-2,500 Acres	>2,500 Acres
raccoon	raccoon	raccoon	raccoon	raccoon
	hare	hare	hare	hare
				coyote
small rodent	small rodent	small rodent	small rodent	small rodent
	porcupine	porcupine	porcupine	porcupine
				bobcat
cottontail	cottontail	cottontail	cottontail	cottontail
	beaver	beaver	beaver	beaver
				black bear
squirrel	squirrel	squirrel	squirrel	squirrel
	weasel	weasel	weasel	weasel
		mink	mink	mink
				fisher
	woodchuck	woodchuck	woodchuck	woodchuck
		deer	deer	deer
muskrat	muskrat	muskrat	muskrat	muskrat
			moose	moose
red fox	red fox	red fox	red fox	red fox
songbirds	songbirds	songbirds	songbirds	songbirds
		sharp-shinned hawk	sharp-shinned hawk	sharp-shinned hawk
			bald eagle	bald eagle
skunk	skunk	skunk	skunk	skunk
		Cooper's hawk	Cooper's hawk	Cooper's hawk
		harrier	harrier	harrier
		broad-winged hawk	broad-winged hawk	broad-winged hawk
			goshawk	goshawk
		kestrel	kestrel	kestrel
			red-tailed hawk	red-tailed hawk
		great-horned owl	great-horned owl	great-horned owl
			raven	raven
		barred owl	barred owl	barred owl
		osprey	osprey	osprey
		turkey vulture	turkey vulture	turkey vulture
		turkey	turkey	turkey
most reptiles	most reptiles	reptiles	reptiles	reptiles
	garter snake	garter snake	garter snake	garter snake
	ring-necked snake	ring-necked snake	ring-necked snake	ring-necked snake
most amphibians	most amphibians	most amphibians	amphibians	amphibians
		wood frog	wood frog	wood frog

TOWN OF SWANZEY
NATURAL RESOURCES INVENTORY
PHASE II:
ECOLOGICAL ASSESSMENT

Prepared for:
Swanzey Conservation Commission



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January 2020

Cover Photograph The view from atop Mt. Caesar looking south towards Rattlesnake Mountain, Bullard Mountain, and Gunn Mountain. The wetland in the foreground once served as a heron rookery (Littleton 2007), and just behind this wetland one can view part of Swanzey Lake.

TABLE OF CONTENTS

Page

INTRODUCTION 1

ECOLOGICAL ASSESSMENTS 5

Wildlife Habitats and Natural Communities 5

Biological Diversity 26

Unfragmented Lands and Habitat Connectivity 29

Invasive Species 33

CLIMATE CHANGE and RESILIENT LANDSCAPES 34

RECOMMENDATIONS FOR CONSERVATION PLANNING 37

LITERATURE RESOURCES 41

APPENDIX A – GIS DISCLAIMER 42

APPENDIX B – WILDLIFE SPECIES LIST 44

APPENDIX C – HABITAT SIZE REQUIREMENTS FOR WILDLIFE 48

INTRODUCTION

The Town of Swanzey today faces challenges that are familiar to many communities in southern New Hampshire. The rate of residential and commercial development and growth in general has continued to increase, especially over the past three decades. Larger challenges not widely foreseen half a century ago are now in plain sight, as global climate change and invasive species have become new causes for concern. With the understanding that growth and change will occur, the Town is faced with choices about directing growth and preservation so that a suitable balance can be achieved. Planning for the protection of open space is a critical and positive step towards solutions to these challenges.

Swanzey still has large areas of intact wildlife habitat of state-wide significance, extensive natural river frontage, unique natural communities, and relatively large areas of unfragmented forest. The acquisitions of significant conservation lands such as Mount Cresson and Mount Caesar are cause for optimism, but the protection of other important open space lands will become increasingly important. Time, money, and human resources are limited in the accomplishment of conservation. A Natural Resource Inventory is a critical asset that will help Swanzey to understand the location and quality of its natural resources and provides a solid objective basis for all conservation planning activities.

A Natural Resource Inventory (NRI) is not only an important starting point for informing conservation decisions, it is also a core responsibility written into the enabling State legislation allowing for the existence and authority of conservation commissions. In conjunction with the conservation planning that it can inform, an NRI can also provide a basis for outreach to public, which can result in further support for land conservation. To this end, the Swanzey Conservation Commission has acted on this responsibility.

In March 2018, the Swanzey Conservation Commission contracted with Moosewood Ecological LLC to conduct an NRI (Littleton 2018). This NRI provides the basis for balancing population growth and conservation planning. It covers a variety of natural resource topics such as wetlands, rivers and streams, ponds and lakes, groundwater supplies, wildlife habitats, unfragmented lands, agriculture and forest soils, and conservation lands. The NRI report concluded with a variety of recommendations

that Swanzey could pursue as it builds upon its NRI, as well as planning for future growth and natural resource protection.

As such, the Swanzey Conservation Commission decided to move forward with the second phase of the NRI in 2019. The purpose of this project was to build upon the Swanzey Natural Resources Inventory (NRI) through field-based exercises to verify habitats mapped by the NH Fish and Game Wildlife Action Plan, as well as to catalogue Swanzey's wildlife diversity and noting species of conservation concern. This report reflects the findings during the 2019 field season.

Swanzey's Physical Landscape

Swanzey covers approximately 46 square miles, or 29,440 acres, of mostly forested and hilly terrain (Figures 1). Its topography is highly variable, ranging in elevation from approximately 470 feet along the Ashuelot River and its floodplains to 1,417 feet on Franklin Mountain along the southwestern town boundary. Generally, the landscape becomes steep as one moves out of the Ashuelot River and South Branch Ashuelot River valleys in all directions.

The landscape is further characterized by the rolling hills of Forbush Hill, Marcy Hill, and Hewes Hill in the southeast; Gunn Mountain, Rattlesnake Mountain, and Bullard Mountain in the southwest; West Hill in the northwest; and Mount Cresson and Mount Caesar rising abruptly from the Ashuelot River.

Major water bodies include Swanzey Lake and Wilson Pond. Extensive wetland systems grace many sections along rivers and streams, such as Ashuelot River, South Branch Ashuelot River, Martin Brook, Falls Brook, Forbush Brook, and Perry Brook. These varying landforms offer great diversity for wildlife and plant communities alike.

The most heavily developed parts of Swanzey include residential and commercial areas associated with the three main town centers, as well as the Dillant-Hopkins Airport located in the northern part of town. Moving away from these largely developed areas the town is mostly characterized by its rural setting that surrounds its economic centers.

The Topographic Base Map in Figure 1 provides a sense of some of Swanzey's hiking and rail trails. Six trailheads show the locations of various open spaces including

Mt. Caesar, Carroll's Hill, Mt. Cresson, Dickinson Forest, Honey Hill, Tippin Rock/Hewes Hill. These six areas offer a total of 9 miles of trails available for all ages as they are family-friendly, and many are organized as loop hikes. Trail maps are located at some trailheads while the town's website provides maps for Carroll's Hill, Mt. Cresson, and Tippin Rock/Hewes Hill, as well as bike trails to explore covered bridges, the Ashuelot River Rail Trail, and the Cheshire Rail Trail. These rail trails are also shown on the topographic map.

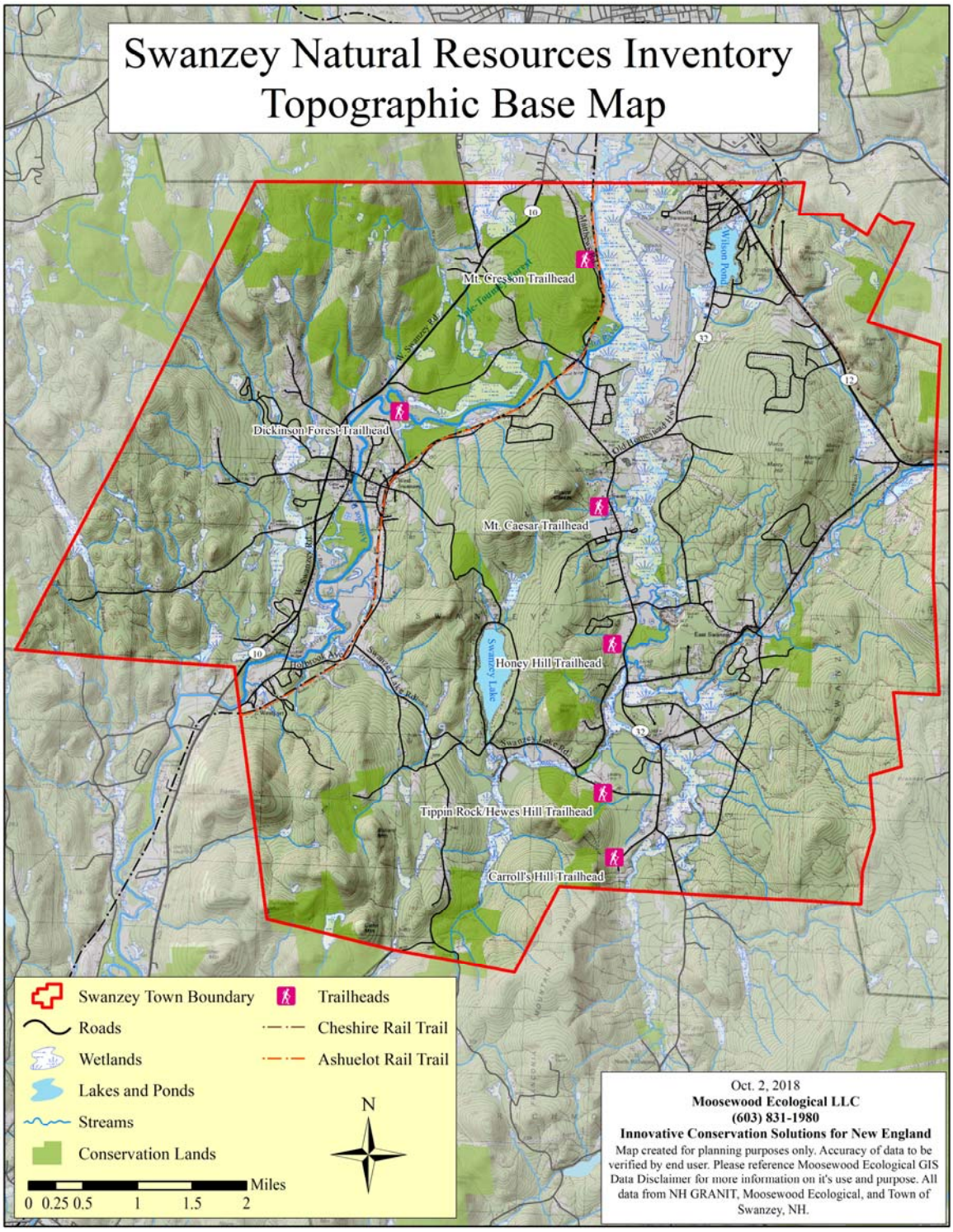


Figure 1 Topographic map of Swanzey showing locations of a variety of trailheads.

ECOLOGICAL ASSESSMENT

Wildlife Habitats and Natural Communities

Swanzey's landscape affords the opportunity for diverse habitats. Rivers, lakes, wetlands, and floodplains provide a stark contrast to the variety of upland forests, cliffs and talus slopes, grasslands, and shrublands distributed throughout the town. In turn, the presence of so many different types of habitats promote greater biodiversity. Refer to the wildlife habitat map in Figure 2 at the end of this section.

Hemlock-Hardwood-Pine Forests

The hemlock-hardwood-pine forest ecosystem is widespread in southern New Hampshire, and it forms the matrix forest community in the Monadnock Region. This means it is our dominant forest type, and so is the case with Swanzey. Covering 16,609 acres, or 57% of Swanzey, it is the most abundant and readily available habitat for a diverse suite of wildlife. It supports 140 vertebrate wildlife species, including 15 amphibians, 13 reptiles, 73 birds, and 39 mammals. This forest type can be found in numerous publicly accessible areas such as the lower elevation of Mt. Caesar, Tippin Rock, Mt Cresson, Carrol Hill, Honey Hill, and Dickinson Forest.

The hemlock-hardwood-pine forest ecosystem is a transitional forest type. It occurs at the overlap of the Appalachian oak-pine forest found at lower elevations and the northern hardwood-conifer forests found in higher elevations and further north. Typically, this forest ecosystem is dominated by hemlock, beech, red oak, and white pine. Other species in lower abundance include, white ash, birches, maples, and occasionally hickories.



This is a typical hemlock-hardwood-pine forest dominating Swanzey's landscape. This particular example was observed along the steep slope just west of Swanzey Lake and in association with numerous boulders.



This stand of red pines was planted amongst the hemlock-hardwood-pine forest. It now has naturalized at the Yale-Toumey forest where it is part of their timber harvesting program. Red pine forests are typically found on high ridges subject to periodic fires and with thin, nutrient poor soils. A few red pines can be found on top of Mt. Caesar.



This old red oak observed on Marcy Hill was nearly 4½ feet in diameter. It grew in the open when this area was cleared for agriculture in the early 1800s and is estimated to be about 200 years old.

Appalachian Oak-Pine Forests

The Appalachian oak-pine forest ecosystem covers approximately 5,846 acres in Swanzey, or about 20% of the town. Examples of this forest can be found on top of Mt. Caesar. It appears that the NH WAP predicts this forested habitat could be found along the Ashuelot River and The Branch, as well as some of their tributaries. These predictions are based on habitat models that suggest these areas would most likely support this forest ecosystem, especially in the absence of human disturbance.

Appalachian oak-pine forests are limited in their distribution in New Hampshire and are typically found in lower elevations below 900 feet. They are associated with nutrient poor, sandy soils or dry rocky ridges. In contrast, there are some rare forest communities within this ecosystem that have nutrient enriched soils characteristics. Fire is a common ecological process that helps to maintain these forests. Plants found within this forest ecosystem are commonly found along the Appalachian Mountains, including white oak, black oak, scarlet oak, chestnut oak, pitch pine, and American chestnut, as well as mountain laurel and a variety of hickories. In addition, this forest ecosystem

supports 104 vertebrate wildlife species, including 8 amphibians, 67 birds, 14 mammals, and 12 reptiles.



This Appalachian oak-pine forest was observed on the southern face of Mt. Caesar. It is dominated by shagbark hickory, red and white oaks, and white pine.



This cavity tree was located within the Appalachian oak-pine forest on Mt. Caesar. These provide important habitat for cavity nesting birds such as nuthatches, chickadees, woodpeckers, and owls. They also provide cover and dens sites for mammals such as flying squirrels, fisher, raccoon, porcupine, and even black bear is they are large enough to support them during hibernation.

Rocky Ridges, Cliffs, and Talus Slopes

These 3 habitat types occur together in Swanzey, where rocky ridges are located just above cliffs and their talus slopes. They cover about 159 acres. Great examples can be found on Mt. Caesar, Rattlesnake Mountain, and Mt. Cresson. Based on field assessments, the location west of Swanzey Lake does not exist as mapped by the NH Wildlife Action Plan.

Rocky ridges are fairly open areas that are sparsely vegetated mainly due to the presence of open bedrock. These areas are typically very dry and acidic, supporting forest communities that are maintained by periodic fires due to exposure to lightning. Similarly, cliffs are relatively open with sparse vegetation. They are characterized as very steep, rock faces over 10 feet tall. Talus slopes occur at the base of cliffs where boulders accumulate, forming crevices and caves that many wildlife use to raise their young or for hibernation in winter.

These areas are fairly uncommon and can contain rare and exemplary forest communities, such as pitch pine-scrub oak forests and black birch-red oak talus slopes. They may support rare species, such as timber rattlesnake. Rocky outcrops and talus slopes that face south also provide wonderful sunning sites for bobcat in the winter months.



One can find rocky outcrops and ledges on Mt. Caesar. The forests associated with these sites have a more woodland feel as opposed to the denser forests elsewhere.



The lower talus slopes and associated crevices and open spaces provide great winter hibernacula for snakes such as this milk snake (center of photo) emerging from a crevice in spring.

Grasslands

Grasslands are maintained by humans for a variety of resources, such as hay, pastures, and wildlife. They are dominated by grasses and wildflowers with little to no presence of trees and shrubs. Grasslands were much more abundant during the late 1700s through the 1800s before farms were abandoned and allowed to revert back into forests. As such, there has been a steep decline in wildlife associated with this habitat.

Locations of grasslands were revised from the NH Wildlife Action Plan data during the Phase I NRI. They cover nearly 950 acres in Swanzey. Grasslands include many active farms (pastures and hayfields), meadows, and the Dillant Hopkins Airport. They support numerous species of conservation concern, and therefore, are some of Swanzey's most significant habitats for wildlife. In fact, they support rare species such as meadowlark, grasshopper sparrow, vesper sparrow, horned lark, wood turtle, and northern leopard frog.



This hayfield was once a floodplain forest along the Ashuelot River. It supports bobolink, a bird of conservation concern in New Hampshire. Recently, part of this area has been restored, allowing it to become a once again a forested floodplain.



The grasslands at the Dillant Hopkins Airport support many species of conservation concern, including 5 species of birds, 1 species of frog, and 1 species of reptile. Additional species of concern may be using this habitat as well.

Shrublands

Shrublands are dominated by young trees and shrubs with occasional mature trees, bare ground, and areas dominated with grasses and wildflowers. Shrubland habitat is declining in the state, and this decline has a profound effect on wildlife. Shrublands provide an important habitat for 139 species of reptiles, amphibians, mammals, and birds in New Hampshire. Several of these have been identified as species of greatest conservation need. In fact, 22 of 28 species of shrubland birds are currently in decline.

Shrublands are difficult to quantify and map since most of them are a product of logging operations that result in large areas of forest regrowth that forms shrubby habitat. However, unless maintained these areas typically revert back into forests. Sand and gravel pits typically form shrubland habitat but, again, unless maintained they will eventually become forests. Utility corridors typically provide consistent shrublands as they are maintained periodically so trees are prevented from growing into the powerlines.



Shrublands can be found scattered throughout Swanzey. This example was observed on the Dragon property adjacent to the Horatio Colony Preserve. Other examples can be found along utility corridors, as well as various private properties.

Floodplains

Floodplains are found along river valleys directly adjacent to rivers such as the Ashuelot River and South Branch. They can vary in their species composition and overall structure from forests to open herbaceous floodplains with shrub swamps, oxbows, and

vernal pools. They are strongly influenced by the size of the watershed and the gradient of the river. Historically, many of our floodplains were cleared for agricultural fields in the 1700s-1800s. Many have now been converted into residential, commercial, and industrial developments.

Floodplains and riparian forests play critical roles in helping to protect water quality, store floodwaters, help protect against erosion and sedimentation, and support diverse plant communities. They also provide significant habitat for a wide variety of wildlife including several species of conservation concern, such as wood turtle, Blanding's turtle, spotted turtle, smooth green snake, leopard frog, Jefferson's salamander, American woodcock, cerulean warbler, and veery.

It is estimated that Swanzey has about 552 acres of floodplain forests found along the Ashuelot River and South Branch. The largest is adjacent to the Dillant Hopkins Airport, which contains a diverse array of habitats from floodplain forests, marshes, and shrub swamps. In fact, this area supports an exemplary silver maple-false nettle-sensitive fern floodplain forest. Other areas in Swanzey most likely support this same type of floodplain.



This exemplary silver maple-false nettle-sensitive fern floodplain forest is located along the Ashuelot River at the Dillant Hopkins Airport. More examples occur along other sections of the Ashuelot River.
Photo by: The Ecosystems Management Company

Marsh and Shrub Wetlands

There are about 950 acres of marsh and shrub wetlands in Swanzey. They are widely dispersed throughout the town. The largest examples are associated with the Ashuelot River and South Branch. However, smaller examples can be found along other streams, associated with beaver ponds, and small isolated pockets scattered throughout Swanzey in low-lying depressions and hilltops.

Marshes are typically dominated by a combination of grasses, sedges, rushes, and to a lesser degree wildflowers. Often times there are components of open water but not always. Edges of beaver ponds tend to support marshes and abandoned beaver ponds usually revert to marsh habitat with less open water. Shrub swamps, in contrast, are dominated by wetland shrubs such as highbush blueberry, arrowwood, northern wild raisin, winterberry, and speckled alder. Marsh and shrub wetlands are distinctly different in their habitat structure and therefore will support different wildlife communities. However, they are often found existing together, supporting relatively high biodiversity.

Wetlands provide many ecological functions and societal values. These include scenic quality, educational and research value, recreation, water quality maintenance, flood storage, groundwater recharge, and important wildlife habitat. In fact, marsh and shrub wetlands support 18 wildlife species of conservation concern in New Hampshire, as well as rare plants and plant communities.



Emergent marshes provide significant habitat for a variety of wildlife, including waterfowl, moose, beaver, otter, turtles, northern water snake, fish, and aquatic macroinvertebrates such as dragonflies, damselflies, and diving beetles. This habitat is widespread and common in Swanzey. Large examples can be found along the South Branch and Ashuelot River, while smaller versions are scattered throughout the town on hilltops and low-lying areas.



This diverse wetland complex is located within the floodplain of the Ashuelot River next to the Dillant Hopkins Airport. This area supports open water, marsh, shrub swamp, forested swamp, and floodplain habitats. In turn, this area supports a rich wildlife community.



Some marsh habitat offers more densely vegetated areas to support secretive water birds such as American bitterns.



This highbush blueberry-winterberry thicket provides a distinct habitat structure for a different wildlife community than those associated with marsh habitat.



This provides an example of how marsh and shrub wetlands occur together, offering habitats for a diverse wildlife community.

Peatlands

Peatlands are open wetland habitats dominated by shrubs, sedges, and *Sphagnum* mosses. They are characterized by their organic soil of partially decomposed plants called peat. Peatlands range from being highly acidic to moderately nutrient enriched. The level of acidity is a strong factor influencing the plant species composition. Typical plants associated with peatlands in general include pitcher plants, sundews, diverse sedge community, mosses, highbush blueberry, mountain holly, speckled alder, sheep laurel, bog rosemary, and wildflowers such as bog aster and bog goldenrod. Fifty-four rare plants are supported by peatlands, including dwarf huckleberry. In addition, the bog haunter, a rare dragonfly, is associated with peatlands found in the southern part of the state. Littleton (2005) recorded this species at Converse Meadows in Rindge just east of Swanzey.

It is estimated that there are about 75 acres of peatlands distributed across Swanzey's landscape. These represent relatively small, isolated wetland habitats at the beginning of small headwater streams and other areas of slow, sluggish waters. One example can be viewed at the Yale-Toumey Forest along Route 10.

Forested Swamps

There are about 559 acres of forested swamps in Swanzey. The most common examples include seasonally flooded red maple swamps and hemlock-cinnamon fern swamps. However, there are a couple of small examples of the black gum-red maple swamp. These are located on Marcy Hill and West Hill in the Horatio Colony Preserve. While not rare, it is regionally significant. Similarly, the red maple-black ash swamp is regionally significant and may be found in Swanzey.

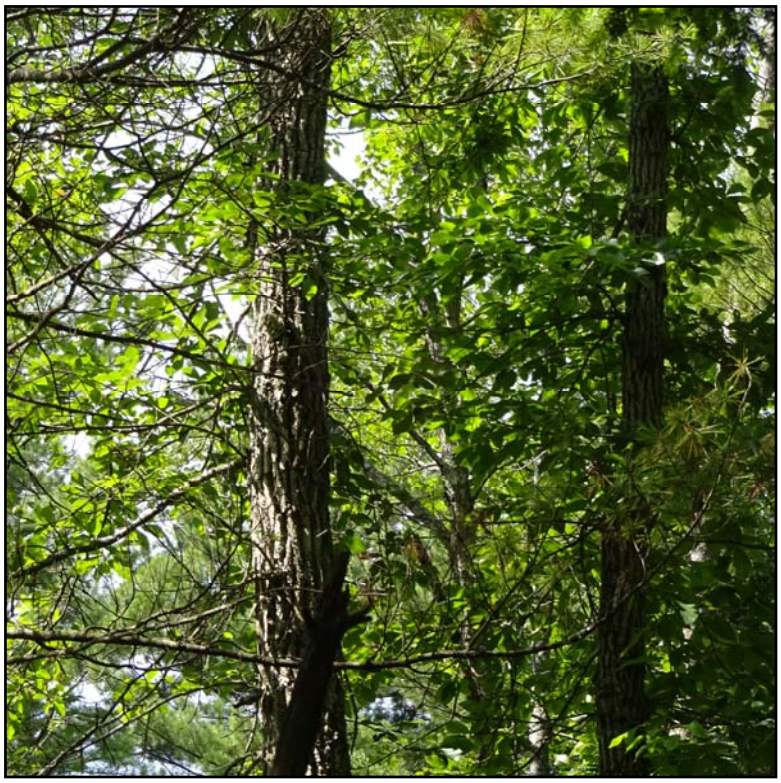
Forested swamps are typically isolated wetlands found in low-lying basins. However, they could be part of larger wetland complexes such as those associated with the Ashuelot River and South Branch. Similar to marsh and shrub wetlands, forested swamps help maintain water quality, store floodwaters, recharge groundwater supplies, and may support vernal pools as well.



This hemlock-cinnamon fern swamp is a common type of forested wetland found throughout Swanzey. Some may provide vernal pool habitat as well.



Seasonally flooded red maple swamps are another type of common forested swamp in Swanzey. Good examples can be found along the Ashuelot River, South Branch, and the Dillant Hopkins Airport wetland complex.



These black gums were associated with a small forested swamp dominated by red maple located on Marcy Hill.

Vernal Pools

Vernal pools provide critical habitats for a variety of species. These pools typically fill during the spring, dry out completely or partially in the summer, and contain no fish. These attributes are critical for the long-term survival of vernal pool obligate organisms. They also have no permanent inlet or outlet streams.

Amphibians such as wood frog, spotted salamander, and Jefferson's salamander (species of conservation concern) use vernal pools. Vernal pools are also significant for other species of conservation concern including Blanding's turtle, spotted turtle, and ribbon snake. Many aquatic macroinvertebrates such as fairy shrimp and fingernail clam depend upon this habitat.

There are about 49 vernal pools (confirmed and potential) distributed throughout Swanzey (Figure 2). These can be found in a multitude of locations such as at the beginning of headwater streams on hilltops and ridges, along benches on side slopes of hills and mountains such as West Hill, riparian forests, floodplain forests, and level areas

between hilltops, as well as just about anywhere where the topography forms small depressions in flat areas.



Vernal pools provide critical breeding habitat for a variety of obligate species, such as wood frogs, spotted salamanders, and fairy shrimp that need these pools to complete their life cycles.



These spotted salamander egg masses on West Hill confirm this habitat as a functional vernal pool.

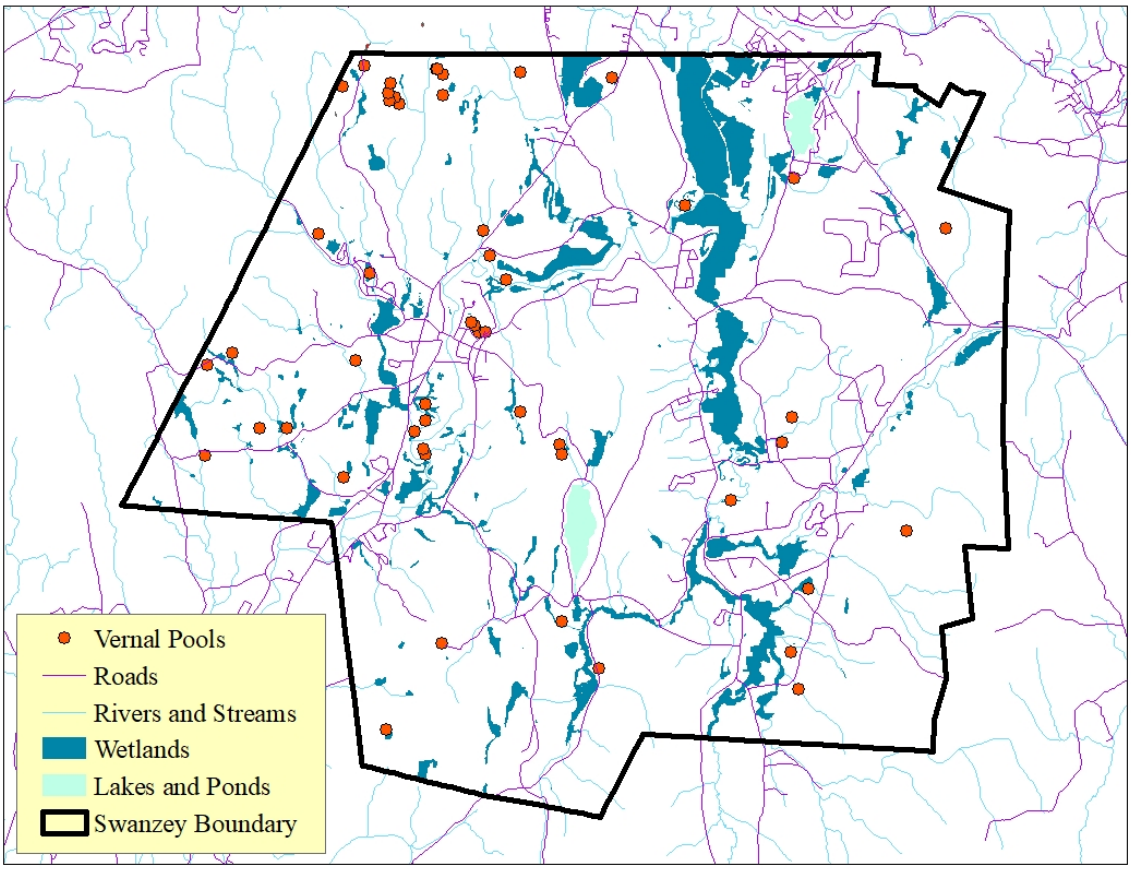


Figure 2 Confirmed and potential vernal pools in Swanzey, NH.

Ponds and Lakes

There are about 228 acres of ponds and lakes in Swanzey. The two largest waterbodies include Swanzey Lake (180 acres) and Wilson Pond (72 acres). The remaining 48 acres includes a variety of small ponds scattered throughout the town. Ponds and Lakes provide significant recreational resources as well as wildlife habitat.

Historically, ospreys hunted for fish in these waterbodies, and eagles would hunt for both fish and waterfowl. These species most likely still hunt in these waters. Ponds and lakes provide important habitat for many species of reptiles and amphibians such as snapping turtles, painted turtles, red-spotted newts, green frogs, bullfrogs, and pickerel frogs. Many species of waterfowl use these habitats for resting during migration, as well as for feeding and breeding. Mammals such as beaver and otter are often observed along

with racoons hunting for fish and crayfish. In addition, there are numerous aquatic macroinvertebrates in ponds and lakes often providing a food source for other wildlife species.



Overlooking the beach area of Wilson Pond along Route 32. Lakes and ponds provide critical habitat for many aquatic wildlife such as fish, as well as stopover sites for migrating waterfowl.

Rivers and Streams

There are about 125 miles of rivers and streams in Swanzey. They are quite diverse as they provide important resources for a variety of species that thrive in both coldwater and warmwater habitats. Most of Swanzey's coldwater streams can be found cascading down its mountains and smaller hillsides where they provide cold, clear, highly-oxygenated waters. These streams are important for brook trout and stream salamanders such as the spring salamander, as well as many aquatic macroinvertebrates. Falls Brook recently was the focus of a restoration project. The Cheshire County Conservation District in partnership with the Town of Swanzey and Trout Unlimited replaced an inadequate culvert on Hale Hill Road, providing coldwater fish and other

aquatic wildlife access to coldwater habitat upstream. Swanzey's lower stretches of streams and rivers, such as Ashuelot River and South Branch, provide warmwater habitat. While species adapted to colder waters may be found in these habitats long term survival is limited.

Concern for our rivers and streams is certainly justified. Historically, they have been neglected and often abused mostly due to a lack of understanding of the many ecological functions and values they provide. We fondly use them for recreation such as canoeing and kayaking, hunting, fishing, and general exploration. They provide habitat for a diverse wildlife community for many aquatic and terrestrial mammals, birds, reptiles, amphibians, and insects. They are threatened by climate change due to increasing temperatures, which greatly affect coldwater streams, and increased erosion with the frequency of more intense rain storms. In addition, developments along and adjacent to rivers and streams degrades wildlife habitats, increases the level of invasive plants, reduces water quality, and creates more fragmented landscapes.



A view of the Ashuelot River and a small forested floodplain.



Erosion along riverbanks can be part of the natural ecological process as streams meander and age. However, they can also be created as a result of past land use histories and disturbances to the riparian forests. The erosion of this riverbank on the Ashuelot River adjacent to the Dickenson Forest may be the result of human activities.



The Cheshire County Conservation District in partnership with the Town of Swanzey and Trout Unlimited restored a section of Falls Brook by replacing the culvert on Hale Hill Road in 2016. The previous culvert prevented passage of fish and other aquatic wildlife. This restoration project provided access to 10 miles of upstream coldwater habitat.

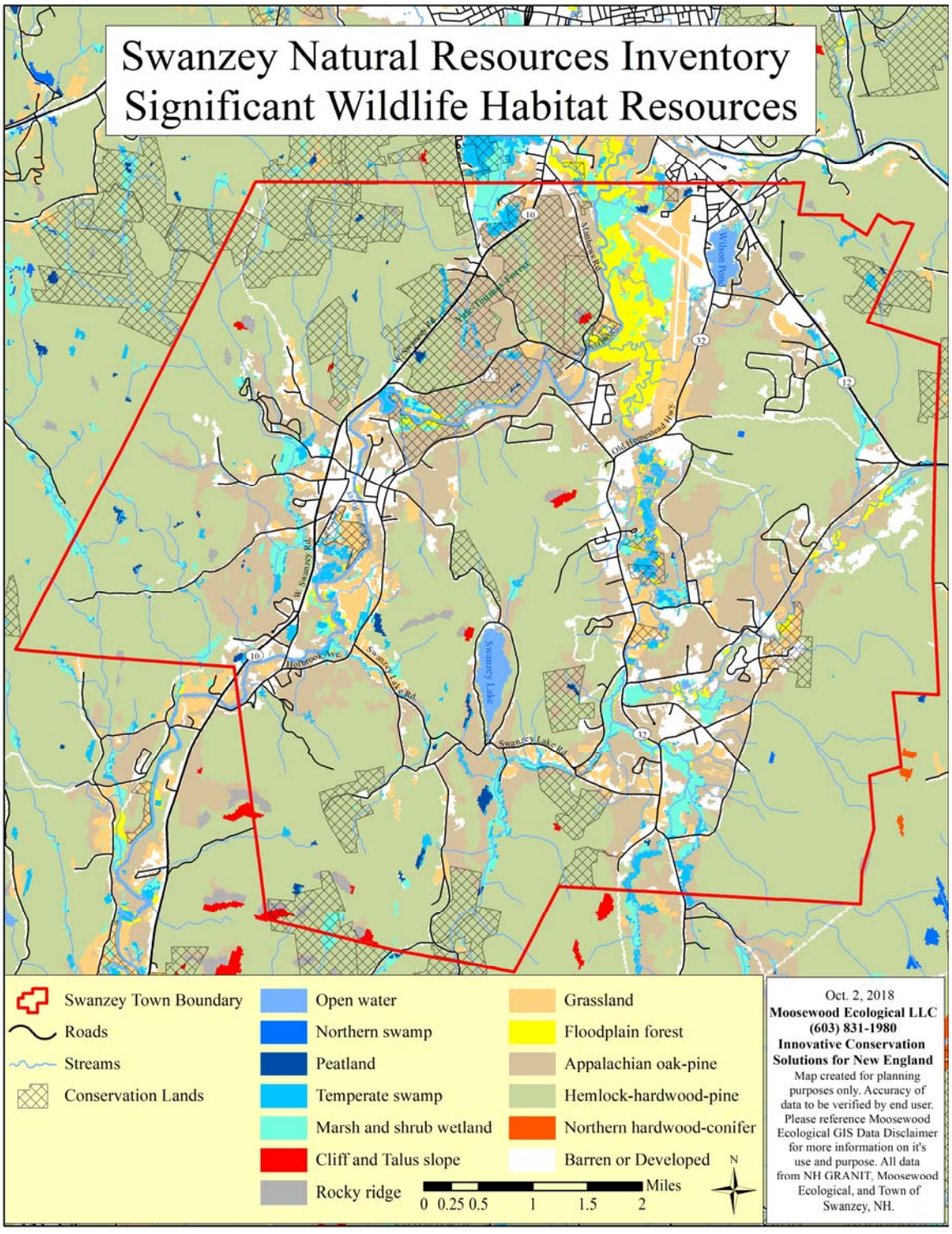


Figure 2 Significant wildlife habitats in Swanzey.

Biological Diversity

Swanzey boasts an incredibly diverse landscape with a wide variety of habitats. This in turn affords the opportunity to support a rich wildlife community. A total of 252 species were recorded during this project, including 24 mammals, 208 birds, 7 reptiles, and 13 amphibians (Appendix B). This includes 41 species of conservation concern identified in the NH Wildlife Action Plan (2015).

Data gathered during the 2019 field season was supplemented from various sources including Lamonde (2020) and eBird, which provides observations of birds posted by individuals that have a deep interest in bird watching and conservation. This included bird observations throughout the past 20 years from 1999-2019 during spring and fall migration, as well as the breeding season and winter residents. Wildlife species located in Appendix B does not represent a comprehensive list but provides a great resource to build upon over time. Below are a few photos to help demonstrate Swanzey's wildlife diversity.



Painted turtles observed in the marsh wetland system at the Dillant Hopkins Airport.
Photo by: The Ecosystems Management Company



Can you see this wood frog? Look in the center of the photograph and you can make out the dark facial mask and striped back legs. Completely camouflaged, wood frogs are at home on the forest floor among the brown leaves. This is an obligate species of vernal pools, which mean they need this special habitat for long term survival.



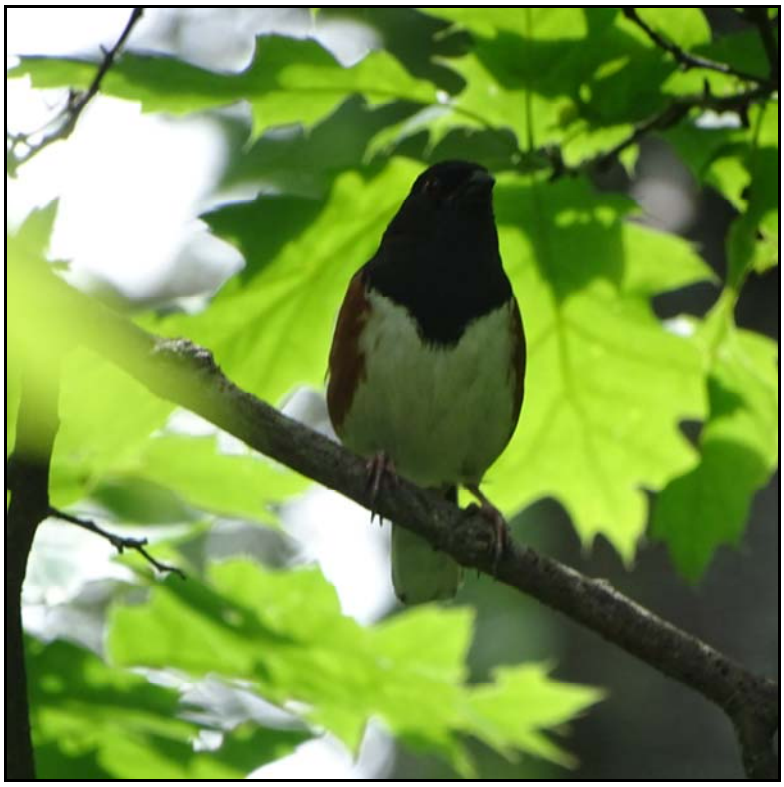
Bear scat was observed on Marcy Hill and west of Swanzey Lake in 2019. Moosewood Ecological LLC has also observed bear sign at the Yale-Toumey Forest and West Hill in years past. It is anticipated that bear distribution is quite wide in Swanzey.



Signs of moose were observed in a few locations in Swanzey. This species of conservation concern has been decreasing in abundance in southern New Hampshire due to rising temperatures and increase in tick populations associated with climate change.



The common garter snake can be found in many upland habitats from forests and shrublands to backyard gardens and agricultural fields.



This eastern towhee, a species of conservation concern, was observed at the base of Mt. Caesar near the trailhead. Another species of concern, prairie warbler, was also observed. These open, shrubland habitats are limited in their abundance and distribution but support many species of concern.

In addition to the wildlife species of conservation concern noted above, the NH Natural Heritage Bureau (NHNHB) has documented two rare plants in Swanzey, including long-headed windflower and northeastern bulrush. Both are considered as state-endangered; however, the northeastern bulrush is also included on the federally-endangered species list. The NHNHB has also documented the presence of American eel and the state and federally-endangered dwarf wedge mussel in Swanzey.

Unfragmented Lands and Habitat Connectivity

Unfragmented lands are defined by the surrounding human infrastructure (roads and developed areas). Fragmentation of land can negatively affect species survival rates by increasing mortality, lowering breeding success, or causing species loss altogether. The degree of severity of fragmentation depends upon many aspects, such as the size and shape of unfragmented blocks, the species or community in question, the extent of loss of natural habitats, intensity of human use, and colonization of invasive species.

The NH Wildlife Action Plan (WAP) developed an unfragmented lands analysis. However, this data layer has inherent errors. As such, the unfragmented lands were revised to more accurately reflect Swanzey's landscape (Figure 3). For the purposes of this project, fragmenting features were defined as 500 feet on either side of existing roadways, including all state and town roads but excluding Class VI roads and trails, as well as private driveways. This assumes that most development occurs within 500 feet of roadways. Unfragmented blocks of land include a variety of natural habitats such as forests, wetlands, streams, and ponds but also can include human-modified areas such as agricultural lands and shrublands.

Large blocks of unfragmented areas are widely known to support greater biodiversity than smaller blocks. As forest blocks become smaller due to the construction of roadways and developments their biodiversity generally decreases. This fragmentation affect has less immediate impact on generalist species or those with small home ranges (such as gray squirrel, raccoon, many amphibians, and small rodents) while affecting and potentially eliminating area-sensitive specialists that need large forested blocks in order to maintain their home ranges and for long-term survival (such as bear, bobcat, moose, various reptiles, wood thrush, and goshawk). Appendix C provides a general list of habitat block size requirements for wildlife to help illustrate this point.

Large landscapes also provide for wildlife movement and habitat connectivity. By maintaining connectivity between critical habitats, it is be possible to provide permanent wildlife corridors within the built environment. Wildlife travel corridors function as areas that one or many species may use to move from one habitat to another. This movement can be based on traveling to various areas for feeding, breeding, nesting, or shelter.

Wildlife must be able to travel safely throughout the landscape in order to meet their biological needs. Many depend upon a variety of habitats for their survival and may utilize many natural features for travel. These include features such as riparian zones of wetlands, ponds and streams, ridgelines, utility right-of-ways, and forest patches acting as a safe route between two or more habitats. A variety of wildlife can be associated with these corridors, including otter, muskrat, fox, coyote, bobcat, deer, moose, fisher, mink, and bear.

Wildlife corridors are not only significant for mammals but equally as important for amphibians, reptiles and migratory birds. Both amphibians and reptiles begin to move from their wintering habitats to their respective breeding and nesting grounds in the spring. This is the time of year that most mortality can be noticed as these species travel across roadways in search of suitable habitats. This affect can often be exacerbated as the same individuals must return back to their wintering habitats. Thus, there is a great significance in maintaining habitat connectivity, as well as understanding where these patterns of movement are taking place. This latter point can be a very important educational tool for community education and awareness about corridors across roadways. It can provide a means to adjust transportation patterns to help eliminate potential road mortality, or identify sites for road modifications to allow wildlife to safely cross.

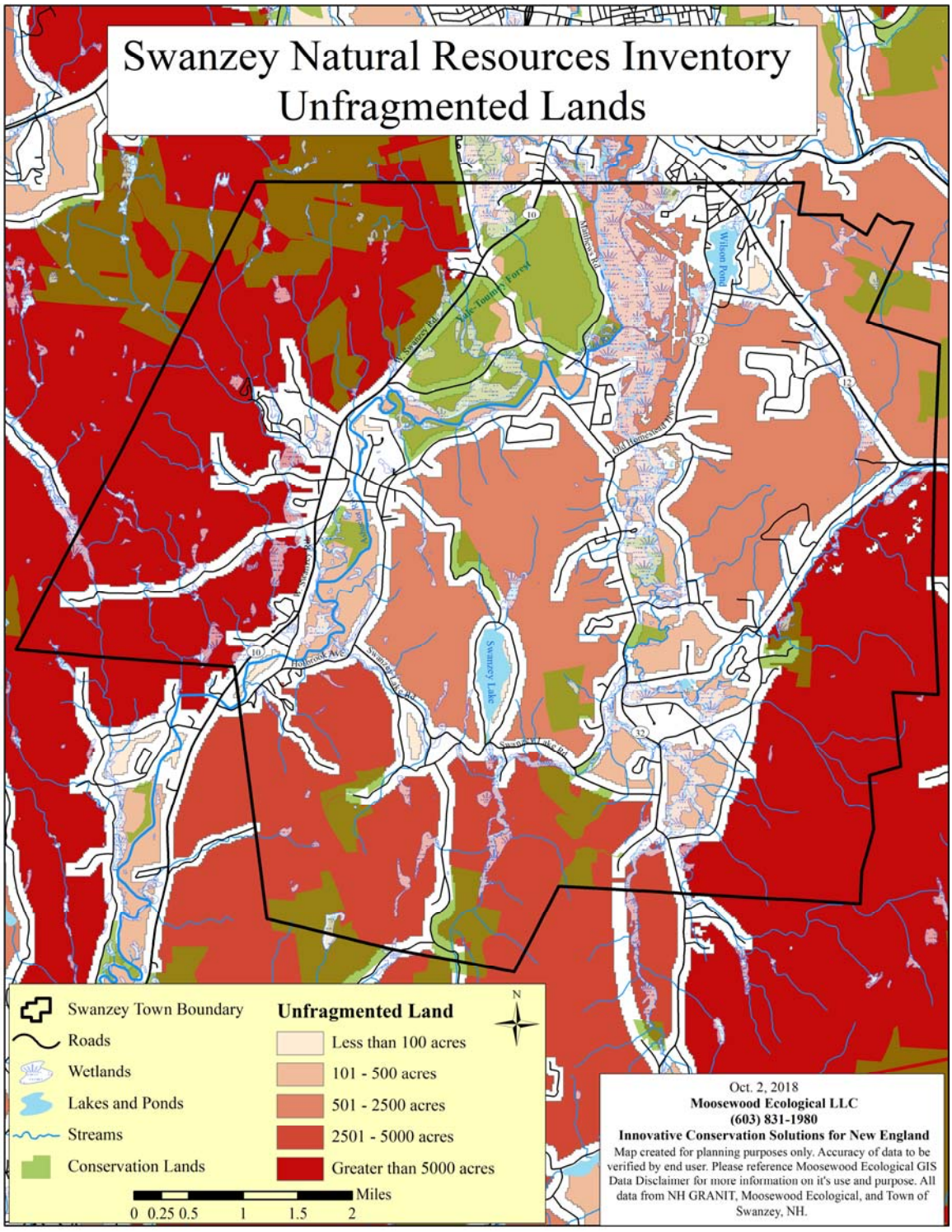


Figure 3 Unfragmented lands in Swanzey.

Invasive Species

Invasive species are defined as non-native species that have been introduced to our continent over time and have had a negative impact on native species. They possess many traits that provide them with a competitive edge, including the production of numerous offspring, adaptation to a variety of site and soil conditions, thrive in areas of disturbance, and early and rapid development in the spring.

Cygan (2011) further explains that "These traits allow invasive species to be highly competitive and, in many cases, suppress native species. Studies show that invasives can reduce natural diversity, impact endangered or threatened species, reduce wildlife habitat, create water quality impacts, stress and reduce forest and agricultural crop production, damage personal property, and cause health problems."

Many of our invasive plants have been brought here for many uses such as ornamental components of landscaping, erosion control, and food for native wildlife. Many other invasive species, including plants, insects, and fungi, were brought to North America inadvertently through shipments of various products form other continents. Historically, this resulted in the demise of American chestnuts and elms, as well as the beech bark scale disease that reduces this species rigor and eventual death. Currently, we are dealing with many other pathogens that are affecting our forests, including emerald ash borer, hemlock wooly adelgid, Asian long-horned beetle, and red pine scale.

As with most communities in New Hampshire, Swanzey has certain areas that have a strong presence of invasive plants while other areas may have relatively low to no pressure. Areas that are associated with disturbance or has forest edges typically has high levels of invasive plants. These areas include the sides of roadways, rail trail system, managed fields such as the Riley Conservation Area, riverbanks and shorelines, and recently logged areas with current invasive species. Invasive plants were also observed on Mt. Cresson, Mt. Caesar, and a few private properties. Species observed in Swanzey include Japanese knotweed, Asiatic bittersweet, glossy and common buckthorn, Japanese barberry, multi-flora rose, burning bush, and bush honeysuckles. Others invasive species are likely present as well.



This patch of Japanese knotweed was observed at the Riley Conservation Area.

CLIMATE CHANGE and RESILIENT LANDSCAPES

In light of evidence of a changing climate, communities are incorporating the concept of resiliency into their proactive planning efforts. The concept of ecological resiliency refers to the capacity of wildlife and plants and their natural processes to sustain change over time. Resiliency studies attempt to predict how the landscape can respond to a changing climate where extreme temperature and precipitation patterns, increasing intensity and frequency of storms, flooding, and rising sea levels are predicted.

When crafting a conservation and open space plan it is necessary to understand the distribution of the various natural resources and conserved lands within and adjacent to Swanzey. As part of this planning process, it is imperative to identify and capture climate-resilient landscapes. This provides a more inclusive approach, integrating significant natural resources with areas that are capable of recovering from major disturbance events (such as stronger storms, increased droughts, and floods) for long-term conservation success.

There are three major characteristics of resilient landscapes that we can use to plan for this future change. The first characteristic is the geophysical diversity of our landscape. This aspect refers to the diversity of geology, soils, elevations, and landforms, including water features such as lakes and streams. Physical diversity promotes both habitat and species diversity due to a wide range of conditions, including elevations, sun exposure (temperature and moisture), soils, hydrology, and ecological processes that help define distinct ecosystems. In general, the more diversity there is, the more a landscape is likely to recover from extreme disturbances.

The second major characteristic is connectedness. This refers to the ability of species to freely move throughout the landscape unimpeded by major barriers such as human developments. Connectedness can be viewed at the local and regional levels. The goal is to connect conservation open space to promote free movement of wildlife and plant species.

Biological condition is the final consideration in planning for climate resilience. This characteristic takes into consideration the impact of stressors on the environment, including past land use, human development, invasive species, air and water pollution, and climate change. Biological condition also considers the presence of species of greatest conservation need.

A number of recent predictive models have shown that northeastern forests are likely to experience greater tree species diversity loss than other parts of the United States due to climate change. One recent study also conducted an assessment of 13 broad northeastern habitat types. The study identified habitat types which are especially susceptible to the effects of climate change. Habitat types which occur in Swanzey are as follows:

Most Susceptible:

- peatlands
- southern reaches of northern hardwoods forest

Less Vulnerable:

- Appalachian oak-pine forest
- marshes
- shrub swamps

The NH Wildlife Action Plan (WAP) includes a risk assessment of 27 habitats and 157 species of greatest conservation concern that was based on standards adopted by other northeastern states. The assessment assigned a number of risk factors to each of these species within each described habitat to determine which habitat types (and the species they support) appear to be most vulnerable to various effects including pollution, climate change, natural systems modification, invasive species, disease and development. The following list of WAP habitats which occur in Swanzey and were determined to be the most highly ranked threats from these change factors are as follows:

- Appalachian oak-pine forests
- Hemlock-hardwood-pine forests
- Cold and warmwater rivers, streams, ponds, and lakes
- Vernal pools
- Peatlands

Invasive species and introduced pathogens in Swanzey have been recognized as a significant threat since the decimation of virtually all American chestnuts, once a keystone forest species. In more recent years, invasive plants as well as introduced insects and diseases have become widespread. Major river valleys are especially susceptible to the introduction and spreading of such exotic plant species as Asian bittersweet, Japanese knotweed, and glossy buckthorn, due to the popularity as a food for migrating and resident birds which spread their seeds.

A progressively warmer climate has been seen as one cause of the spread of many of these species. In the last 5 years alone, the emerald ash borer (EAB) and red pine scale

have quickly spread to their respective host trees much in the way the American elm was once so drastically affected. As road maintenance, forestry, and recreational improvements are planned on open space, roads, and Town-owned lands, extra precautions need to be taken to minimize the spread and introduction of invasive plants.

To learn more about climate-resilient landscapes and to view maps developed by The Nature Conservancy go to:
https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/resilience/Pages/default.aspx

RECOMMENDATIONS FOR CONSERVATION PLANNING

It is highly recommended that the information provided in both phases of the Swanzey NRI be used when considering the adoption of various land use planning techniques or when working with willing landowners on resource protection efforts. The data used to develop these reports represents the most current, readily available data to better understand Swanzey's natural resources. As such, there are some basic guidelines that the Town can use to promote innovative and informed land use planning.

- Protect large unfragmented blocks, especially those with high quality habitats located within close proximity of one another and with limited barriers for wildlife movement;
- Protect known rare species populations;
- Protect representative examples of critical habitats for known rare species;
- Protect rare and representative examples of natural communities;
- Protect intact wetland and stream riparian buffers and promote the restoration of degraded areas;
- Support voluntary and regulatory approaches at natural resources protection;
- Build upon existing contiguous protected lands;

- Connect protected lands and other critical habitats with upland, aquatic, and/or riparian corridors;
- Better understand wildlife movement patterns to identify and design the most effective conservation corridors; and
- Promote community education and outreach regarding Swanzey's biodiversity and the importance of long-term protection strategies.

The following general recommendations were based on the findings of the NRI projects. These are considered as the next Actions Steps that Swanzey could consider while proceeding with community land use and conservation planning, as well as community education of its residents and town boards.

1. Conduct a Parcel-based Ecological Assessment. This is a computer-based model that ranks parcels based on their natural resource values. The assessment can assist with conservation planning and working with willing landowners interested in land protection.

2. Update the Swanzey Open Space Plan developed in 2004 to include newly acquired natural resources data. This will help to revise Swanzey's conservation planning efforts and enhancing conservation focus areas while reviewing how the current plan has been helpful, how can it serve Swanzey better, and what projects have been accomplished.

3. Incorporate the NRI into the Swanzey Master Plan adopted in 2003. This provides a vision for the town from which adaptive land use planning can be adopted. Build public support for the NRI through informational sessions, published materials, and other means of community education and outreach. This will help to inform the community about its natural resources and future planning.

4. Conduct an audit of current zoning regulations to better understand if and how they protect critical natural resources. This effort can illuminate certain land use planning techniques that Swanzey might want to consider adopting in an effort to develop informed land use decisions for a more sustainable future. This could identify ways to use land more efficiently, encourage more compact development, and allocate specific areas for conservation and development.

5. Continue to work with adjacent communities on similar conservation initiatives of common interest. It would be helpful to meet annually with the Conservation Commissions within each of the adjacent communities to build strong relationships and create open lines of communication, as well as to inform these communities about Swanzey's conservation planning efforts.

6. Continue with community outreach and landowner education regarding Swanzey's natural resources and conservation planning. This can be accomplished in many ways, including workshops, hikes, and printed materials such as brochures and maps to help landowners with resource protection and management. A subcommittee of the Conservation Commission could be developed to focus on outreach and education efforts.



Lady slippers are one of the most common types of orchids in Swanzey. They can typically be found in mixed forests with pines and hemlocks and acidic soils.

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APPENDIX A

MOOSEWOOD ECOLOGICAL GIS DATA DISCLAIMER

Moosewood Ecological LLC GIS Data Disclaimer

A variety of existing and newly created data layers were used to prepare the Natural Resources Inventory (NRI) maps. These existing data have been developed by numerous government agencies and other sources. They have been produced specifically for the town, the state of New Hampshire, or the entire United States using *remote data*. These sources of remote data were developed from the interpretation of satellite imagery and aerial photography. The data were produced at various scales and therefore, represent different degrees of errors, omissions, and inaccuracies.

The NRI maps are for education and planning purposes only. They are suitable for general land use planning. However, they are not suitable for detailed site planning and design, including wetlands delineations and other jurisdictional determinations. As such, boundaries of all habitats, including wetlands, and parcels are approximate locations and should be field verified. The accuracy of the data is the end user's responsibility, and Moosewood Ecological LLC cannot be responsible for the accuracy and completeness of the data. Moosewood Ecological LLC makes no warranty, expressed or implied, as to the accuracy or completeness of the data. Furthermore, Moosewood Ecological LLC shall assume no responsibility for any errors, omissions, or inaccuracies in the information provided.

APPENDIX B

WILDLIFE SPECIES LIST

Birds

Snow Goose
Brant
Canada Goose
Mute Swan
Wood Duck
Blue-winged Teal
Northern Shoveler
Gadwall
American Wigeon
Mallard
American Black Duck
Northern Pintail
Green-winged Teal
Ring-necked Duck
Greater Scaup
Lesser Scaup
White-winged Scoter
Black Scoter
Long-tailed Duck
Bufflehead
Common Goldeneye
Hooded Merganser
Common Merganser
Red-breasted Merganser
Ruddy Duck
Ruffed Grouse
Wild Turkey
Pied-billed Grebe (T)
Horned Grebe
Red-necked Grebe
Mourning Dove
Yellow-billed Cuckoo
Black-billed Cuckoo
Common Nighthawk (E)
Eastern Whip-poor-will
Chimney Swift
Ruby-throated Hummingbird
Virginia Rail
Sora
Common Gallinule
American Coot
American Golden-Plover
Killdeer
Upland Sandpiper (E)
Least Sandpiper
Pectoral Sandpiper
American Woodcock
Wilson's Snipe
Spotted Sandpiper
Solitary Sandpiper
Greater Yellowlegs
Lesser Yellowlegs
Bonaparte's Gull
Ring-billed Gull
Herring Gull
Black Tern
Common Tern (T)
Red-throated Loon
Common Loon (T)
Double-crested Cormorant
American Bittern
Great Blue Heron
Great Egret
Little Blue Heron
Green Heron
Black-crowned Night-Heron
Turkey Vulture
Osprey
Golden Eagle (E)
Northern Harrier (E)
Sharp-shinned Hawk
Cooper's Hawk
Northern Goshawk
Bald Eagle (T)
Red-shouldered Hawk
Broad-winged Hawk
Red-tailed Hawk
Rough-legged Hawk
Eastern Screech-Owl
Great Horned Owl
Barred Owl
Short-eared Owl
Northern Saw-whet Owl
Belted Kingfisher
Yellow-bellied Sapsucker
Red-bellied Woodpecker
Downy Woodpecker
Hairy Woodpecker
Pileated Woodpecker
Northern Flicker
American Kestrel
Merlin
Peregrine Falcon (T)
Olive-sided Flycatcher
Eastern Wood-Pewee
Yellow-bellied Flycatcher
Alder Flycatcher
Willow Flycatcher
Least Flycatcher
Eastern Phoebe
Great Crested Flycatcher
Eastern Kingbird
Yellow-throated Vireo
Blue-headed Vireo
Philadelphia Vireo
Warbling Vireo
Red-eyed Vireo
Northern Shrike
Blue Jay
American Crow
Fish Crow
Common Raven
Black-capped Chickadee
Tufted Titmouse
Horned Lark
Northern Rough-winged Swallow
Tree Swallow
Bank Swallow
Barn Swallow
Cliff Swallow
Golden-crowned Kinglet
Ruby-crowned Kinglet
Red-breasted Nuthatch

Birds

White-breasted Nuthatch
Brown Creeper
Blue-gray Gnatcatcher
House Wren
Winter Wren
Marsh Wren
Carolina Wren
European Starling
Gray Catbird
Brown Thrasher
Northern Mockingbird
Eastern Bluebird
Varied Thrush
Veery
Swainson's Thrush
Hermit Thrush
Wood Thrush
American Robin
Bohemian Waxwing
Cedar Waxwing
House Sparrow
American Pipit
Evening Grosbeak
Pine Grosbeak
House Finch
Purple Finch
Common Redpoll
Hoary Redpoll
White-winged Crossbill
Pine Siskin
American Goldfinch
Lapland Longspur
Snow Bunting
Grasshopper Sparrow (T)
Chipping Sparrow
Field Sparrow
American Tree Sparrow
Fox Sparrow
Dark-eyed Junco
White-crowned Sparrow
White-throated Sparrow
Vesper Sparrow
Savannah Sparrow
Song Sparrow
Lincoln's Sparrow
Swamp Sparrow
Eastern Towhee
Bobolink
Eastern Meadowlark
Baltimore Oriole
Red-winged Blackbird
Brown-headed Cowbird
Rusty Blackbird
Common Grackle
Ovenbird
Louisiana Waterthrush
Northern Waterthrush
Blue-winged Warbler
Black-and-white Warbler
Tennessee Warbler
Nashville Warbler
Common Yellowthroat
American Redstart
Cape May Warbler
Northern Parula
Magnolia Warbler
Bay-breasted Warbler
Blackburnian Warbler
Yellow Warbler
Chestnut-sided Warbler
Blackpoll Warbler
Black-throated Blue Warbler
Palm Warbler
Pine Warbler
Yellow-rumped Warbler
Prairie Warbler
Black-throated Green Warbler
Canada Warbler
Wilson's Warbler
Summer Tanager
Scarlet Tanager
Northern Cardinal
Rose-breasted Grosbeak
Indigo Bunting
Dickcissel

Bold = species of conservation concern
T = state threatened
E = state endangered

Amphibians

Spotted salamander
Northern dusky salamander
Northern two-lined salamander
Redback salamander
Eastern red-spotted newt
American toad
Gray treefrog
Spring peeper
Bullfrog
Green frog
Pickerel frog
Wood frog
Northern leopard frog

Reptiles

Common snapping turtle
Eastern painted turtle
Wood turtle
Northern water snake
Northern red-bellied snake
Eastern garter snake
Milk snake

Mammals

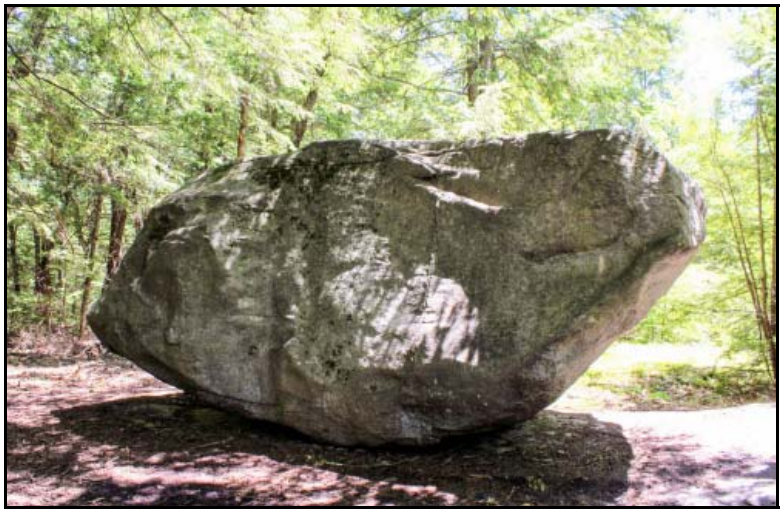
Eastern coyote
Red fox
American beaver
Moose
White-tailed deer
Bobcat
Virginia opossum
Snowshoe hare
Eastern cottontail
River otter
Fisher
Weasel
Mink
Striped skunk
North American porcupine
Woodchuck
Muskrat
Deer or White-footed mouse
Gray squirrel
Eastern chipmunk
Red squirrel
Raccoon
Star-nosed mole
Black bear

Bold = species of conservation concern

APPENDIX C

HABITAT BLOCK SIZE REQUIREMENTS FOR WILDLIFE

1-19 Acres	20-99 Acres	100-499 Acres	500-2,500 Acres	>2,500 Acres
raccoon	raccoon	raccoon	raccoon	raccoon
	hare	hare	hare	hare
				coyote
small rodent	small rodent	small rodent	small rodent	small rodent
	porcupine	porcupine	porcupine	porcupine
				bobcat
cottontail	cottontail	cottontail	cottontail	cottontail
	beaver	beaver	beaver	beaver
				black bear
squirrel	squirrel	squirrel	squirrel	squirrel
	weasel	weasel	weasel	weasel
		mink	mink	mink
				fisher
	woodchuck	woodchuck	woodchuck	woodchuck
		deer	deer	deer
muskrat	muskrat	muskrat	muskrat	muskrat
			moose	moose
red fox	red fox	red fox	red fox	red fox
songbirds	songbirds	songbirds	songbirds	songbirds
		sharp-shinned hawk	sharp-shinned hawk	sharp-shinned hawk
			bald eagle	bald eagle
skunk	skunk	skunk	skunk	skunk
		Cooper's hawk	Cooper's hawk	Cooper's hawk
		harrier	harrier	harrier
		broad-winged hawk	broad-winged hawk	broad-winged hawk
			goshawk	goshawk
		kestrel	kestrel	kestrel
			red-tailed hawk	red-tailed hawk
		great-horned owl	great-horned owl	great-horned owl
			raven	raven
		barred owl	barred owl	barred owl
		osprey	osprey	osprey
		turkey vulture	turkey vulture	turkey vulture
		turkey	turkey	turkey
most reptiles	most reptiles	reptiles	reptiles	reptiles
	garter snake	garter snake	garter snake	garter snake
	ring-necked snake	ring-necked snake	ring-necked snake	ring-necked snake
most amphibians	most amphibians	most amphibians	amphibians	amphibians
		wood frog	wood frog	wood frog



Tippin Rock along the Tippin Rock Trail southeast of Swanzey Lake. Parking for the trailhead is located on Warmac Road.

Appendix D

A Plan for the Protection of Open Space, Town of Swanzey

A Plan for the Protection of Open Space

Town of Swanzey, New Hampshire



August 2004

A Plan for the Protection of Open Space
Town of Swanzey, New Hampshire
Adopted August 2004

INTRODUCTION

Open space protection can be an effective tool for preserving community character, protecting the environment, and enhancing quality of life. Consensus about the role of open space protection in community planning is critical. A Municipal Open Space Plan is the information and policy basis for setting priorities and action plans for land protection, in concert with other community goals.

BACKGROUND AND CONTEXT

In 2003, New Hampshire remained the fastest-growing state in the Northeastern United States. Along with the many positive aspects of this growth come challenges and stresses on the environment. Among the most serious concerns is the permanent conversion of open spaces – natural areas, forests, farms, riparian zones, and water supply protection lands. Statewide, it is estimated that 15,000 acres of open land are developed every year.

Many communities have found that conversion of these lands for development can result in lost opportunities for recreation, degraded waters supplies, undermining of traditional economic uses such as forestry and agriculture, disruption of habitat, and diminishment of quality of life. In some regions, especially the Merrimack Valley and Southeastern New Hampshire, towns are going to great lengths to save the remaining undeveloped land, in some cases spending large sums of public money.

Swanzey is feeling the pressures of this growth. During the 1990s, the town grew nearly twice as fast in population and new housing units as Cheshire County as a whole. In response, the 2003 Master Plan emphasized the need to preserve the "rural character" of the community. As listed below, the Master Plan called for action to identify and protect high priority open spaces in town.

PURPOSES

This Plan supports or partially fulfills many Objectives, Strategies, and Recommendations of the "Swanzey Master Plan Update 2003." Principally these include several appearing under the section, Overall Goal for Land Use: "…to develop and preserve a pleasant, attractive, healthy, safe, affordable and convenient environment for living, working, shopping and recreation." They are:

> "Objective 4. Provide for the conservation and management of the Town's natural resources and the protection of sensitive areas …"
>
> "Objective 6. Protect natural resources, preserve the Town's rural areas, and minimize sprawl by directing higher density development to occur within the existing villages and to parcels accessible to public water and sewer systems."

> "Strategy 4. Support any public and/or private efforts to preserve and protect open land in Swanzey – insofar as these efforts do not economically penalize the landowner."
>
> "Strategy 5. … develop a comprehensive plan to identify, establish and maintain greenways to protect wildlife corridors and to provide undeveloped areas for recreation and for aesthetics."

This Plan sets forth criteria, goals, and recommendations for implementing an Open Space Protection Plan, and establishes a role for Town government in land conservation as a matter of public policy. That policy acknowledges that preventing development of certain properties will protect or enhance a set of "resource values" described here under "Findings," and that it is fitting for Town government to facilitate the conservation of certain lands that exhibit these values. At a minimum, this Plan directs the Town of Swanzey to promote land conservation and to be vigilant for opportunities for land conservation. The role of Town government in this area may also be to educate landowners about the topic, network among landowners and land trusts, and acquire land or conservation easements.

APPROACH AND PROCESS

This planning process was facilitated by staff from the Monadnock Conservancy and Southwest Region Planning Commission, with support by a grant from the John F. and Dorothy H. McCabe Fund of the New Hampshire Charitable Foundation. Swanzey was selected from among seven municipalities that submitted proposals for the assistance.

The Town of Swanzey convened an Open Space Advisory Committee (see appendix) to identify how and where land conservation could best serve the public interest as established in the Master Plan and further articulated here. During monthly meetings between May 2003 and November 2003, the Committee reviewed information and maps regarding land use patterns, distribution of natural resources (e.g. aquifers and wetlands), and threats to Swanzey's natural resources. To solicit public input, the Committee conducted a public survey that asked residents to define what places or kinds of places in Town define Swanzey's "rural character." They created and distributed a high quality lapel button promoting the effort. In September, approximately 40 citizens attended a public meeting to review and comment on the Committee's initial findings.

The Committee reached consensus on a set of *Resource Values* that can be protected by conserving open space; *Land Conservation Priority Areas* where those resources are most prevalent; and *Specific Place*s as examples of properties worthy of consideration for protection. In all cases, the values and places were determined to be essential to community well-being in some basic way, or are part of how residents define Swanzey's community character. Ultimately, all are basic to environmental quality and quality of life.

FINDINGS

Resource Values to be protected or restored by land conservation:

1. Recreation and Public Access
2. Natural Beauty
3. Habitat Diversity for native species of wild plant and animal life
4. Unfragmented Habitat (large continuous undeveloped areas – regardless of natural habitat types found there)
5. Historic and Archeological Areas and Sites
6. Active Agriculture and Prime Soils
7. Community Character
8. Remoteness and Sense of Isolation
9. Water Supply and Water Quality
10. Air Quality

Land Conservation Priority Areas (preliminary list):

1. Forested Hills throughout Town: Especially visible land along ridgelines, hilltops, and summits. Specific examples cited include but are not limited to:
    - West Hill
    - Mount Huggins
    - Mount Cresson
    - Portions of Yale Forest
    - Bullard and Rattlesnake Mountains
    - Mount Caesar
    - Franklin Mountain

2. River Corridors and Wetlands: Riparian lands and buffers along the shoreline of rivers, streams, lakes, and ponds. Specific examples cited include but are not limited to:
    - Ashuelot and South Branch Rivers
    - Martin and Perry Brooks (wetlands)
    - California Brook watershed
    - Watersheds of Wilson Pond & Swanzey Lake
    - Vicinities of Covered Bridges

3. Open Fields and Farmland throughout Town. Specific examples cited include but are not limited to:
    - Fields in vicinity of Westport Rd. and Swanzey Lake Rd.
    - Bardwell Farm
    - Rabbit Hollow

The chart below exhibits how the Resource Values can be sustained by protecting the Kinds of Places identified by the process. Key: A solid bullet indicates the resource is prevalent; an open bullet indicates the resource is present but not prevalent; an "X" indicates that the resource is not present.

Resource Values	**Kinds of Places**		
	Forested Hills	River Corridors & Wetlands	Open Fields & Farm Land
Recreation / Public Access	●	◒	◒
Natural Beauty	●	●	●
Habitat Diversity	●	●	●
Unfragmented Habitat	●	●	☒
Historic Sites / Areas	◒	●	●
Active Agriculture	☒	◒	●
Community Character	●	●	●
Remoteness / Sense of Isolation	●	●	☒
Water Supply / Water Quality	●	●	●

OVERVIEW OF LAND CONSERVATION

There are two primary ways to protect land for conservation purposes: *Regulation* and *Conservation Land Transactions*. This plan will focus primarily on the latter, which involves working directly with interested landowners. The two most common Conservation Land Transactions are acquisition of land, and acquisition of development rights through conservation easements.

Conservation Land Transactions occur in two fundamental ways:

Active and strategic

This involves identifying high priority parcels and actively seeking to purchase or encourage donation of land or conservation easements. When successful, these projects have the greatest potential to achieve agreed upon goals. However, these projects may require significant investments of money if the owners are not in a position to make donations.

Vigilance and responsiveness to opportunity

Most land protection accomplishments come as the result of being ready to respond to opportunities. Having the Open Space Plan in place will help guide decisions when these opportunities arise. It will also help create opportunities through education and outreach.

RECOMMENDATIONS

1. The Planning Board should adopt the Open Space Plan as a chapter in the Town Master Plan.

2. The Town should inventory existing properties that are currently owned by the Town, other public entities, and private institutions to determine the level of protection of each parcel. Some properties – including Yale Forest and certain Town-owned land – presently may be designated as permanent conservation land on some maps, despite having no deed restrictions or other legal prohibitions against intensive development. Each of these parcels should be identified with one or more of the following designations:
    a. State-owned with conservation restrictions
    b. State-owned without conservation restrictions
    c. Town-owned with conservation restrictions
    d. Town-owned without conservation restrictions
    e. Owned by a conservation organization such as the Society for the Protection of New Hampshire Forests (SPNHF)
    f. Protected by a conservation easement by a conservation organization such as the Monadnock Conservancy or SPNHF
    g. Owned by a private institution (such as Yale University) for the stated purpose of conservation, but not legally protected for those purposes
    h. Owned by other public or private entities for public purposes

3. From this inventory, the Town should determine which parcels deserve formal protection based on the Findings section of this plan. To start, the Town may choose to convey permanent conservation easements on land it owns to a qualified land trust such as the Monadnock Conservancy. The Town should open a dialogue with Yale University and other institutions to determine their willingness to consider permanent conservation agreements on its holdings.

4. In carrying out their responsibilities, the Board of Selectmen, Planning Board, Conservation Commission, and Zoning Board of Adjustment should look for ways to actively integrate the Open Space Plan into their deliberations and plans. These might include Master Plan updates, zoning changes, subdivision regulations, subdivision reviews, site plan reviews, placement and extension of infrastructure, economic development, emergency management, and facility siting. In addition, the boards should explore the use of more innovative development concepts that incorporate open space conservation. The Open Space maps should be posted in Town Hall so they are easy to consult during board meetings.

5. The Selectmen should establish a standing Open Space Committee. Voting members of this Committee should include one designee each from the Planning Board, the Conservation Commission, and the Selectboard, and two “at-large” members. Additional non-voting members should be appointed to assist with the

work. This committee should work closely with all town boards, especially the Conservation Commission, but should report directly to the Selectboard.

6. The Conservation Commission and the Open Space Committee should establish a plan for contacting and educating owners of priority lands. This could include mailings, field trips to existing protected lands, educational forums with land protection experts, etc.

7. The Town should consider expanding its Conservation Fund through regular appropriations and collection of Current Use change tax payments. This fund should be used to:
    a. acquire land or conservation easements
    b. reimburse private landowners for the direct costs of donating land or conservation easements
    c. other purposes allowed by state enabling legislation

8. The Conservation Commission and Open Space Committee should meet with the Planning Board and Selectboard annually to review and update the Plan.

ACTION STEPS

Within 6 months

1. Appoint a standing Open Space Committee that will report directly to the Board of Selectmen."
2. Adopt a Conservation Land rating system to evaluate opportunities (see draft attachment).
3. Identify all owners of parcels greater than 50 acres within the Land Conservation Priority Areas.
4. Publicize the Open Space Plan to the general public, landowners in Priority Areas, and interested groups such as sportsmen's groups, snowmobilers, and the Bike Ped Committee.
5. Meet with other Town Boards to review the Open Space Plan and actions.
6. Sponsor a landowner education workshop with the Monadnock Conservancy.

Quarterly

1. The Open Space Committee should report to the Board of Selectmen.

Annually

1. Consider what actions are needed at Town Meeting to implement the Open Space Plan. These could include expanding the Conservation Fund or acquiring specific parcels.
2. Hold a landowner education workshop on conservation options.
3. The Conservation Commission and the Open Space Committee should meet with the Planning Board and Selectboard to review progress toward implementation.

Biannually

1. Review the Open Space Plan and revise, if necessary.
2. Acquire updated maps from Southwest Region Planning Commission showing conservation lands, natural resources, and other related features.

CONCLUSION

The Swanzey Master Plan of 2003 clearly calls for action to identify and protect important open space throughout Town. This Plan provides further guidance for such action. It should be the responsibility of the Open Space Committee to ensure the Plan is adopted by the Planning Board, understood by all municipal officials, and regularly updated.

Town of Swanzey Open Space Plan

2004

Conservation Priority Areas

- Forested Hills
- Ashuelot and South Branch River Corridors
- Perry and Martin Brooks Wetlands/Streams Complex
- Farm Fields of West Swanzey and Westport
- Unprotected Municipal and Institutional Land
- Covered Bridges
- Rivers and Streams
- Lakes and Ponds
- Wetland
- Town Boundary
- State, Class I and II Highways
- Town, Class V Roads
- Town, Class VI Roads

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Prepared by: **SWRPC**
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fax: (603) 357-7440
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Digital base information provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (GRANIT)

Town of Swanzey
Open Space Plan
2004
Protected Land
and Other Public & Institutional Lands

- Conservation Easement
- Deed Restriction
- Agricultural Restriction
- Public or Institutional Ownership - - May or May Not be Protected

- A Yale University (SPNHF)
- B Horatio Colony Preserve
- C Yale-Toumey Forest
- D Humane Society of the U.S.
- E Dickinson Memorial Forest (SPNHF)
- F Town of Swanzey (LCIP)
- G Meadows End Timber Co. (NE Forestry Foundation)
- H Honey Hill (State of NH)
- I Olsen / Wolf Creek Invest.,LLC (SPNHF)
- J Edgewood Civic Association
- K Monadnock Conservancy
- L Town of Swanzey
- M Belding Farms (Monadnock Cons'y)

- Rivers and Streams
- Lakes and Ponds
- Wetland
- Town Boundary
- State, Class I and II Highways
- Town, Class V Roads
- Town, Class VI Roads

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Town of Swanzey
Open Space Plan
2004
Landscape Fragmentation in Swanzey
and
Surrounding Towns

Developed Areas

State Highways
Town Roads

More-Fragmented Areas

Landscape Fragments
(larger than 100 acres)

Less-Fragmented Areas

River or Stream

Lake or Pond

Wetland

Town Boundaries

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Presentation prepared by:

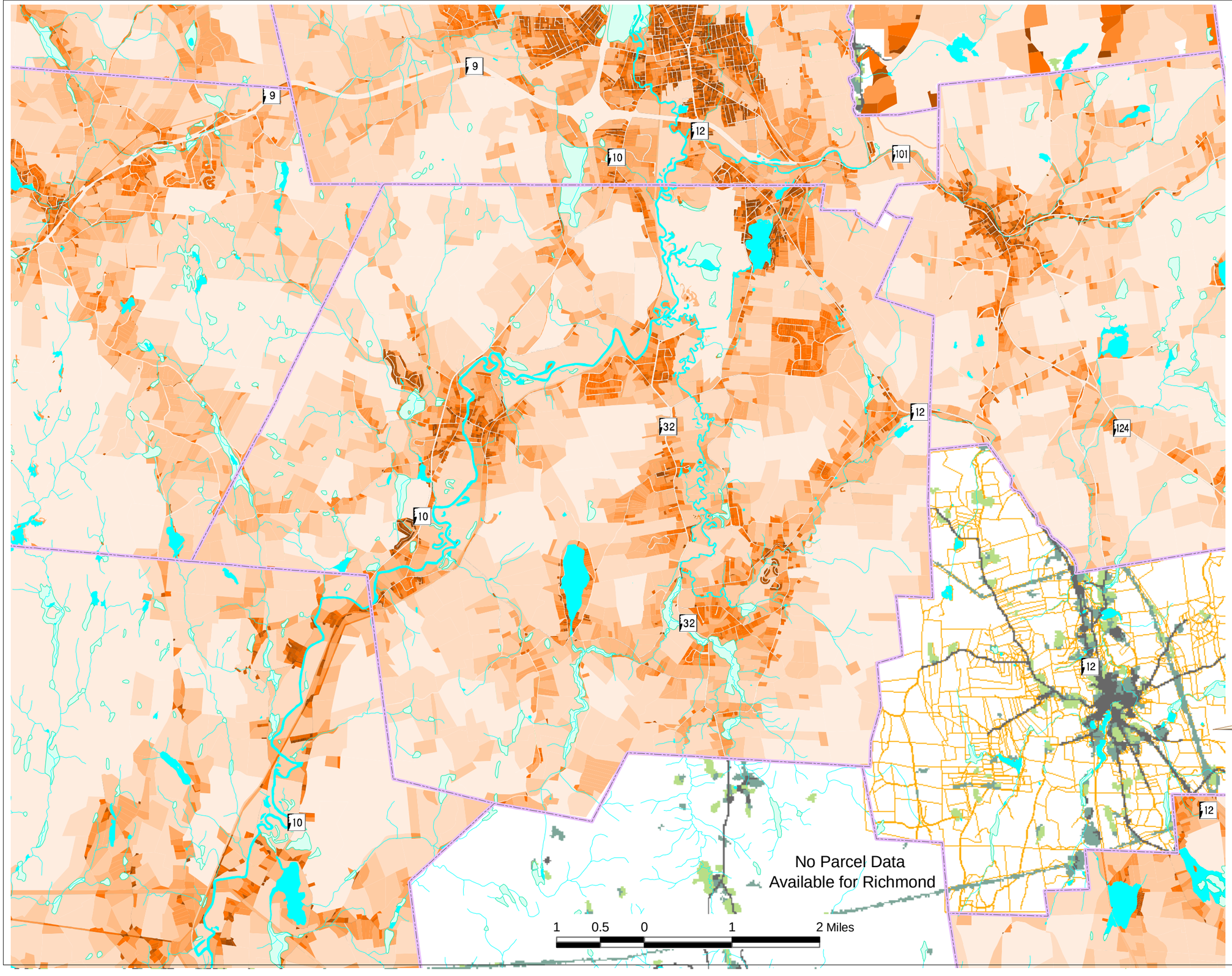
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Town of Swanzey
Open Space Plan

2004

Properties in Swanzey
and Surrounding Towns
Graded by Size



Smaller Properties

Individual Properties

Larger Properties

Rivers and Streams

Lakes and Ponds

Wetland

Roads, Buildings, Parking

Agriculture / Open Fields

Other Disturbed Areas

Town Boundaries

Property line data for Troy cannot be graded by size.

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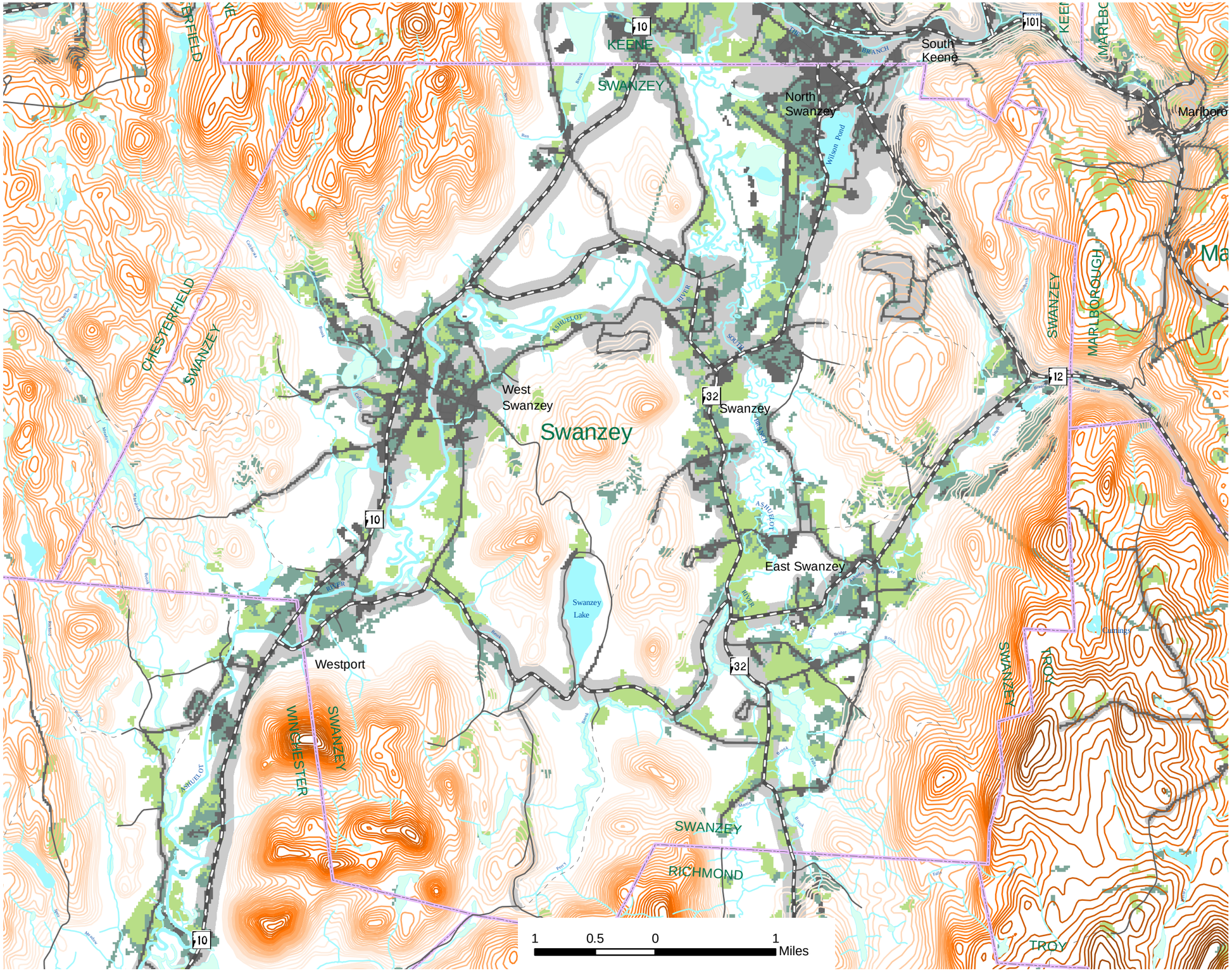
Town of Swanzey
Open Space Plan

2004

Undeveloped Forested Hills in Swanzey

and

Surrounding Towns



Higher Elevations and Hill Tops

Topographic Countours

Lower Elevations

Roads, Buildings, Parking

Agriculture / Open Fields

Other Disturbed Areas

Neighborhoods and Roadside Development

Rivers and Streams

Lakes and Ponds

Wetland

Town Boundaries

N W E S

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Digital base information provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (GRANIT)

Town of Swanzey
Open Space Plan

2004

Land Cover in Swanzey
and Surrounding Towns
with Property Lines

- Roads, Buildings, Parking
- Agriculture / Open Fields
- Other Disturbed Areas Neighborhoods and Roadside Development
- Property Lines
- Rivers and Streams
- Lakes and Ponds
- Wetland
- Town Boundaries

N
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S

1 0.5 0 1 2 Miles

Presentation prepared by:

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Digital base information provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (GRANIT)

APPENDIX 2.

Swanzey Open Space Plan Project Rating Sheet

Project or Parcel Name: _____ Acres: _____

Location in town: _____ Current Owner: _____

Type of Place: __ Forested Hillside __ River Corridor/Wetland __ Field / Open Space
Brief summary of project or parcel:

_____

_____

RESOURCE VALUES
Rank all values present or prevalent on property from 1 – 5, with 5 being highest

RECREATION / ACCESS	**Comments**
___ Existing Trails	_____
___ Potential for Trails	_____
___ Water Access	_____
___ Appropriate for hunting and fishing	_____
___ Remoteness / Sense of isolation	_____
___ *Total Points*	

HABITAT DIVERSITY AND INTEGRITY	
___ Natural Heritage site or rare natural community	_____
___ Diversity/quality of habitat on site is significant	_____
___ Part of corridor	_____
___ Linkage to other conservation lands	_____
___ Unfragmented habitat	_____
___ *Total Points*	

NATURAL BEAUTY	
___ Is part of a prominent viewshed	_____
___ Protrects unique views	_____
___ Provides good views from property	_____
___ *Total Points*	

WATER QUALITY	
___ Public drinking water supply	_____
___ Lake or pond frontage	_____
___ River or stream frontage	_____
___ Wetlands	_____
__ Aquifer or Wellhead Protection	_____
___ *Total Points*	

ACTIVE AGRICULTURE	
___ Prime soils (state or local significance	_____
___ Viable farm now or potential	_____
___ *Total Points*	

COMMUNITY CHARACTER	
___ Highly scenic from public ways	_____
___ Includes historically significant resources	_____
___ *Total Points*	

CHARACTERISTICS OF PROJECT OR PARCEL

YES	NO	DON'T KNOW	
__	__	__	Meets criteria as priority area in 2003-2004 Open Space Plan
__	__	__	Included as specific example of priority area in Open Space Plan
__	__	__	Abuts, enlarges, or provides linkages to other town-owned land
__	__	__	Clear potential to stimulate future projects
__	__	__	Benefits wide range of people
__	__	__	Access for public recreational uses
__	__	__	Opportunities for environmental or other educational uses
__	__	__	Opportunities for historic or cultural activities and public uses
__	__	__	Absence of actual or potential safety hazards
__	__	__	Title is clean and unencumbered
__	__	__	Town can provide effective stewardship of property
__	__	__	Potential for private land trust to assist
__	__	__	Imminently threatened by change of use that would undermine Resource Values
__	__	__	Is affordable for Town and will advance other priorities

Other Comments:

_____

_____

APPENDIX 3.

Selected Sources of Assistance and Information

Monadnock Conservancy
PO Box 337
160 Emerald Street
Keene, NH 03431
(603) 357-0600
www.monadnockconservancy.org
Information for landowners, technical assistance, land conservation transactions

Society for the Protection of New Hampshire Forests / Center for Land Conservation Assistance
54 Portsmouth Street
Concord, NH 03301
(603) 224-9945
www.spnhf.org
General information on land conservation, publications on municipal funding for land conservation, technical assistance, land conservation transactions

NH Land and Community Heritage Investment Program
10 Dixon Avenue
Concord, NH 03301
(603) 224-4113
www.lchip.org
Grants available to fund land conservation projects

Land Trust Alliance
1331 H Street NW
Suite 400
Washington, DC 20005-4734
(202) 638-4725
www.lta.org
Information, workshops, publications, updates on land conservation

Southwest Region Planning Commission
20 Central Square
Keene, NH 03431
(603) 357-0557
www.swrpc.org
Planning and technical assistance, mapping, information, education

APPENDIX 4.

Open Space Advisory Committee

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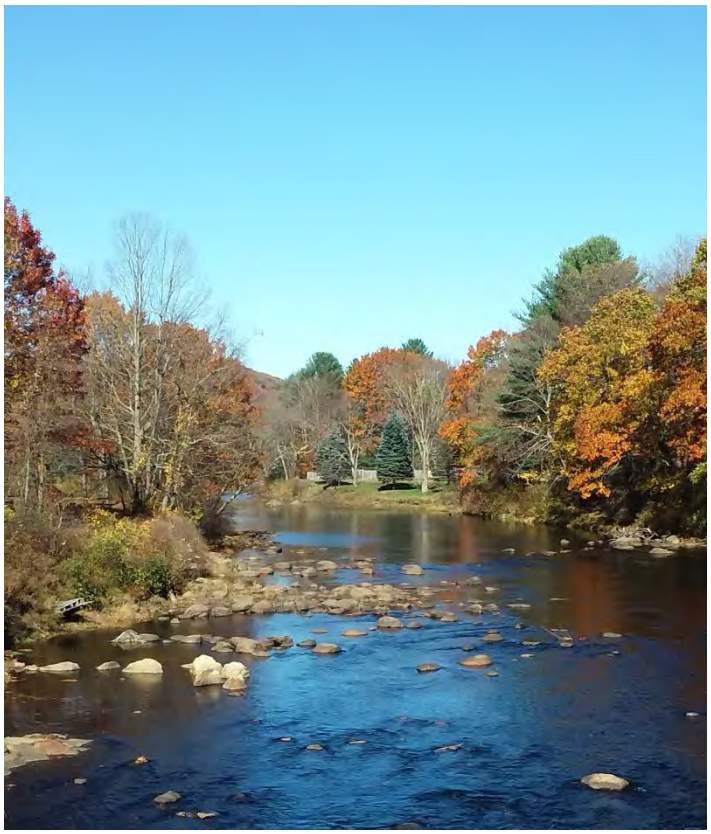
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Appendix E

Source Water Protection
Plan for Swanzey, NH

Source Water Protection Plan for Swanzey, New Hampshire



March, 2017

Prepared By: Granite State Rural Water Association
Andrew Madison, Source Water Specialist
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603-756-3670
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Produced For: Town of Swanzey, NH Drinking Water Committee
Primary Contact: Town of Swanzey, NH Drinking Water Committee

Acknowledgements

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Cover Photo: Ashuelot River in Swanzey. Credit: Beverly Bernard

Executive Summary

Groundwater is a vital resource for any community, and protecting this source of clean, pure drinking water should be a priority for town governments whether their residents rely on public drinking water supplies or privately-owned residential wells. Swanzey, New Hampshire is fortunate to have a highly productive stratified-drift aquifer within its town, capable of supplying ample quantities of clean drinking water. This aquifer is the product of glacial deposits dating back to 10,000-20,000 years ago.

Swanzey is unique among New Hampshire communities in that despite having a population of approximately 7,500 individuals, the town does not supply drinking water by means of a municipally-owned public water system. Drinking water in Swanzey is supplied by a combination of private residential wells, and 25 public water suppliers. Approximately 1/3 of Swanzey residents rely on a public drinking water supplier. Swanzey's groundwater resources are susceptible to contamination from commercial and industrial development. Leaking underground storage tanks, abandoned and disassembled vehicles, the accidental release of hazardous chemicals from aboveground storage tanks are a few of the most pressing concerns facing the preservation of Swanzey's drinking water sources.

Swanzey is also unique among New Hampshire communities in that the town has not enacted an ordinance specifically to protect its source of drinking water. With proper stewardship, Swanzey's groundwater resources should be able to fulfill the town's drinking water needs well into the future. To ensure this, the town should take action to protect this resource including enacting an ordinance to govern land uses and activities near the aquifers, educating land owners on how they can help protect ground water resources, and maintaining a drinking water protection committee.

This plan serves as a guide to town officials, residents, business leaders, and water suppliers to assist with decision making with regards to drinking water resources. It is designed to serve as a reference for the town to utilize when evaluating developments, or planning for the future. This plan is the collaborative effort of elected officials, town committees and boards, drinking water suppliers, residents and local experts. This plan is a living document and in order to remain viable as a resource for the future it will need to be periodically reviewed and updated, ideally every three years.

Swanzey, NH Drinking Water Protection Committee

Jane Johnson- Conservation Commission
Glenn Page- Planning Board
Jim McConnell- Planning Board
Beverly Bernard- Conservation Commission
Stephen Stepenuck- Conservation Commission
Sylvester Karasinski- Board of Selectmen
Barbara Skuly- Ashuelot River Local Advisory Committee
Roberta Visser- Local Resident

1. Introduction

1.1 Background and Purpose

Groundwater is a critical natural and economic resource for New Hampshire. It is our most frequently used source of drinking water, in addition to being an integral part of the hydrologic system and vitally important for fish, wildlife, and recreation. The New Hampshire Department of Environmental Services (NHDES) estimates that 70 to 75 million gallons of groundwater are supplied for drinking water in New Hampshire per day. Approximately 60 percent of New Hampshire residents rely on groundwater for their drinking water and of the 2,416 public water supply systems in New Hampshire, 98 percent rely on groundwater. Groundwater also provides an estimated 40 percent of the total flow in New Hampshire's rivers, which in turn feed the state's lakes, reservoirs, and estuaries.

Groundwater can be contaminated when chemicals or other substances are spilled or discharged onto or into the ground. Liquids can flow through the ground into groundwater, and both solids and liquids can be flushed downward by rain and snowmelt. Once contaminants reach groundwater, they often move along with the groundwater flow. The most common causes of groundwater contamination in New Hampshire are leaking underground storage tanks, mishandling of industrial chemicals, and stormwater runoff. The presence of contaminants, such as MtBE (methyl*tertiary*butylether), in groundwater strongly correlates with urban factors (population density, housing density, and the percentage of urban land use or roads) emphasizing the importance of controlling potential contaminants in developed or developing areas. Although MtBE has been removed from the gasoline supply, gasoline still contains many other toxic compounds. Land uses associated with gasoline releases to the ground are therefore still a concern. Some industrial solvents are especially potent contaminants; Only 5 ounces of TCE (tetrachloroethylene), a common industrial solvent, can make up to 7.8 million gallons of water unacceptable for drinking based on federal standards. Although there are many state and federal programs that directly or indirectly serve to protect groundwater, it is generally acknowledged that local land use controls, inspection programs and public education are necessary to maximize the effectiveness of groundwater protection.

The importance of protecting groundwater resources in the Town of Swanzey is well recognized. A 1990 underground storage tank leak contaminated groundwater resources for hundreds of Swanzey residents and was the catalyst the a New Hampshire state law banning the gasoline additive MtBE, as well as a recently settled lawsuit between the State of New Hampshire and a major petroleum corporation. The 2003 Swanzey Master Plan Update addressed protecting groundwater resources by providing an update to Swanzey's 1990 Water Resource Management and Protection Plan. In the update, the first recommended management action was the adoption of an aquifer protection overlay district, designed to regulate land uses within the boundaries of Swanzey's stratified drift aquifers (Town of Swanzey, 2003). The 2003 Master Plan Update also recommended that an education and outreach campaign be established to educate homeowners whose properties are located near sensitive water resources, and that an inventory of underground storage tanks be created and periodically reviewed. The 2014 Southwest New Hampshire Natural Resource Management Plan also recommended that towns in southwest New Hampshire adopt aquifer protection ordinances to protect groundwater resources that supply both public and private wells (SWRPC, 2014). As of 2014 seven communities within Cheshire County had adopted aquifer protection ordinances.

The primary goal of this Source Water Protection Plan is to protect groundwater that is used or may be used as a source for public drinking water systems in the Town of Swanzey, New

Hampshire. This plan provides data, maps, guidance, priorities and actions to protect Swanzey's groundwater aquifers and public drinking water sources from contamination. It is the result of a collaborative process that involved town officials, water system managers, regional planners, and residents and serves as a guide for them to use in future planning efforts. This plan is a working document that should be reviewed annually and updated every three years to remain current, active, and viable.

1.2 Definitions

Wellhead Protection Area (WHPA)- Sometimes also called a "source protection area" is the surface and subsurface areas from or through which contaminants are reasonably likely to reach a water system source, such as a well. The Wellhead Protection Area is divided into two zones: the Sanitary Protective Area and the Zone of Contribution. For Community Drinking Water Systems, the Sanitary Protective Area is a buffer surrounding the well where no potential contaminants should be present. The Zone of Contribution comprises the remainder of the wellhead protection area.

Public Water System- A "public water system" (PWS) is defined as "a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily for at least 60 days out of the year" (Chapter Env-Ws 300, NH Drinking Water Rules). Public water systems are classified into three groups: community systems, non-community transient systems, and non-community non-transient systems.

- **Community systems** serve at least 25 individuals on a year-round basis. Examples include municipal water systems, mobile home park systems, condominium systems, and single family housing developments.
- **Non-community transient systems** serve at least 25 individuals, for at least 60 days per year. These water systems typically serve restaurants, hotels, service stations, campgrounds, or recreational areas.
- **Non-community non-transient systems** serve at least 25 individuals, for at least six months per year. These systems typically serve daycare facilities, schools, and commercial properties.

Aquifer- An aquifer is a layer of water-saturated, permeable rock, through which water can move and be extracted using a well.

Stratified Drift- A geologic formation comprised of fine and coarse material deposited by glacial melt water.

UST- Underground Storage Tank

AST- Aboveground Storage Tank

LUST- Leaking Underground Storage Tank

UIC- Underground Injection Control, any discharge of wastewater into the ground.

VOC- Volatile Organic Compound, an organic chemical with a low boiling point. These can include industrial solvents, fuels, and other petroleum products.

SOC- Synthetic Organic Compound, organic chemicals with a higher boiling point than VOC's. These are often found in chemical pesticides.

Hazardous Waste Generator- Any facility producing wastes which is corrosive, toxic, reactive, or flammable. Hazardous Waste Generators are divided into two categories:

- **Small Quantity Generators** produce 220lbs or less of hazardous waste each and every month.
- **Full Quantity Generators** produce greater than 220lbs of hazardous waste each and every month.

2. Methods

To determine what potential contaminants were present and to evaluate their risk, extensive research was performed examining land use practices and site histories. Information on above and underground storage tanks, hazardous waste and underground injection permits, and hazardous material spill reports was gleaned from New Hampshire Department of Environmental Services' One-Stop data portal (NHDES, 2016). This information was then verified and supplemented using a windshield survey, where sites were inspected visually from public throughways. At times, information garnered from NH DES's One-Stop was verified by communication with drinking water system operators, the Town of Swanzey, local residents, and boards and committees of the Town of Swanzey. Land cover was determined using the 2015 USDA National Cropland Dataset. Soils and underlying geology was determined using the Natural Resource Conservation Service (NRCS) Web Soil Survey and the Soil Survey of Cheshire County, New Hampshire (USDA Soil Conservation Service 1989).

Guidance on evaluating the risk presented potential sources of contamination was provided by The DES Guide to Ground Water Protection (NHDES 2008), The Trust for Public Land Source Protection Handbook (Hopper and Ernst 2005), and Nonpoint Source Pollution: A Handbook for Local Governments (Jeer et. al. 1997). Furthermore, all information, data, and conclusions stated in this plan were reviewed by the source protection committee for accuracy. All GIS data layers were accessed from the University of New Hampshire Extension's Geographically Referenced Analysis and Information Transfer System (NH GRANIT) and NH DES.

3. Town of Swanzey, New Hampshire

3.1 Town of Swanzey, NH Demographics

The Town of Swanzey is a rural-residential community covering 45 square miles in Cheshire County, New Hampshire, along NH Routes 10, 12, and 32. Swanzey is bordered by the Towns of Chesterfield, Winchester, Troy, Marlborough, Richmond, and the City of Keene. Swanzey has a population of 7,230 with 2,919 households and a median household income of approximately $54,355 per year (US Census Bureau, 2016).

3.2 Zoning and Land Uses in Swanzey

Land Use

Swanzey is a rural-residential community with some industrial and commercial development. Forest cover makes up over 80% of the land cover within Swanzey, however it is important to note that much of this forest land includes rural residences. Another 8% of the land in the town is developed for residential, commercial, or industrial use. Open water such as lakes and rivers, and wetlands account almost 6% of the land area in Swanzey. The remaining land in the town includes agricultural land use (crops and pasture), vacant land, and pasture (USDA, 2015).

Table 1. Land uses in Swanzey, NH. Data from USDA National Agricultural Statistics Service.

Land Cover Type	Acres	Percent of Coverage
Agriculture/Cultivated Crops	297	1.0%
Hay/Pasture	972	3.4%
Water	335	1.2%
Developed Open Space	1102	3.8%
Developed Low Intensity	890	3.1%
Developed Med. Intensity	310	1.1%
Developed High intensity	67	0.2%
Vacant	142	0.5%
Deciduous Forest	7420	25.6%
Coniferous Forest	14013	48.3%
Mixed Forest	2083	7.2%
Shrub land	92	0.3%
Wetlands	1263	4.4%
Total	**28985**	**100.0%**

Zoning

The Town of Swanzey has enacted a zoning ordinance to regulate land use within the town limits (Town of Swanzey, 2016). This ordinance was originally adopted in 1947, and has most recently been amended in 2016. Swanzey's zoning ordinance provides for 11 zoning districts and overlay districts to cover commercial, residential, industrial and business uses. Additional ordinances dictate shoreline regulations, and protections for wetlands. A map depicting the location of Swanzey's zoning districts is available in Appendix C.

Rural-Agricultural District: The Rural-Agricultural district allows for residential and agricultural uses including forestry, low-density residential, recreation, open space, and water-supply protection.
Residential District: The Residential District includes more densely developed transition areas between the Rural-Agricultural District and the Commercial district. This district allows for residences, churches, some light commercial activity, and essential services.
Village Business District I: This district covers most of West Swanzey Village and provides for commercial development, primarily for community use.
Village Business District II: This district is located in West Swanzey Village along California, West, and S. Winchester Streets. This district provides a compact area for business and commercial development.
Business District: The Business District includes the more densely developed areas along Routes 10, 12, and 32, and allows for commercial development, specifically to the traveling public.
Commercial/Industrial District: The Commercial/Industrial zone is located along the northern half of Route 10 and is designed to encourage commercial and industrial development off of Route 10.
Shoreland Protection District: The Shoreland Protection Overlay District includes properties abutting protected shoreland including the Ashuelot River; South Branch River; Ash Swamp Brook; Martin Brook; Ashuelot River Dam; Swanzey Lake; Wilson Pond. This district stipulates special requirements for properties abutting these water bodies.
Floodplain District: The Floodplain district includes properties located in a designated flood hazard area and stipulated additional building and land use requirements related to flood hazard mitigation.
Wetlands District: This district includes identified wetlands in Swanzey and prevents development within them, so as to protect surface and groundwater resources.
Airport District: The Airport District includes the Dillant-Hopkins Airport, its surrounding properties, and its approach zone. It stipulates structure heights and other aviation-related land uses.
Industrial Park District: This district is located along Safford Dr. between Routes 32 and 12. The Industrial Park District allows for industrial development in an area where municipal water and sewer are available. Minimum building sizes are stipulated so as to preclude individual small businesses and offices.

3.3 Topography, Geology, and Soils

Much of Swanzey is covered with rolling hills and small mountains, many of which are currently protected as conservation lands. The highest point in Swanzey is Franklin Mountain at 1,423 ft above sea level. Other significant topographic features in Swanzey include: Rattlesnake Mountain (1,345ft), Mount Caesar (1,115ft), Marcy Hill (1,050ft), and Hewes Hill (1,020ft). The lowest point in Swanzey is along the Ashuelot River at the Winchester town line at 426ft above sea level. Bedrock geology in Swanzey is dominated by granitic rock types dating to the Ordovician Era (500-440 MYA). Other bedrock types include schist and quartzite deposits dating to the Silurian Era (440-416 MYA) in the Route 32 area in eastern Swanzey. Sand and

Gravel deposits, left by the glacial Lake Ashuelot 10,000-20,000 years ago, contribute to Swanzey's abundant groundwater resources. Soils in Swanzey consist of fine sandy loams of the Berkshire, Peru, Marlow, Monadnock, and Sunapee series representing 47% of the soil coverage in the town. Stony loams, of the Tunbridge-Berkshire and Monadnock series, and granitic rock outcroppings each account for 15% of the soils in Swanzey. Loamy sands of the Caesar, Suncook, and Pootatuck account for 14% of the soil coverage. The remaining nine percent of soils in Swanzey consist of hydric soils associated with wetlands (4%), silt loams (2%), impervious surfaces (2%), and water (1%). Soils data obtained from the USDA Natural Resource Conservation Service Web Soil Survey (NRCS, 2016).

3.4 Surface and Groundwater Resources

Surface Water Resources

Swanzey has four major surface water resources including the Ashuelot River, South Branch Ashuelot River, Wilson Pond, and Swanzey Lake. The Ashuelot River travels approximately 10 river miles south through the Town of Swanzey from the Keene Dillant-Hopkins Airport, through West Swanzey and into Winchester. The Ashuelot River is a tributary of the Connecticut River and the entire Town of Swanzey lies within the watershed of the Ashuelot River. Other streams within Swanzey include Ash Swamp Brook, California Brook, Forbrush Brook, Martin Brook, Perry Brook, Falls Brook, and Bridge Brook. None of the above named streams are used as drinking water supplies.

Swanzey Lake is a 50ft deep, mesotrophic lake located in southern Swanzey along Swanzey Lake Road. The lake covers 108 acres and hosts a number of private homes used for both year-round and seasonal use. Additionally there are several camps located around the lake, which is a popular recreation spot during the summer. Wilson Pond is a shallow, warmwater, pond located across Route 32 from the Keene Dillant-Hopkins Airport. The pond covers 72 acres and has a maximum depth of 15 ft. A number of private residences are located around the pond along with some conservation land along the northern shore of the pond. Neither water body is used as a drinking water supply.

Groundwater Resources

Swanzey has abundant groundwater resources located within the glacial deposits left by Lake Ashuelot 10,000-20,000 years ago. These aquifers were delineated by the US Geological Survey in 1994. Stratified drift deposits, associated with high groundwater transmissivity, cover 12.3mi^2 in Swanzey and largely consist of coarse-grained material covered with fine-grained silt and clay lake-bottom deposits (Moore, 1994). Saturated thickness for the aquifers in Swanzey is up to 120ft and is likely thickest in the segment along the Ashuelot River where it travels between Sawyers Crossing Rd. and Eaton Rd. (Moore, 1994). A pluton, which is an intrusion of igneous rock, is likely responsible for the distinctive "U" shape of the aquifers in Swanzey as they transit around Swanzey Lake (Moore, 1994). Transmissivity for stratified drift aquifers in Swanzey ranges from zero to slightly more than 4,000 feet per day (Moore, 1994).

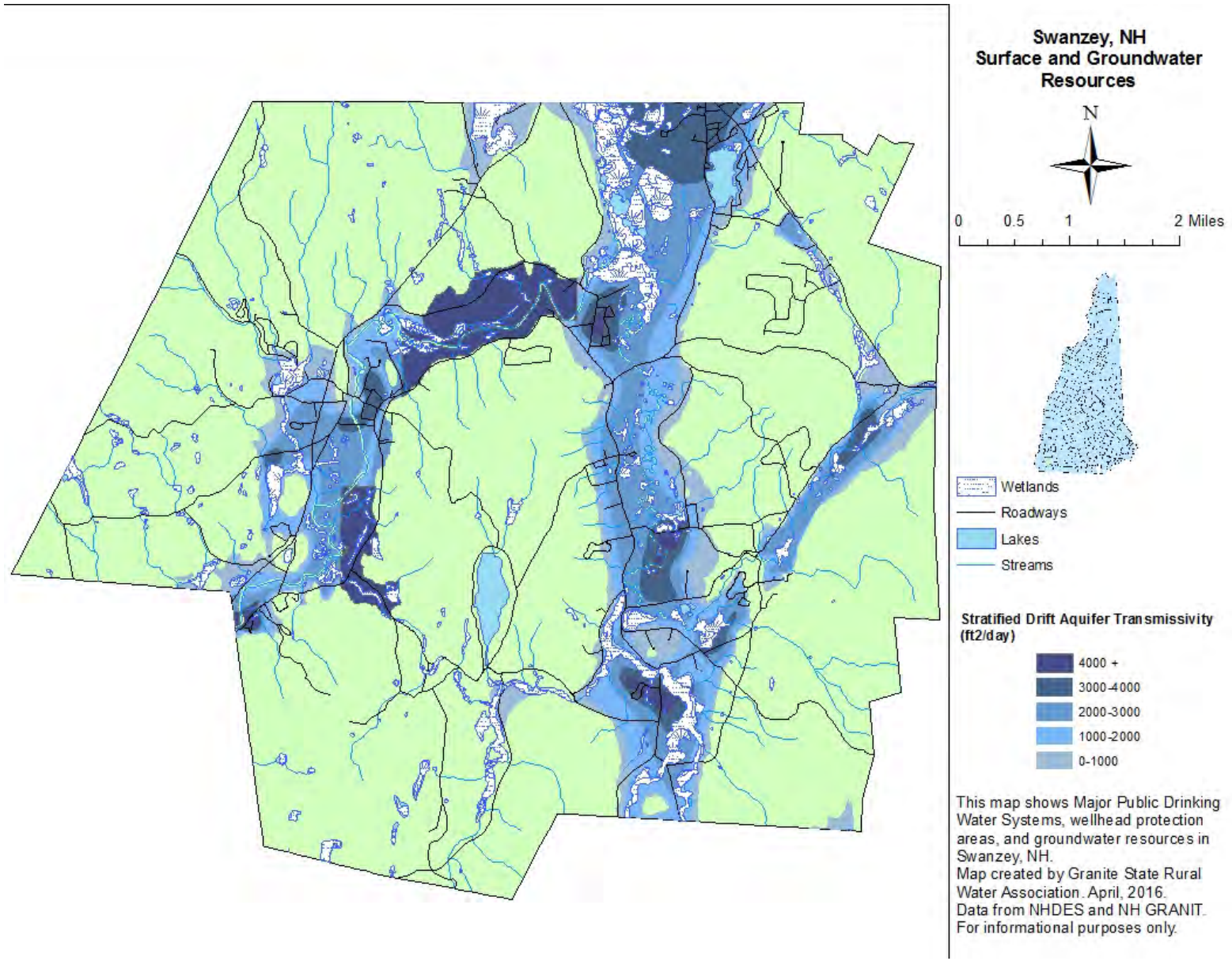


Figure 1. Surface and groundwater resources in Swanzey, NH. Data from NHDES and NH GRANIT.

3.5 Drinking Water Supplies in Swanzey

As of 2016, the Town of Swanzey does not provide drinking water to most town residents by means of a municipally owned community water system. The North Swanzey Water and Fire Precinct supplies 1250 individuals with drinking water transferred from the City of Keene. Most Swanzey residents rely either on private wells, or privately-owned community water systems. A small portion of Swanzey, namely West Swanzey and North Swanzey, have sewer access, however the majority of town residents are dependent on residential septic systems.

There are 25 active public drinking water systems in Swanzey including seven community drinking water systems, 15 transient systems, and three non-community non-transient systems. The seven community public drinking water systems provide domestic drinking water for approximately 2,400 individuals through 858 service connections. An estimated 4,830 individuals rely on private, residential wells for their daily water needs.

Table 2. Community public water suppliers in Swanzey, NH. Data from NHDES

System Name	EPA ID	Location	Number of Connections	Population Served
North Swanzey Water and Fire Precinct	2301010	31 Walnut Pl.	498	1250
West Swanzey Water Co.	2301020	Winchester St.	81	203
Ashuelot River Apartments.	2302010	57 Riverside Ln.	40	100
Eastfield Crossing	2302040	Bellview Ave.	45	113
Forest View Estates	2302050	Owens Dr.	72	180
Pine Grove Mobile Home Park	2303010	935 W. Swanzey Rd.	122	305
View Point Co-Op	2303020	Pond View Dr.	99	248

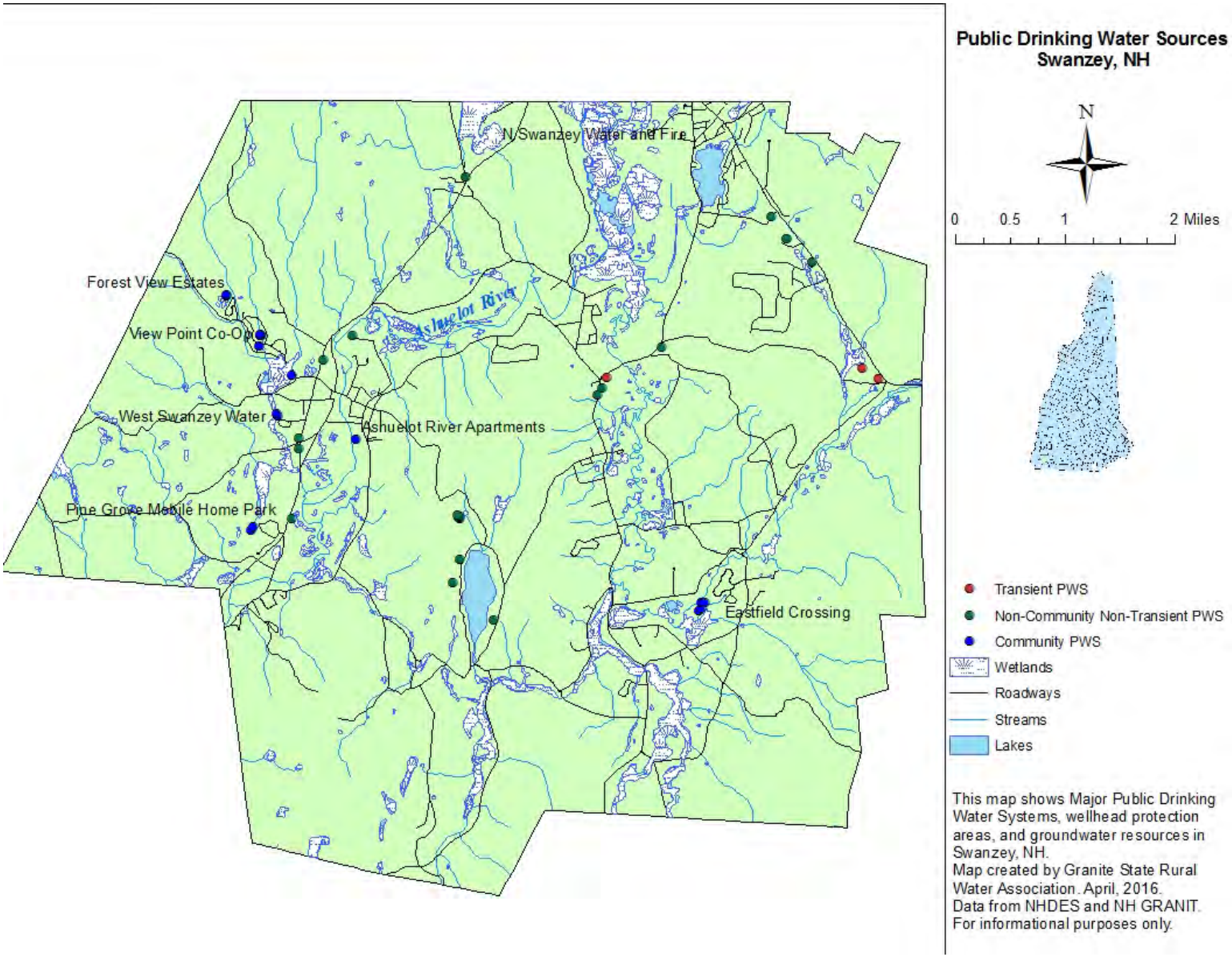


Figure 2. Public Drinking Water Sources in Swanzey, NH. Data from NHDES and NH GRANIT.

4.0 West Swanzey Water System

4.1 System Description

The West Swanzey Water System (PWS ID: 2301020) is a privately-owned community drinking water systems supplying approximately 203 customers through 81 service connections and has been in operation since 1986. The system is supplied by a wellfield located on West Street in West Swanzey, average daily water usage for the system ranges from a minimum of 26,000 gallons per day in 2016 to a maximum of 88,000 gallons per day in 2013 (NHDES, 2016) The system provides water for domestic use along NH Route 10 in West Swanzey.

The wellfield suppling the system consists of three gravel packed wells, two active and one inactive. The two active wells (sources 001 and 002) are located off of West St. near Perry Ln, while the one inactive well (source 003) is located off of California Brook Rd. All three wells are located within a stratified drift aquifer with an estimated transmissivity of 1,000-2,000 ft^2/day. Water pumped from the two active West Swanzey wells is disinfected and then stored in a 10,000 gallon underground storage tank located between the two wells. Water from this system is not treated for corrosion control.

Table 3. West Swanzey Water Sources. Data from NHDES.

Source ID	Source Type	Status	Well Depth	Estimated Yield
2301020-001	Gravel Packed Well	Active	77ft	350 GPM
2301020-002	Gravel Packed Well	Active	76ft	300 GPM
2301020-003	Gravel Packed Well	Inactive	35ft	725 GPM

4.2 Description of Source Protection Area

The wellhead protection area (WHPA) for West Swanzey Water Company's two active sources covers an area of approximately 443 acres along Route 10, and California Brook Rd. in West Swanzey. The WHPA was delineated by NHDES using a Phase I delineation derived from a combination of a fixed radius of 4,000 ft to the north, and stratified drift aquifer mapping to the south and east. Advanced hydrological investigations such as pump tests were not used in delineating West Swanzey Water Company's WHPA. A sanitary protective radius of 300ft has been delineated for the system based upon the system's maximum average daily usage and recommendations from NHDES.

Land use within the WHPA is predominantly forest (230 acres), with 131 acres currently occupied by residences, 33 acres covered by commercial businesses, 29 acres occupied by a wetland near where the wells are located, and 20 acres utilized as hayfields or pasture. The WHPA is located west of the Ashuelot River, however California Brook and Bailey Brook transect the WHPA north to south. A 29 acre wetland is located approximately 1,200ft north of wells 001 and 002, well 003 is located along the wetland. NH Route 10 transects the WHPA on the eastern side of the delineation with approximately 43 acres of the WHPA being located east of Route 10. Other major roadways within the WHPA include West St., California St., Perry Ln, and California Brook Rd. Soils in the WHPA consist of fine sandy loams of the Berkshire and Sunapee series (27%), loamy sands of the Colton and Windsor series (52%), stony soils and rock outcroppings (11%) and hydric soils associated with wetlands (10%).

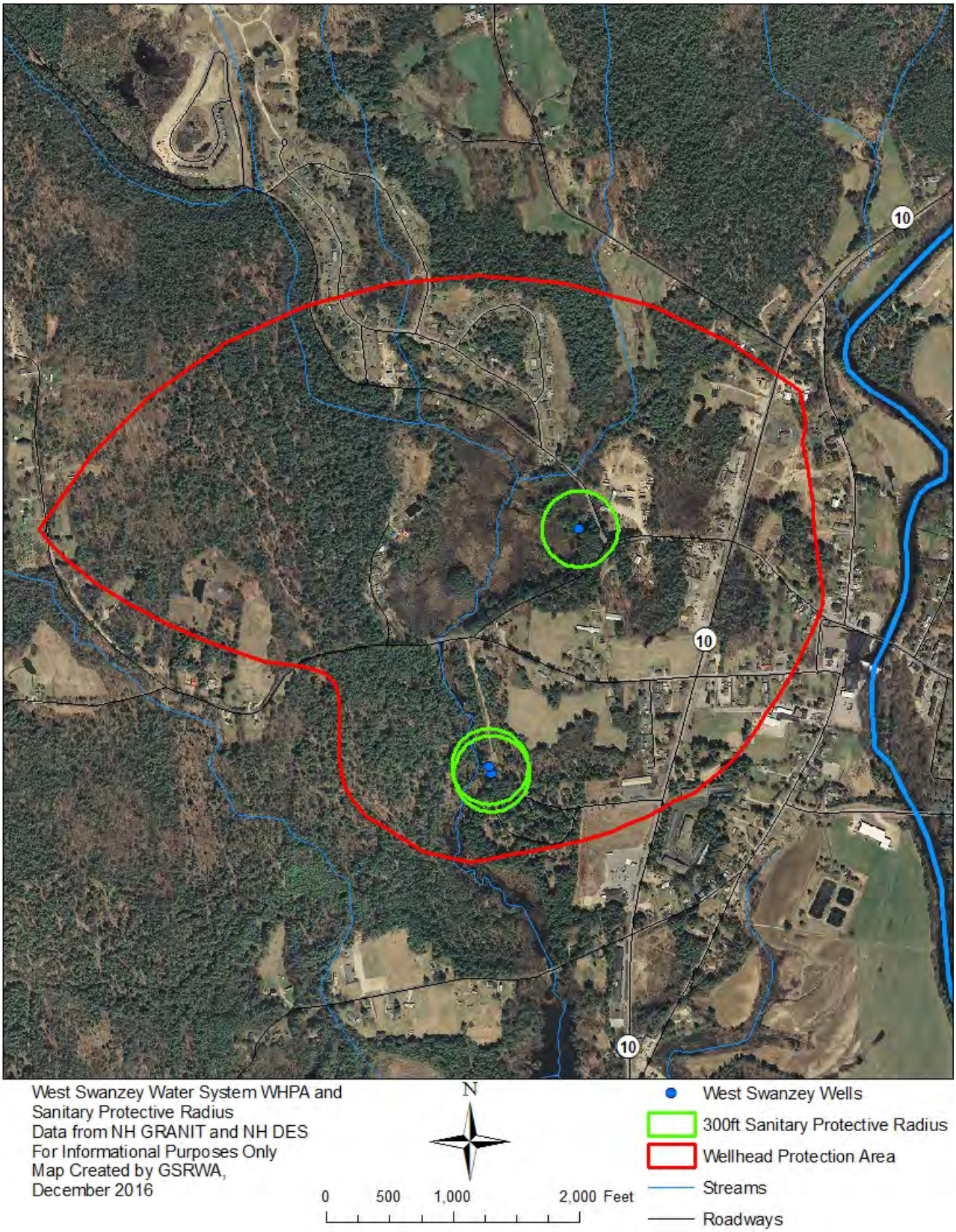


Figure 3. Wellhead protection areas and sanitary protective radii for West Swanzey Water Company wells. Data from NHDES and NH GRANIT.

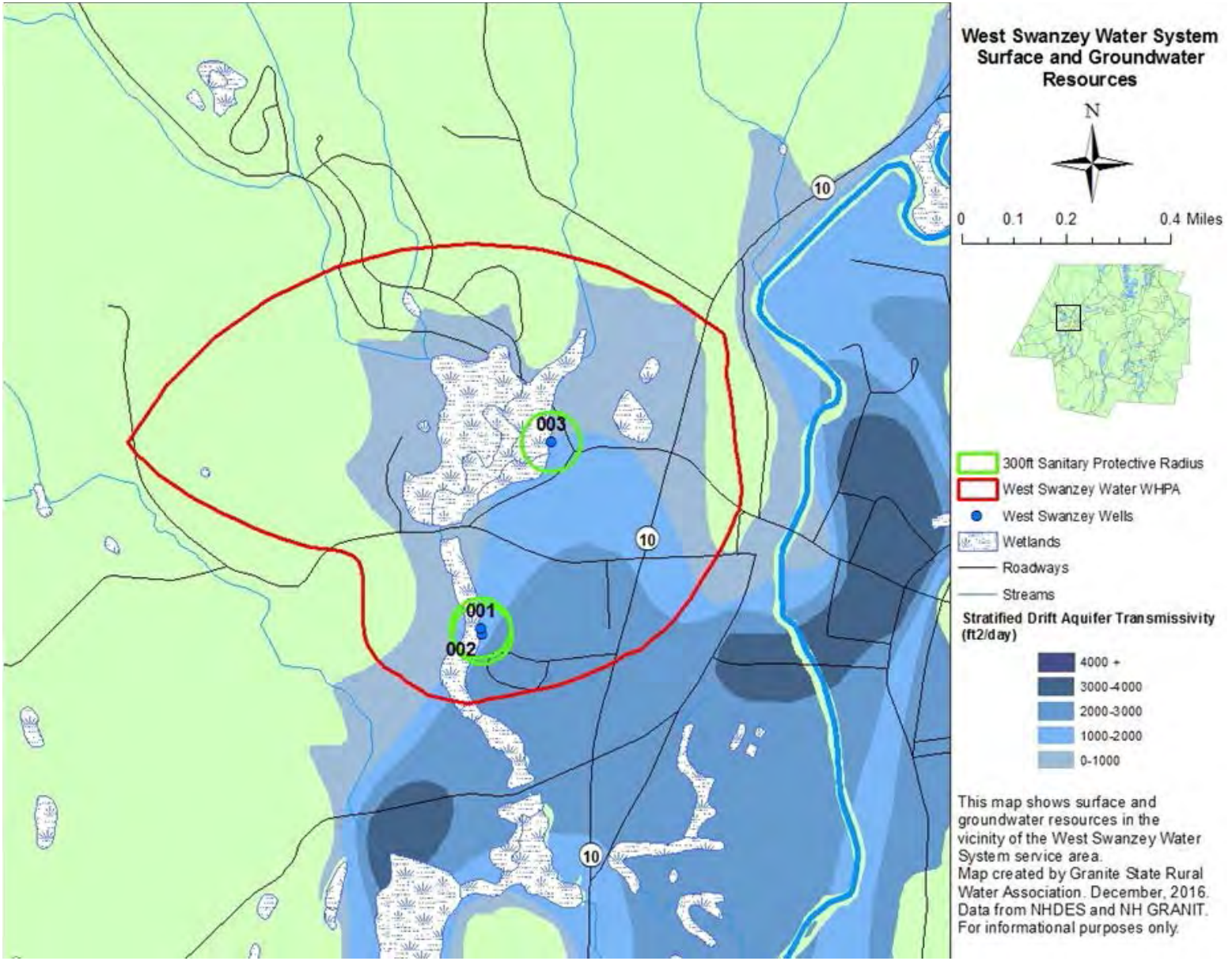


Figure 4. Surface and groundwater resources within the West Swanzey Water System WHPA. Data from NHDES and NH GRANIT.

4.3 Potential Sources of Contamination

Automotive Service Stations and Salvage Yards-

Automotive service stations include any facility where vehicles are serviced, repaired or sold. These facilities may have vehicles stored on-site while waiting to be repaired or salvaged. Salvage yards, often called junkyards, are facilities where vehicles are stored outside and gradually disassembled as usable parts are removed. Vehicles may be stored at salvage yards for years or even decades.

Six salvage years/automotive service facilities exist within the wellhead protection area of the West Swanzey Water System. Additionally, one more facility is located immediately outside of the wellhead protection area. Automotive service stations often store petroleum products (such as motor oil and lubricants), as well as VOC's such as solvents and cleaners in bulk quantities on-site. The accidental release of these products, even in small quantities, can impact near-by drinking water wells. This risk is magnified when these products are stored in bulk quantities in aboveground storage tanks. Auto salvage yards often have dozens or even hundreds of derelict vehicles stored outside in various states of disassembly or repair. These vehicles can often leak automotive chemicals including gasoline, oil, solvents, and heavy metals over time. Improperly disposed of car parts such as catalytic converters, brakes, and engines can leach heavy metals into soils and groundwater while corroding and buried. The number of registered and unofficial salvage yards within the wellhead protection area present a high risk to the West Swanzey water system.

Table 4. Auto service stations and salvage yards within and near the West Swanzey WHPA. Data from NHDES.

Facility Name	Address	Coordinates	Facility Type	NHDES Permits	Distance From Wells
Unnamed	76 California St. (estimated)	42.87363 72.33520	Unofficial Salvage Yard	None	2050ft- 001/002 570ft- 003
YBA Muffler and Brake	67 California St.	42.87489 72.33556	Auto Repair Facility; Possible Salvage Yard	None	2430ft- 001/002 450ft- 003
Route 10 Auto	665 W. Swanzey Rd	42.87357 72.33322	Used Car Dealership; Auto Repair; Salvage Yard	Auto Salvage; Haz. Waste Generator; Solid Waste Facility; Underground Injection Control	2330ft- 001/002 1100ft- 003
Bill's Trading Post/ WM Auto Sales	919 W. Swanzey Rd	42.87726 72.33093	Auto Sales; Possible Salvage Yard; Possible Auto Repair	None	3800ft- 001/002 2000ft- 003
Bob's West Swanzey Garage	90 N. Winchester St	42.87858 72.32995 Outside of WHPA	Auto Repair	Haz. Waste Generator	4350ft- 001/002 2500ft- 003
Larry's Homestead Garage	655 W. Swanzey Rd.	42.87444 72.33298	Auto Repair	None	2,600ft- 001/002 1,100ft- 003
Swanzey Truck and Auto	639 W. Swanzey Rd.	42.87565 72.33242	Auto Sales and Repair	None	3100ft- 001/002 1300ft- 003

Transportation Corridors-

One major roadway, NH Route 10, travels through the wellhead protection area of the West Swanzey water system. Route 10 travels approximately 3,500ft through the eastern part of the WHPA. There are other residential feeder streets including West St, California St, and California Brook Rd. Other smaller residential streets include Perry Ln, Aylward Ln, Pondview Dr, and Mountainview Dr. There are approximately 4 miles total of roadways within the West Swanzey WHPA.

Roadways can present a few hazards to nearby drinking water wells, particularly from road salts and accidental chemical releases. Heavy road salt application can result in chlorides from salts or other deicing chemicals leaching into groundwater and traveling to surface waters, especially during snowmelt or other runoff events. Automobile accidents, even relative minor ones, can release petroleum products or other automotive chemicals into soils or storm drains. More seriously, an accident with a large tanker could release hundreds or thousands of gallons of product. Serious tanker accidents are rare, and products spilled during passenger car accidents are usually in small quantities. The risk to the West Swanzey water system from transportation corridors is low.

Underground Petroleum Storage-

Aside from residential heating oil tanks, there are no above or underground petroleum storage tanks within the wellhead protection area for West Swanzey's wells. There are two facilities located shortly outside of the WHPA however. These include a heating oil tank at an elementary school, and three underground gasoline storage tanks at a gas station. All of these tanks are located outside of the WHPA and downgradient of West Swanzey's wells. The 10,000 gallon heating oil tank located at Cutler Elementary is doubled hulled and equipped with leak detection equipment and most recently passed an inspection in May, 2016. The three UST's located at the Route 10 gas station were installed in May, 2016 and replaced four tanks that were removed at that time. The three new tanks are double-walled, fiberglass tanks equipped with leak detection systems. Sampling was conducted after the removal of the old tanks and no released petroleum product was detected in either soils or groundwater. Even though the UST's located at the gas station on Route 10 are located outside of the WHPA, and are equipped with modern safety features such as double-walls and leak detection, they present a high risk to the West Swanzey Water system due to their proximity to the system wells. The UST located at Cutler Elementary is likely downgradient of the system and is far enough away to present a low risk to the West Swanzey System.

Table 5. Underground petroleum storage tanks near the West Swanzey Water system WHPA. Data from NHDES

Site Name	Address	Size of Tanks	Products Stored	Distance from Wells
Cutler Elementary School	31 S. Winchester St	1 x 10,000 gal	#2 Heating Oil	2500ft- 001/002 2400ft- 003
Gomarlos Food Mart	765 Route 10	1 x 12,000gal 1 x 6,000 gal 1 x 4,000 gal	Gasoline Diesel Gasoline	1200ft- 001/002 2600ft- 003

Residential Land Use-

Several dozen residences are located within the wellhead protection area for the West Swanzey Water System, primarily along Perry Ln, West St, Mountainview Rd, and Pondview Rd. Overall however, the area is rural in character with low housing density. Residential land use is associated with the presence of septic systems, oil heat, and lawn care products. On-site septic systems represent potential sources of nitrates, chlorides, bacteria, and viruses. If septic systems are improperly used for disposal of household hazardous wastes such as paints and solvents, septic systems can also be a source of synthetic organic compounds. Sewer service is available for much of the wellhead protection area, but isn't available everywhere. Municipal sewers can help protect groundwater by treating wastewater by removing harmful pathogens and nitrates. Lawn chemicals such as pesticides, herbicides, and chemical fertilizers, when used in excess, can leach into ground water and impact nearby wells. Furthermore, if chemicals from home auto repair are improperly disposed of, they can also potentially contaminate near-by drinking water sources. The closest residences to the West Swanzey wells are located along Perry Ln. and are located approximately 250ft from the wells. The risk to the West Swanzey Water System from residential land use is high given the large number of residences, and their proximity to the wells.

Agricultural Land Uses-

There are approximately 17.5 acres of agricultural land within the wellhead protection area for the West Swanzey Water System. This land is largely utilized for hay production. Agricultural land use can be beneficial for near-by drinking water well by protecting the wells from urban development or other hazardous land uses and by promoting recharge. However fertilizer and pesticide application can introduce pathogens from manure, and SOC's from pesticides into groundwater. Fertilizers and pesticides are rarely used for the production of hay however, so the risk to the West Swanzey Water System from agriculture is low.

Hazardous Waste Producers-

There are two registered hazardous waste producers within the wellhead protection area for the West Swanzey Water System wells. One is a manufacturing facility located on the corner of Route 10 and Perry, Ln., the other is an automotive facility located on Route 10. Two more facilities are located shortly outside of the wellhead protection area

One facility, located within the WHPA, produces industrial liquid chillers and is a registered small quantity hazardous waste producer with the NH Department of Environmental Services. Typical waste streams reported include solvents such as naphtha, paints, waste oils, and isocyanates (used in the production of enamel coatings) in quantities typically less than 20 gallons. Another facility, also located within the WHPA is a previously mentioned automotive sales and service facility that is also a registered small quantity generator with NHDES.

Table 6. Hazardous waste producers within the West Swanzey Water Service area. Data from NHDES.

Site Name	Address	Generator Size	Waste Streams Reported	Distance from Wells
Turmoil	735 W. Swanzey Rd.	Small Quantity Generator	Paints, solvents, waste oils, Naphtha, Isocyanate	1200ft- 001/002 2000ft- 003
Route 10 Auto	665 W Swanzey Rd.	Small Quantity Generator	Solvents	2330ft-001/002 1100ft- 003

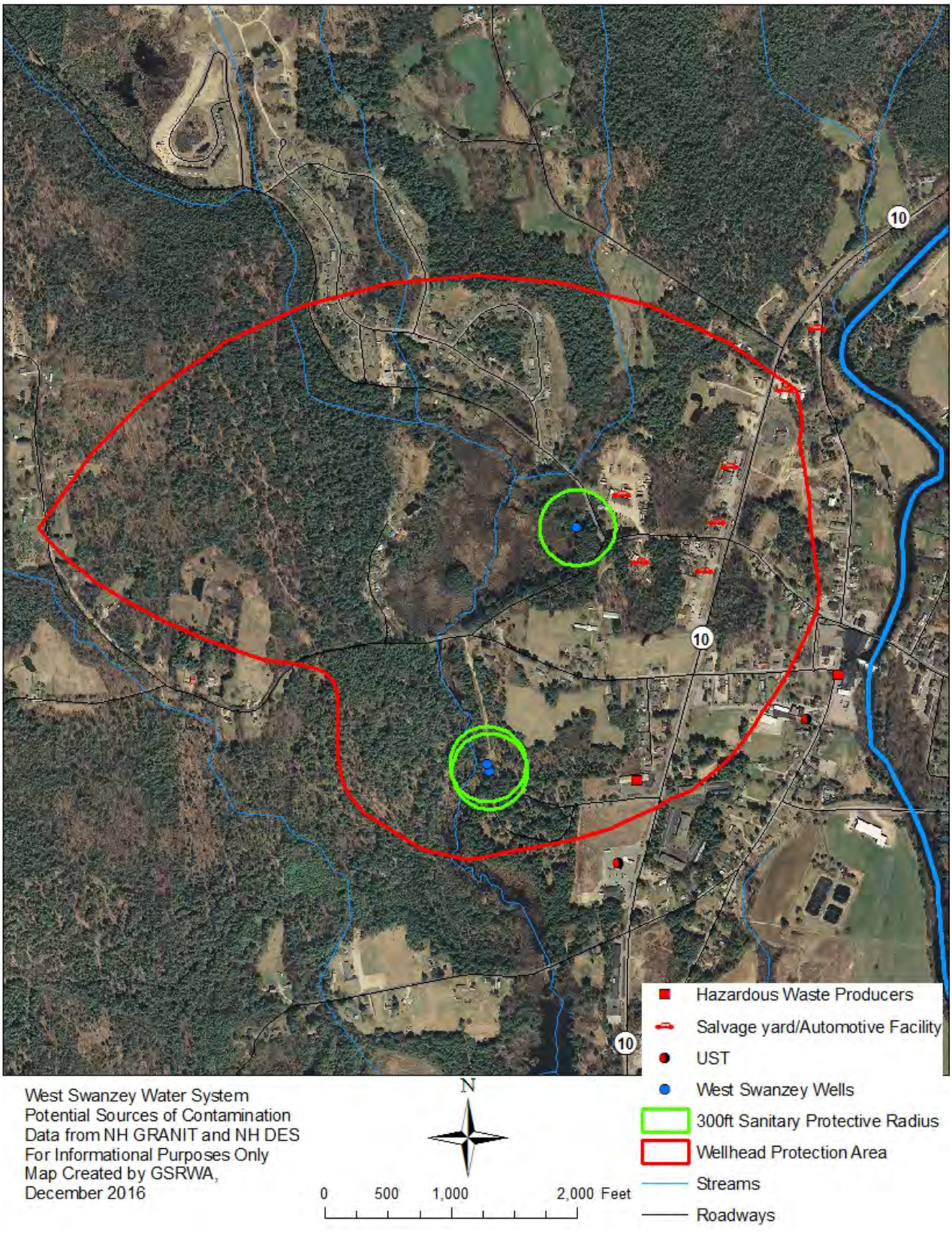


Figure 5. Potential sources of contamination within the West Swanzey Water System WHPA. Data from NHDES and NH GRANIT.

5. Eastfield Crossing System

5.1 System Description

The Eastfield Crossing System (PWS ID: 2302040) is a privately-owned community public water system serving the community of Eastfield Crossing in Swanzey, NH. The system serves approximately 113 individuals through 45 service connections, and has been in operation since 1988. The system is supplied by two gravel packed wells that provide water for domestic home use. Average daily use is unavailable but is estimated to be between 7,500 and 8,000 gallons per day, based on a national average daily household use of 176 gallons per day for 45 service connections. The system does not provide fire protection, however water for firefighting is supplies by means of a fire pond, the South Branch of the Ashuelot River, and a 10,000 gallon storage tank. Sewer service is provided by means of several shared septic system, each serving a cluster of five homes.

The wells supplying the system are comprised of two gravel packed wells located approximately 350ft apart, and near the South Branch of the Ashuelot River. The wells are located in a stratified drift aquifer with an estimated transmissivity between 1,000-2,000 ft^2 per day. Source 005 is a gravel packed well with a depth of 18ft and an estimated yield of 22 gallons per minute. Source 006 is also a gravel packed well, with a depth of 22ft and an estimated yield of 20 gallons per minute. Water is disinfected and stored in two underground storage tanks, located near the wells and then distributes to homes through a 4" PVC water main. A booster pump provides pressure for the system.

Table 7. Eastfield Crossing active water sources. Data from NHDES

Source ID	Source Type	Status	Well Depth	Estimated Yield
2302040-005	Gravel Packed Well	Active	18ft	22 GPM
2302040-006	Gravel Packed Well	Active	21ft	20 GPM

5.2 Description of Wellhead Protection Area.

The wellhead protection area (WHPA) for Eastfield Crossing's two active sources covers an area of approximately 46 acres along Belleview Drive in East Swanzey. The WHPA was delineated by NHDES using a Phase I delineation using basic hydrologic methods including the Uniform Flow Equation taking into account the elevation of the surrounding landscape (NHDES, 2005). Advanced hydrological investigations such as pump tests were not used in delineating the WHPA for the Eastfield Crossing system. A sanitary protective radius of 150ft has been delineated for the system based upon the system's maximum average daily usage and guidelines from NHDES.

Land use within the WHPA is predominantly forest (24 acres), with 13.5 acres currently occupied by residences, 3 acres of undeveloped open land around the wells, and 2.5 acres of wetlands. The WHPA is located between the South Branch of the Ashuelot River and Bridge Brook, an unnamed intermittent brook runs through the WHPA to the west and drains into Bridge Brook. The wetland is located in the southwest corner of the WHPA. Soils in the WHPA are predominantly loamy sands of the Caesar and Windsor series, with stony soils along the South Branch Ashuelot River

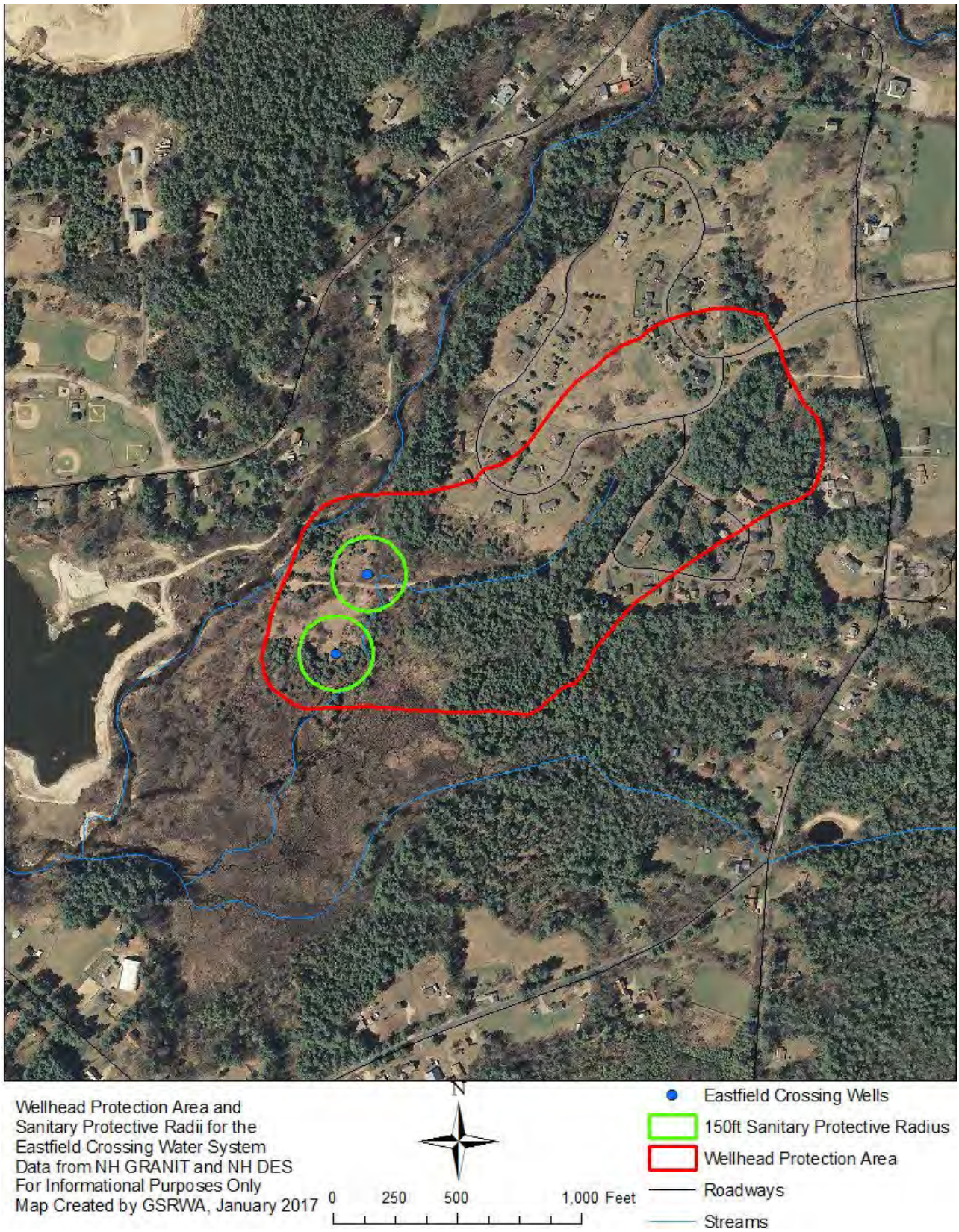


Figure 6. Wellhead protection area and sanitary protective radii for the Eastfield Crossing Water System. Data from NHDES and NH GRANIT.

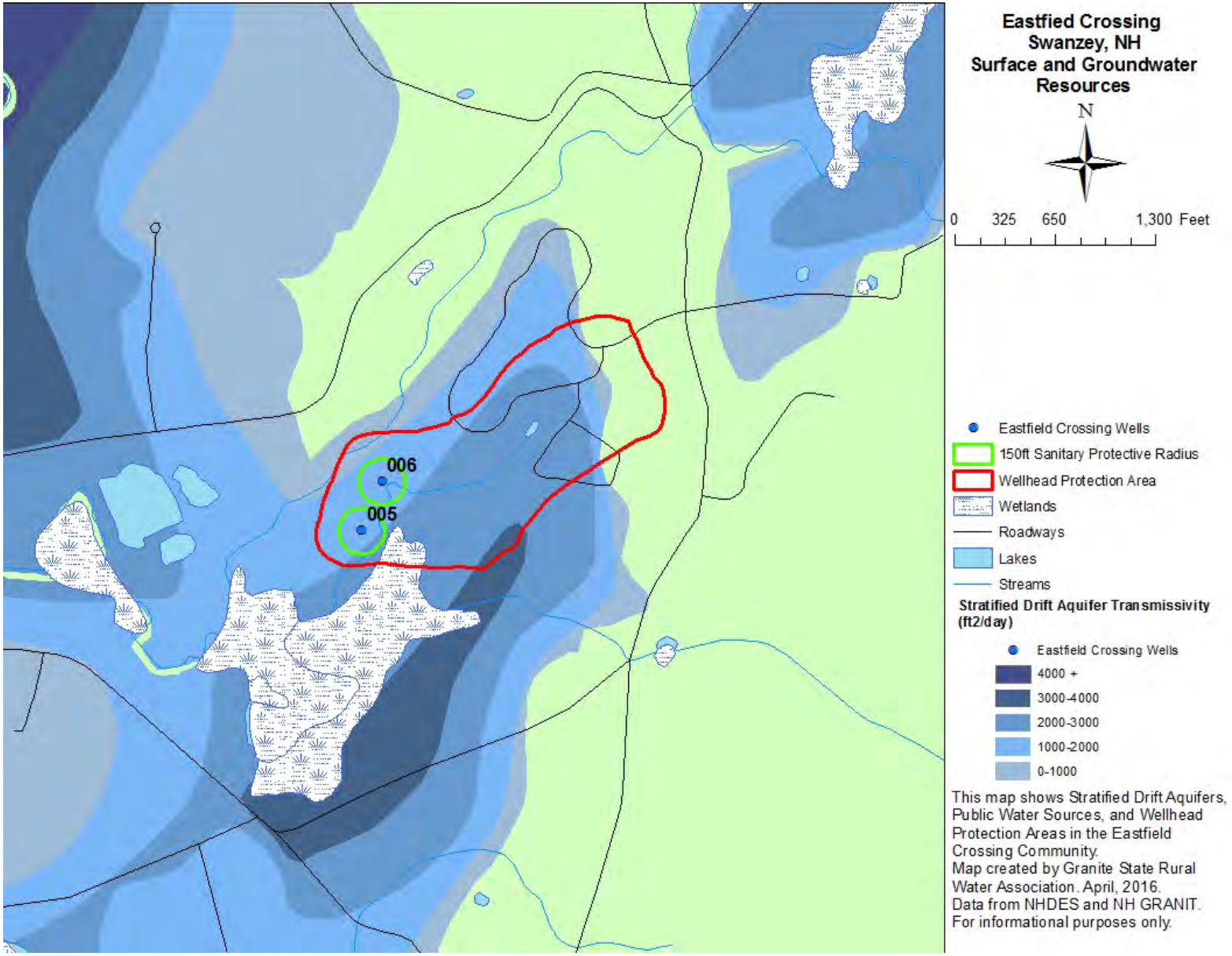


Figure 7. Surface and groundwater resources for the Eastfield Crossing Water System. Data from NHDES and NH GRANIT.

5.3 Potential Sources of Contamination

Residential Land Uses-

Approximately 16 residences are located within the wellhead protection area for the Eastfield Crossing Water System. Overall however, the area is rural in character with low housing density. Residential land use is associated with the presence of septic systems, oil heat, and lawn care products. The Eastfield Crossing community relies on shared septic systems for wastewater disposal and treatment. Each shared septic tank and leach field serves five homes, there are a total of five shared septic systems within the community (Eastfield Crossing, 1989). When properly maintained, residential septic systems are highly efficient at removing pathogens and nitrates from wastewater. However when not regularly pumped, overused, or when used to improperly dispose of household hazardous wastes, they can become a hazard to near-by drinking water wells. Additionally, lawn chemicals such as pesticides, herbicides, and chemical fertilizers can also present a hazard to near-by drinking water supplies. When used in excess, these chemicals can leach into ground water and impact nearby wells. Finally, household hazardous wastes such as paints and solvents, petroleum products from home auto repair or landscaping equipment, and cleaning chemicals can also impact near-by drinking water sources when improperly disposed of. Heating oil tanks, located outside or in basements, can leak fuel oil in the event of an accident or mechanical failure. These tanks typically contain 275 gallons or more of #2 fuel oil, and rarely have secondary containment or leak-detection equipment. Residential land use presents a medium risk to the Eastfield Crossing system wells due to the number of residences grouped together, the presence of shared septic systems, and their proximity to the well.

Transportation Corridors-

There is approximately 3,400ft of roadways within the wellhead protection area largely comprised of Belleview Dr. and Barden Cir. Both of these roadways are lightly traveled residential streets. Roadways can present a hazard to nearby drinking water wells through the over-application of road salts during winter, petroleum releases from automobile accidents, or the loss of recharge to impervious surfaces. Since the roadways traveling through the wellhead protection area of the Eastfield Crossing system are small and lightly traveled, they present a small risk to the system's wells.

Automotive Service Facility-

There is one business advertising automotive repair, in addition to excavation services, located on Old Richmond Rd. approximately 2,000ft from the well. The business is a small, home-based operation and likely does not keep large quantities of petroleum on-site. Since the automotive services offered are limited, and it does not appear that junked vehicles are kept on site, the risk to the Eastfield Crossing system from this business is low.

Agricultural Land Uses-

Although there is no agricultural land within the wellhead protection area for the Eastfield Crossing system, there is some pasture land nearby on Old Richmond Rd. This land is pasture used for equine activities and only a few animals are kept on site. Additionally, this agricultural land is down gradient, and at a lower elevation than the Eastfield Crossing system wells. Nearby agricultural land presents a low risk to the Eastfield Crossing system wells.

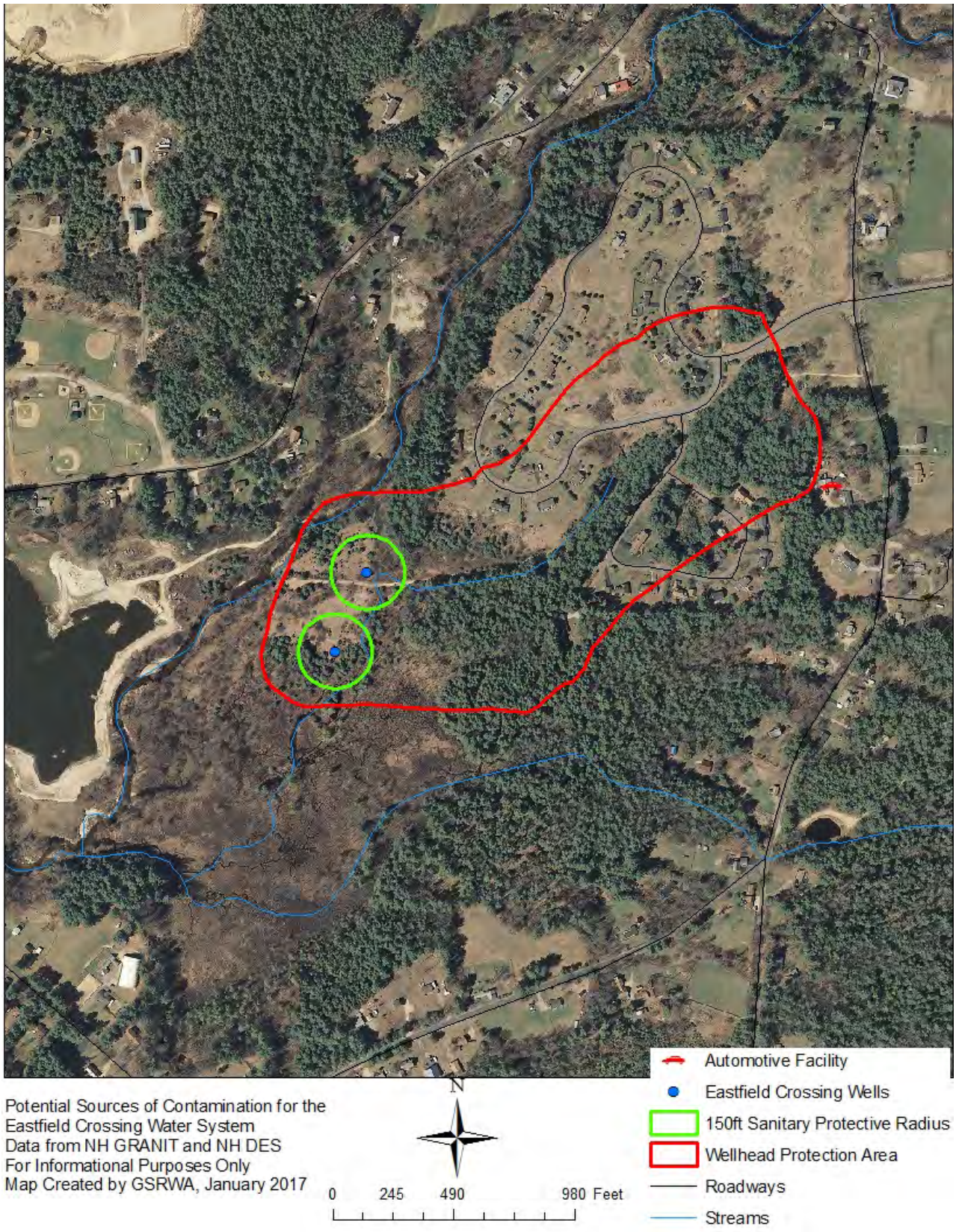


Figure 8. Potential Sources of Contamination for the Eastfield Crossing System. Data from NHDES and NH GRANIT.

6. Pine Grove Co-Op System

6.1 System Description

The Pine Grove Co-Op System (PWS ID: 2303010) is a community public water system serving the residents of the Pine Grove Co-Op mobile home park. The system serves 305 individuals through 122 service connections and has been in operation since 1963. The system is supplied by two gravel packed wells located on Co-Op property and supply an average of 21,500 gallons per day based on a national daily average of 176 gallons per household for 122 households. The system does not provide fire protection, and wastewater disposal is provided via shared septic systems, many of which were replaced during the early 2000's.

The two gravel packed wells supplying the system are located in a forested area west of the primary residential area of the park. Source 006 is a 32ft deep gravel packed well with an estimated yield of 46 gallons per minute, the well is located adjacent to a small wetland and in an area where estimated aquifer transmissivity is between 1,000-2,000 ft^2 per day. Source 007 is also a gravel packed well with a depth of 22ft and an estimated yield of 10.5 gallons per minute, this well is located approximately 200ft away from Source 006 and in an area with aquifer transmissivity estimated to be up to 1,000ft^2 per day. Water from the system is disinfected and treated for corrosion control.

Pine Grove is a cooperative, resident-owned, mobile home community located along Route 10 in Swanzey, NH. The community has 122 homes.

Table 8. Pine Grove Co-Op active water sources. Data from NHDES

Source ID	Source Type	Status	Well Depth	Estimated Yield
2303010-007	Gravel Packed Well	Active	22ft	10.5 GPM
2303010-006	Gravel Packed Well	Active	32ft	46 GPM

6.2 Description of Source Protection Area

The wellhead protection area for the Pine Grove Co-Op system covers an area of approximately 48 acres west of Route 10 in Swanzey. The wellhead protection area was delineated by NHDES using a Phase I delineation using basic hydrologic methods including the Uniform Flow Equation taking into account the elevation of the surrounding landscape (NHDES, 2005). Advanced hydrological investigations such as pump tests were not used in delineating the WHPA for the Pine Grove Co-Op system. A sanitary protective radius of 175ft has been delineated for the system based upon the system's maximum average daily usage and guidelines from NHDES.

Land use within the wellhead protection area is predominantly forest (33 acres) with 15 acres currently occupied by residences and roadways. There are approximately 50 residences within the WHPA. An unnamed, intermittent stream drains wetlands located near the wells to the north. Elevation within the WHPA ranges from 150ft to 170ft. NH Route 10 transects the source protection area from north to south, other roadways within the WHPA include Lat Ln, and Diana Dr, both of which are roads within the Pine Grove Co-Op. Soils in this area are predominantly loamy fine sands of the Colton and Windsor series, with some rocky outcroppings in the northwest corner of the WHPA and hydric soils near the wells.

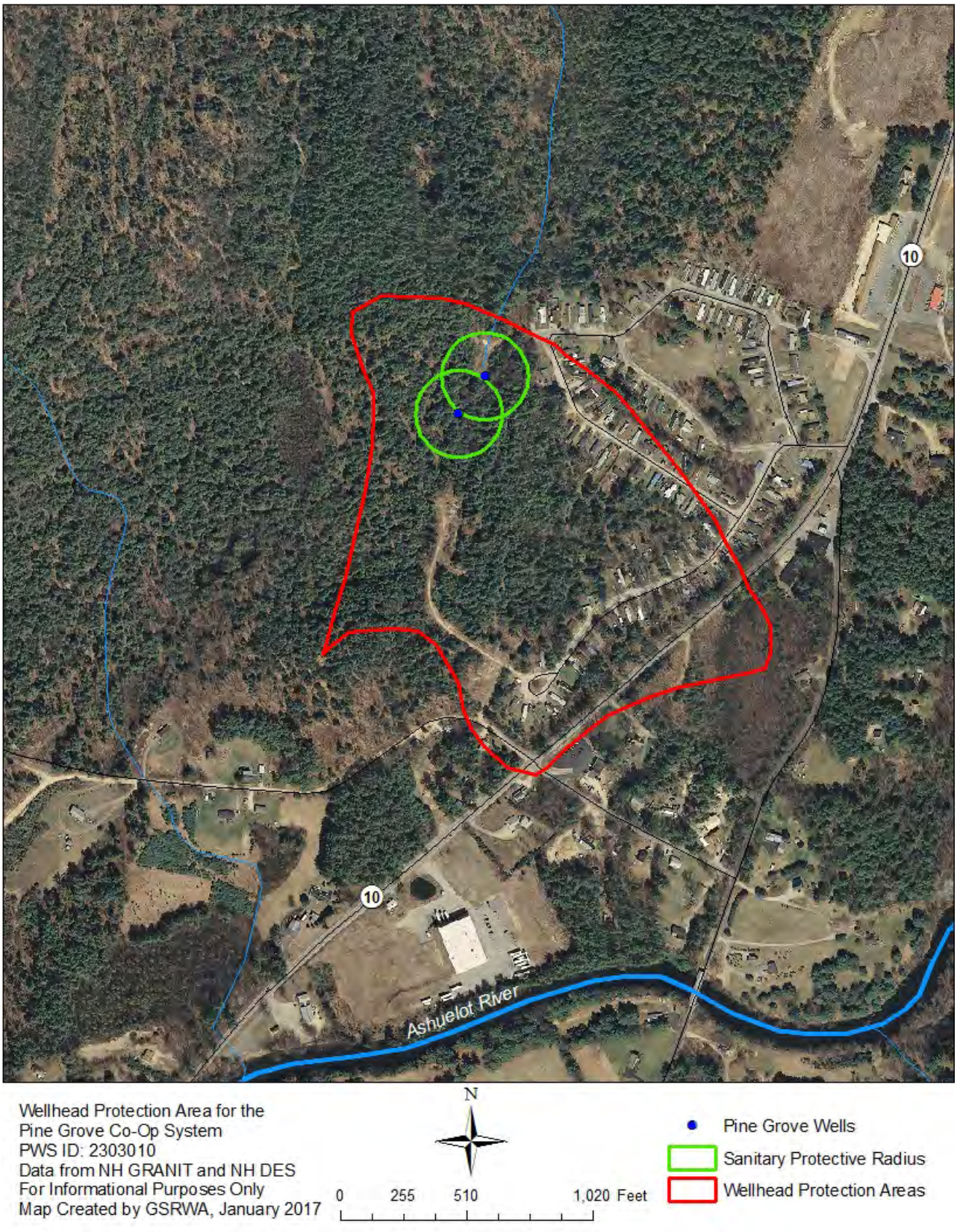


Figure 9. Wellhead protection area and sanitary protective radii for the Pine Grove Co-Op Water System. Data from NHDES and NH GRANIT.

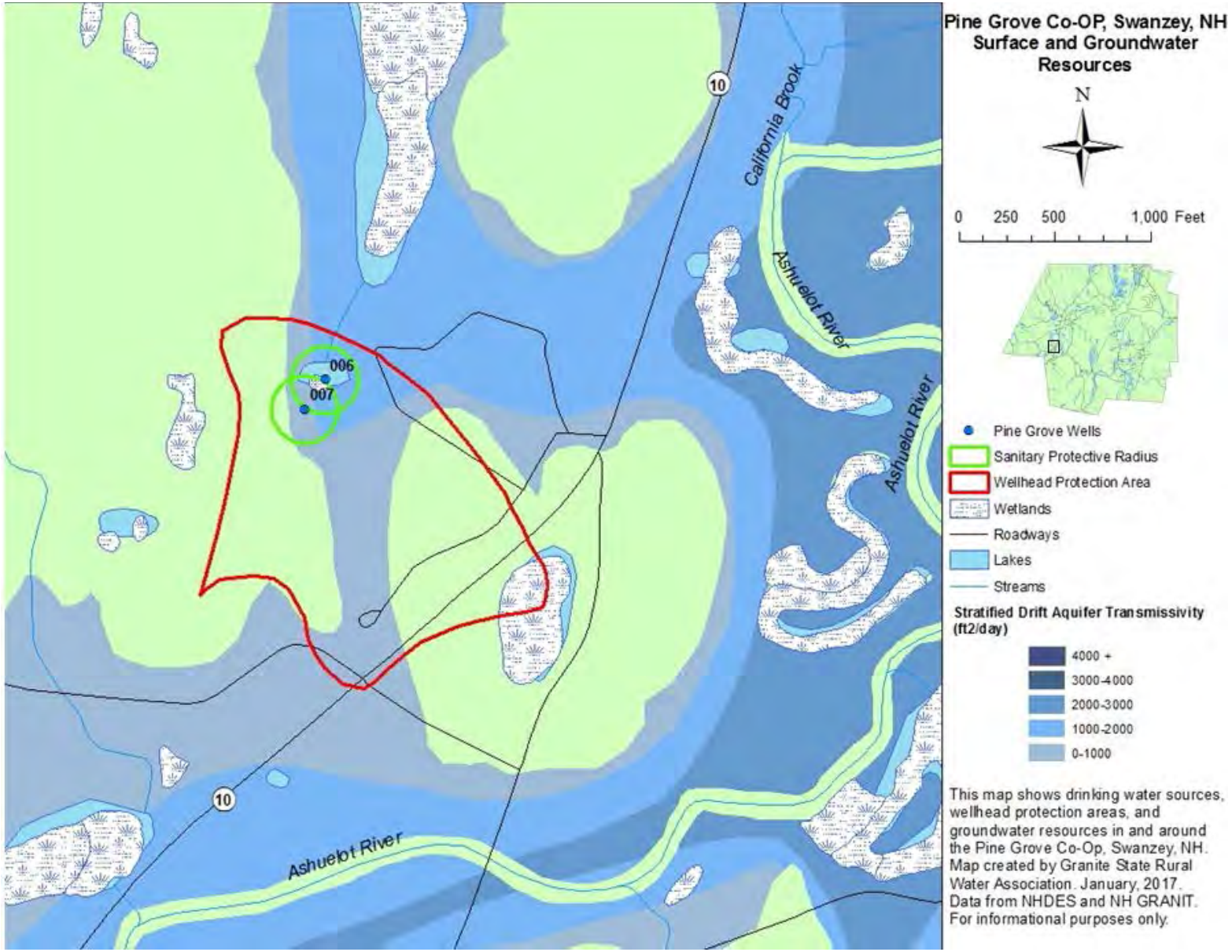


Figure 10. Surface and groundwater resources for the Pine Grove Co-Op Water System. Data from NHDES and NH GRANIT.

6.3 Potential Sources of Contamination

Underground Petroleum Storage-

There is one facility housing underground petroleum storage tanks located across Route 10 from the Co-Op, and approximately 1,500ft away from the wells. This facility is a vehicle service station with five, 4,000 gallon underground storage tanks. Three of these tanks store gasoline, one stores kerosene, and one stores diesel. The three gasoline, and one diesel tanks were installed in 1998 and are made of double walled composite material with plastic piping and were equipped with leak detection and overfill protection devices. The kerosene tank was installed in 1990 and is made of corrosion resistant steel of double-walled construction. Since the installation of these tanks, this facility has failed compliance requirements eight times and was red tagged (prohibited from operating) once in 2009 (NHDES, 2017). These four tanks were installed in 1998 and replaced two 10,000 gallon gasoline, one 10,000 gallon diesel, and one 4,000 gallon kerosene underground storage tanks which were removed at the same time. During the 1998 tank removal the tanks appeared to be in good condition and did not have any obvious signs of leaks or released product. Soil and groundwater samples were taken at the site of the removal, soil samples exceeded standards for naphthalene and toluene, while all groundwater samples met state groundwater standards (Handex, 1998).

Four underground storage tanks were removed from this site in 1990 including three 4,000 gallon gasoline tanks and one 1,000 gallon diesel tank. At the time of removal the tanks were reported to be in good condition with no odors indicating a release (Hidell-Eyster, 1993). Approximately 25 cubic yards of stockpiled, excavated soils from around the underground storage tanks was sampled and analyzed for petroleum products during the removal. Elevated levels of MtBE, toluene, ethylbenzene, and xylene were detected in the excavated soils indicating a release. Additionally, a gasoline-water mixture was discovered in two catch basins located near the property. Samples taken in 1991 from gravel-packed monitoring wells located on the Pine Grove Co-Op property indicated the presence of elevated levels of benzene, toluene, ethylbenzene, and xylene. Additionally, MtBE was detected in bedrock drinking water wells and monitoring wells in properties adjacent to the Pine Grove Co-Op (Geoinsight, 2003). Groundwater was not monitored between 1992 and 1998, a supplemental site investigation was completed for the site in 2000 and citing significant decreases in petroleum products in groundwater samples taken from the area, NHDES opted natural attenuation as the preferred remediation option (Geoinsight, 2003). A groundwater monitoring permit was issued for the site in 2002 that required bi-annual monitoring of five wells located on site and three wells located off site at adjacent properties. Additional monitoring wells were installed on-site in 2008 to further study the movement of VOC's from the site and eight additional residential water wells were sampled during 2011 and 2012. As of October 2016, petroleum products including MtBE, ethylbenzene, xylene, benzene, toluene, and naphthalene continue to be identified in groundwater samples taken from monitoring wells located on-site at the Route 10 mini mart. Additionally, MtBE continues to be found in samples taken from residential drinking water wells on properties located across Westport Village Rd. from the site. MtBE along with tetrachloroethene continues to be discovered in bedrock monitoring wells located at a property immediately north of Pine Grove Co-Op. Furthermore, an unidentified non-aqueous phase liquid (NAPL), often associated with petroleum products has been observed in a monitoring well located on the Pine Grove Property near the corner of Eastview Circle and Anthony Drive (Geoinsight, 2014). The NAPL was discovered during sampling events in 2007, 2010, 2011, 2012, 2014, and 2016 and was treated through the application of an absorbent sock regularly

changed out during each sampling event since. Due to the substance's brown and weathered appearance it is believed to originate for a historic, unknown release (Geoinsight, 2016).

This site continues to present a risk to any nearby drinking water wells both through the movement of previously released product and the presence of existing underground storage tanks. The fact that these tanks have failed compliance tests and inspections on multiple occasions magnifies this risk. Although modern safety measures such as leak detection alarms, double-walled tanks, and regular inspections have helped decrease the risk these tanks present to nearby drinking water systems, these are mechanical devices and can fail. Another product release could potentially further impact already affected wells, and potentially impact wells even further away depending on hydrologic conditions. Any new source developed between Lat Lane and Anthony Drive could be impacted either by the historic release, or any potential future release. It is important to note that no product has been detected in Pine Grove Co-Op's active wells 006 and 007. This facility presents a high risk to any near-by drinking water wells.

Another, smaller release occurred in 2004 at the Pine View Co-Op. Approximately 10 gallons of #2 Fuel Oil leaked from a 275 gallon underground storage tank that was located on a black poly surface and was in the process of being removed from the park. A small quantity of soil was impacted and removed, no product was detected in in nearby groundwater wells. No further action was deemed necessary by NHDES.

Table 9. Route 10 Mini-Mart UST Violations since 1998. Data from NHDES

Violation Type	Violation Date	Return to Compliance Date	Notes
Compliance Inspection Fail	8/21/2002	10/05/2002	Permit Not Displayed; Leak Detection Monitor Not Functioning
Compliance Inspection Fail	2/22/2005	04/04/2005	Vapor Recovery Drop Tube not 12" from bottom of tank; Overfill Protection not at 90% Alert and 95% Shut-Off Levels; Leak Monitor for Tank 13 in Alarm Mode; Annual Leak Detection Tests Not Performed; Piping Leak Detection Test Not Performed.
Compliance Inspection Fail (Red-Tagged 9/21-9/29/2009) IRT-09-011	12/19/2008	9/29/2009	Overfill Protection not Functioning in 5 Tanks; Annual Leak Detection Tests not Performed for 5 Tanks; Stage I Records Not Maintained for 3 Tanks; Piping Leak Detection Tests Not Performed for 3 Tanks; Corrosion Control Documentation not Submitted for 1 Tank.
Compliance Review Fail	07/18/2011	08/01/2011	Leak Detection Tests for Tanks and Piping Overdue.
Compliance Inspection Fail	09/06/2011	09/20/2011	Overfill Prevention Device, and Hose on Dispenser in Need of Replacement.
Compliance Review Fail	10/23/2012	01/29/2013	Operator Training Requirement Not Met
Compliance Inspection Fail (WMD 16-027) (IRT 16-030)	09/04/2014	04/18/2016	Operator Certificate Not Displayed; Emergency Response Guidelines Not Displayed; Operator Training Overdue; Monthly UST Inspection Not Performed for 4 Tanks; Spill Containment Devices Not Maintained for 5 Tanks; Overfill Protection Device Not in Working Order for 5 Tanks; Leak Monitor Not in Working Order for 2 Tanks; Liquid Discovered in Interstitial Space for 1 Tank.

Table 10. Underground storage tanks at the Route 10 Mini-Mart. Data from NHDES.

Tank Number	Product Stored	Volume (Gallons)	Construction Material	Date Installed	Date Removed
1	Gasoline	10,000	Steel-Galvanized	1983	9/30/1998
2	Gasoline	4,000	Steel-Galvanized	1973	12/06/1993
3	Gasoline	4,000	Steel-Galvanized	1973	12/06/1993
4	Gasoline	4,000	Steel-Galvanized	1973	07/01/1990
5	Kerosene	4,000	Steel-Galvanized	1973	09/30/1998
6	Gasoline	10,000	Steel-Galvanized	1983	09/30/1998
7	Diesel	10,000	Steel-Galvanized	1983	09/30/1998
8	Diesel	1,000	Steel-Galvanized	1973	07/01/1990
9	Kerosene	4,000	Steel-Corrosion Protected	08/01/1990	N/A
10	Diesel	4,000	Composite	10/01/1998	N/A
11	Gasoline	4,000	Composite	10/01/1998	N/A
12	Gasoline	4,000	Composite	10/01/1998	N/A
13	Gasoline	4,000	Composite	10/01/1998	N/A

Automotive Sales and Service Facility-

There is one facility providing automotive repair and sales located just outside the southeast corner of the WHPA. The facility is located on the corner of Kempton Rd. and Route 10 and is approximately 1,500ft from the wells. Automotive service stations often store petroleum products (such as motor oil and lubricants), as well as VOC's such as solvents and cleaners in bulk quantities on-site. The accidental release of these products, even in small quantities, can impact near-by drinking water wells. This risk is magnified when these products are stored in bulk quantities in aboveground storage tanks. No junked or salvaged cars are kept on-site at this facility, and the only vehicles kept at this facility are either for sale or actively being repaired. This facility does not possess a Hazardous Waste Generator permit. A second facility advertising auto body repair services is located across Route 10 from the entrance of Pine Grove and is approximately 1,900ft from the Pine Grove system wells. Waste solvents and paints are commonly found on-site at auto-body facilities.

Both of these facilities are small-scale operations and likely do not have hazardous materials and wastes in large quantities on-site. Small spills and accidents can still impact near-by wells however. Give the small scale of both of these businesses, and the fact that hazardous substances are not kept on-site in large quantities, the present a low risk to Pine Grove's wells.

Transportation Corridors-

One major roadway, NH Route 10, travels approximately 1,200ft through the WHPA for the Pine Grove Co-Op. Additionally 1,800ft of local streets exist within the Pine Grove Co-Op. Roadways can present a few hazards to nearby drinking water wells, particularly from road salts and accidental chemical releases. Heavy road salt application can result in chlorides from salts or other deicing chemicals leaching into groundwater and traveling to surface waters, especially during snowmelt or other runoff events. Automobile accidents, even relative minor ones, can release petroleum products or other automotive chemicals into soils or storm drains. More seriously, an accident with a large tanker could release hundreds or thousands of gallons of product. Serious tanker accidents are rare, and products spilled during passenger car accidents are usually in small quantities. The risk to Pine Grove Co-Op's water system from transportation corridors is low.

Residential Land Use-

Approximately 50 residences are located within the wellhead protection area for the Pine Grove System, primarily within the Pine Grove Co-Op. Overall however, the area is rural in character with low housing density. Residential land use is associated with the presence of septic systems, oil heat, and lawn care products. On-site septic systems represent potential sources of nitrates, chlorides, bacteria, and viruses Sewer service is not available in this area, and most residences within the Co-Op utilize single or shared residential septic systems. Lawn chemicals such as pesticides, herbicides, and chemical fertilizers, when used in excess, can leach into ground water and impact nearby wells. Furthermore, if chemicals from home auto repair are improperly disposed of, they can also potentially contaminate near-by drinking water sources. The closest residences to the Pine Grove wells are located along Lat Ln. and are located approximately 250ft from the wells. The risk to the Pine Grove System from residential land use is high given the number of residences, and their proximity to the wells.

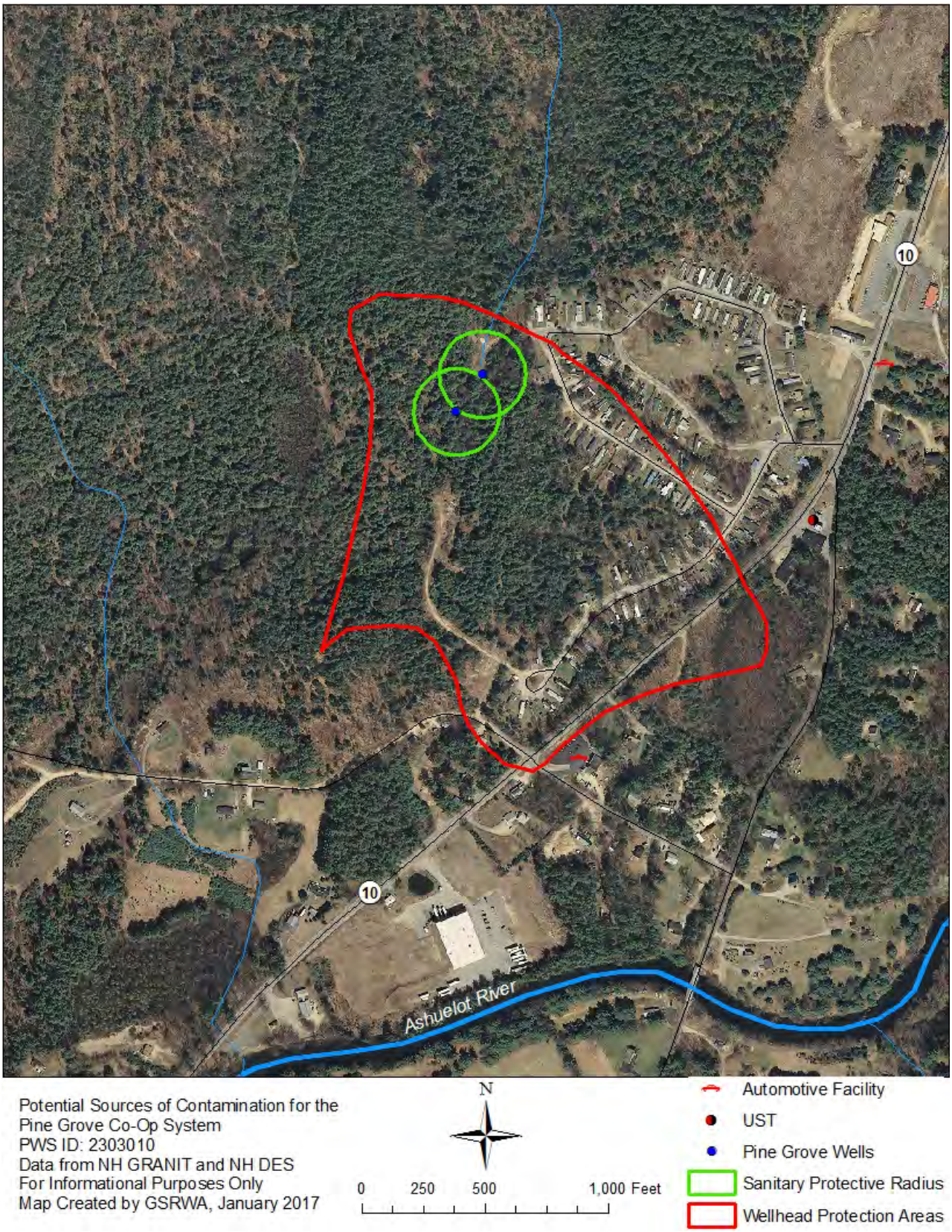


Figure 11. Potential sources of contamination for the Pine Grove Co-Op system. Data from NHDES and NH GRANIT.

7. Management of Risk

The most pressing water quality concerns facing drinking water sources in the Town of Swanzey include the introduction of heavy metals, VOC's, and heavy metals from salvaged automobiles, and the accidental release of hazardous substances into groundwater from underground petroleum storage. To address these concerns, the Town of Swanzey should undertake the following actions:

- Restrict or prohibit hazardous land uses through a municipal zoning ordinance.
- Educate property owners near public water sources.
- Maintain a Source Water Protection Committee

7.1 Adopt a Groundwater Protection Ordinance

The land uses mentioned in Chapters 4-6 of this report can negatively impact groundwater resources utilized by both public water suppliers, and private residential well users. These land uses can be controlled through the implementation of ordinances to restrict the locations of these activities, or to set conditions for their use. New Hampshire municipalities are empowered to regulate land uses and activities near drinking water sources under RSA 674:16 and RSA 674:21. Other New Hampshire communities have enacted such ordinances and regulations, including municipalities in Cheshire County.

The Town of Winchester enacted an aquifer protection ordinance in 2004. This zoning district is designed to protect the town's wells and covers areas in the town where stratified-drift aquifers have been delineated. The Town of Walpole enacted in 2002, and updated in 2015, a source protection overlay district ordinance that governed land uses within the wellhead protection areas for the town's two wells. The Town of Hinsdale, NH adopted an aquifer/wellhead protection overlay ordinance in 2009 that stipulates land use regulations within the wellhead protection areas for that town's municipal wells. Additionally, the New Hampshire Department of Environmental Services has a model ordinance available for municipalities to utilize.

Swanzey is unique among New Hampshire communities in that it has no central, municipally-owned public drinking water system. Although most Swanzey residents rely on private wells for their daily domestic water needs, some rely on privately-owned public water systems. Other, similar New Hampshire communities without municipally-owned community public drinking water systems have also enacted ordinances to protect groundwater resources for both private water wells, and privately-owned water systems. Moultonborough, NH is a Lakes Region community of approximately 4,500 individuals without a municipally-owned public water supplier, and several privately-owned water systems. In 2007 the community enacted a groundwater protection ordinance that regulated land uses in wellhead protection areas for privately-owned public water suppliers, and delineated stratified-drift aquifers. Furthermore, the Town of Swanzey's 2003 Master Plan Update lists the consideration of an aquifer protection overlay district as one of its first recommended action items for protecting drinking water supplies. The Southwest Regional Planning Commission, in their 2014 Southwest New Hampshire Natural Resource Management Plan, recommended that all southwest New Hampshire communities adopt aquifer protection overlay district ordinances.

The Town of Swanzey should enact a similar ordinance to govern land uses in areas where stratified-drift aquifers are known to exist, and within wellhead protection areas. Ideally, this ordinance should establish prohibited land uses, conditions for some exempted land uses, and performance standards for permitted land uses. The list of prohibited land uses should include:

- Underground petroleum storage
- Large Aboveground Hazardous Materials Storage
- Disposal of solid or leachable wastes
- Auto Salvage Yards
- Storage, processing, use, disposal, or recycling of regulated substances
- Bulk storage of road salt or snow dumps
- Excavation into bedrock or below the water table

This is an important step for the Town to take, as increased commercial and industrial development along Route 10 could potential lead to the increased presence of hazardous land uses and activities. An ordinance will help guide developers and business owners into operations that present a minimal risk to groundwater resources, or encourage industrial development in areas within the town without sensitive groundwater resources. The purpose of a groundwater protection ordinance is not to prohibit or impede commercial development and growth, but rather to guide it in a manner so that it does not negatively impact water resources. The importance of developing regulations governing land uses near sensitive drinking water resources should be highlighted by historic events such as releases from underground gasoline storage tanks. A draft ordinance is available in Appendix B.

7.2 Education and Outreach

Public education and outreach is central to protecting drinking water resources because increased awareness by property owners, consumers, and local businesses leads to better cooperation with stakeholders and water suppliers. The Town of Swanzey and Swanzey's drinking water system owners should conduct the following activities:

- Distribute Example Letter #1 to property owners located within the wellhead protection areas. The purpose of this letter is to notify owners that their property is located within a wellhead protection area for a public water supply. A factsheet on topics such as septic system maintenance, and heating oil storage, and a copy of the source protection map (with well locations omitted) should be included with the notification letter.
- Distribute example letter #2 to businesses located within or near wellhead protection areas, along with the associated fact sheets.
- Distribute a notice highlighting the schedule for Swanzey's Household Hazardous Waste Collection Day, to foster increased use of this service.
- Maintain signs at the well houses which read "Tampering with this Facility is a Federal Offense". Additionally, signs should be placed along roadways passing through well head protection areas alerting motorists

These materials will help inform residents on what actions they can take to help keep groundwater resources used for drinking water clean and pure. By highlighting the tangible benefits homeowners receive from being stewards of communal drinking water supplies, an outreach campaign is more likely to encourage and obtain support and action. Furthermore, these types of campaigns can also generate support for protecting surface water resources not used for drinking water. The Town of Swanzey's 2003 Master Plan Update recommended an education and outreach campaign to inform property and business owners on how they can protect drinking water resources. Example education and outreach materials are available in Appendix C.

7.3 Maintain a Source Water Protection Committee

The Town of Swanzey should maintain a source protection committee either as a sub-committee of an existing town commission, or as a stand-along committee. This committee should be tasked with reviewing and updating any source protection plans on an annual basis, and to provide comment and guidance to other town departments and commissions with regard to drinking water related issues. At a minimum, the source protection committee should consist of:

- Water System Operators
- A Selectboard Member
- Conservation Commission Member
- Planning Board member
- Zoning Board of Appeals
- Local Resident
- Local Farmers and Land Owners
- Local Business Owners
- Private Community Board of Directors

In addition to discussing drinking water quality issues, this committee can also help address the mutual concerns of both drinking water quality and surface water resources. The committee should also consider including local scientists, as well as environmentally based non-profits who may be able to lend expertise in communicating the relationship between surface and groundwater quality.

8. Contingency Planning

The New Hampshire Department of Environmental Services requires community public drinking water systems to have emergency plans outlining what to do in the event of a long or short term emergency. These plans are required to outline emergency notification procedures, interconnections with neighboring systems, plans for distributing bulk water, and plans to resume normal operations once the emergency has passed. Additionally, these plans contain contact information for system operators, local emergency responders, contractors and vendors, local elected officials, and local media outlets. These emergency plans are required to be updated every three years. West Swanzey Water Company, Eastfield Crossing, North Swanzey Water and Fire Precinct, and Pine Grove Co-Op have developed extensive emergency response procedures and all above listed systems updated their emergency operating plans in 2015.

Emergency operating plans are a strong tool for planning for, and responding to an emergency such as a chemical spill. However these plans work best when shared with partnering agencies and are practiced regularly. Community drinking water systems should share their emergency operating plans not only with their local fire department, but with upstream departments as well. Additionally, water suppliers should rehearse these plans through drills and table-top exercises with other involved agencies. These types of exercises can help reinforce roles held by different agencies, identify deficiencies, and improve communication between agencies and between neighboring communities. Water systems should also consider sharing these plans neighboring communities as well.

8.1 Potential Municipal Well

This report was tasked with identifying lands where a municipal well could be developed in the event the Town of Swanzey deemed it necessary or desirable. Conservation land, owned by the Town of Swanzey, would be a preferred option since the land is already in municipal ownership and already protected from development.. Swanzey currently owns six conservation lots located with associated aquifers. These include adjoining three lots along Route 32 near Sawmill Rd where aquifer transmissivity is estimated to be between 1,000 and 3,000 ft^2/day (Tax Lot #'s 24/2-3, 33/19). Other lands owned by the Town of Swanzey include the Matthews Rd. lot located near the Dillant-Hopkins Airport, and the West Swanzey Muster Team lot located on Pine St.

Table 11. Town-owned conservation lands with associated aquifers. Data from NH GRANIT.

Tax Lot Number	**Lot Size (acres)**	**Lot Name**	**Aquifer Transmissivities (ft2/day)**
24/2	14	Town of Swanzey Land	1,000-3,000
24/3	24	Town of Swanzey Land	1,000-3,000
N/A	13	West Swanzey Muster Team	1,000-2,000
38/23	7.5	Matthews Rd. Lot	0-1,000
33/19	17	Conservation Land, Sawmill Rd.	1,000-3,000

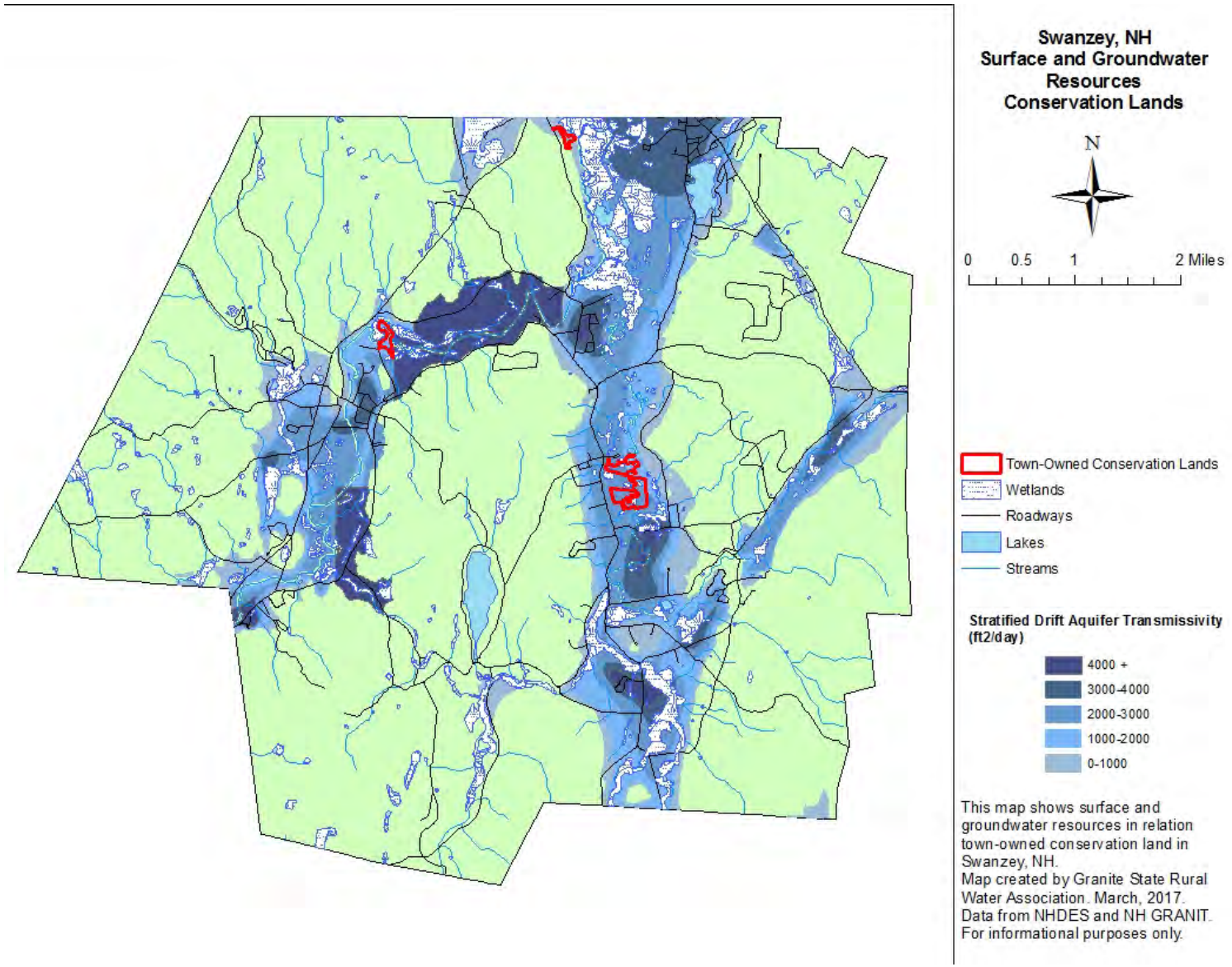


Figure 12. Town-owned conservation lands located over aquifers. Data from NHDES and NH GRANIT.

9. Conclusions

Swanzey is unique among New Hampshire communities in that it has no single municipal drinking water system, but 25 separate public drinking water suppliers to serve 7,230 residents. However the responsibility to protect these resources still requires the support and involvement of the town government, residents, system operators, and business owners. Education and outreach is the key to involving these entities to encourage action on their part to protect drinking water resources. With the intelligent cooperation of land-owners, system owners and operators, and public officials these water supplies should be viable for many years. The regulation of smart growth, by the town, through zoning ordinances is also important as it guides potentially hazardous land uses away from groundwater resources without negatively impacting economic growth. Although the primary purpose of this plan is to protect public drinking water supplies, the action items contained within, especially the education and outreach components, have tangible benefits for surface water resources that are not used as drinking water supplies. To remain viable, this plan should be periodically reviewed by relevant stakeholders.

Resources

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Appendix A. Potential Sources of Contamination Inventory

Table 12. Potential sources of contamination near the West Swanzey System Wells. Data from NHDES, NH GRANIT.

West Swanzey Water Company, Swanzey, NH. PWS ID 2301020, Potential Sources of Contamination and Action Items

Contaminant Source	Location	Street Address	Distance from Sources (ft)	Contaminants of Concern	Risk Level	Action Item
Unnamed Salvage Yard	42.87363, 72.33520	76 California St	2050ft- 001/002 570ft-003	Automotive chemicals, petroleum products, heavy metals	High	Ordinance, education and outreach
YBA Muffler and Brake	42.87489, 72.33556	67 California St	2430ft-001/002 450ft-003	Automotive chemicals, petroleum products, heavy metals	High	Ordinance, education and outreach
Route 10 Auto	42.87357, 72.33322	665 W. Swanzey Rd.	2330ft-001/002 1100ft-003	Automotive chemicals, petroleum products, heavy metals	High	Ordinance, education and outreach
Bill's Trading Post/WM Auto Sales	42.87726, 72.33093	919 W. Swanzey Rd	3800ft-001/002 2000ft-003	Automotive chemicals, petroleum products, heavy metals	High	Ordinance, education and outreach
Bob's West Swanzey Garage	42.87858, 72.32995	90 N. Winchester St.	4350ft-001/002 2500ft-003	Automotive chemicals, petroleum products, heavy metals	High	Ordinance, education and outreach
Swanzey Truck and Auto	42.87565, 72.33242	639 W. Swanzey Rd.	3100ft-001/002 1300ft-003	Automotive chemicals, petroleum products, heavy metals	High	Ordinance, education and outreach
Cutler Elementary School UST	42.87040, 72.33055	31 S. Winchester St	2500ft-001/002 2400ft-003	Petroleum Products, MtBE, VOC's	Low	Education and Outreach
Gomarlos Food Mart UST	42.86706, 72.33533	765 Route 10	1200ft-001/002 2600ft-003	Petroleum Products, MtBE, VOC's	High	Education and Outreach
Roadways	Throughout	N/A	250ft-001/002 175ft-003	Pathogens, petroleum products	Low	Signs Along Roadways
Residential Land Use	Throughout	N/A	250ft-001/002 175ft-003	Pathogens, Nitrates, Petroleum Products	Low	Education and Outreach
TurmOil	42.86888, 72.33503	735 W. Swanzey Rd.	1200ft-001/002 2000ft-003	VOC's, Paints, Solvents	Low	Education and Outreach
Agriculture	Throughout	N/A	450ft-001/002 750ft-003	Pathogens, Nitrates	Low	Education and Outreach

Table 13. Potential sources of contamination near the Eastfield Crossing System Wells. Data from NHDES and NH GRANIT.

Eastfield Crossing System, Swanzey, NH. PWS ID 2302040, Potential Sources of Contamination and Action Items						
Contaminant Source	Location	Street Address	Distance from Sources (ft)	Contaminants of Concern	Risk Level	Action Item
Roadways	Throughout	N/A	Source 005- 950ft Source 006- 625ft	Impervious Surfaces, non-point runoff, automotive chemicals, road salts	Low	Signage along roadways
Residential Land Use	Throughout	N/A	Source 005- 900ft Source 006- 600ft	Septics, lawn chemicals, heating oil, automotive chemicals	Medium	Education and Outreach letters to Homeowners
Vehicle Service Station	42.84563, 72.25509	81 Old Richmond Rd.	Source 005- 2100ft Source 006- 1900ft	Petroleum Products, MtBE, VOC's	Low	Education and Outreach letter to Business
Agriculture	Throughout	N/A	Source 005- 2400ft Source 006- 2300ft	Nitrates, pathogens, pesticides, SOC's	Low	Education and Outreach letters to Property Owners

Table 14. Potential sources of contamination near the Pine Grove Co-Op

Pine Grove Co-Op System, Swanzey, NH. PWS ID 2303010, Potential Sources of Contamination and Action Items						
Contaminant Source	Location	Street Address	Distance from Sources (ft)	Contaminants of Concern	Risk Level	Action Item
Roadways	Throughout	N/A	Source 006- 400ft Source 007- 400ft	Impervious surfaces, non-point runoff, automotive chemicals, road salts	Low	Signage along roadway
Residential Land Use	Throughout	N/A	Source 006- 250ft Source 007- 400ft	Septics, lawn chemicals, heating oil, automotive chemicals	High	Edu. And Outreach Mailings
Green Light Auto	42.84993, -72.34128	23 Kempton Rd.	Source 006- 1600ft Source 007- 1500ft	Petroleum Products	Low	Edu. And Outreach Mailings
Bedard's Auto	42.85259, -72.33863	956 W. Swanzey Rd.	Source 006- 1600ft Source 007- 1800ft	Petroleum Products	Low	Signs at well houses
Underground Petroleum Storage	42.85259, -72.33863	968 W. Swanzey Rd	Source 006- 1500ft Source 007- 1550ft	Petroleum Products, MtBE	High	Edu. And Outreach Mailings, Compliance Inspections, Monitor Wells

NHDES Source Water Assessment Reports

Assessments of Public Water Supply Sources - SWANZEY

This report is a summary of NH Department of Environmental Services' assessments of the vulnerability of each source used by the public water system(s) located in this municipality. The sources listed here are grouped first by the type of public water system and then by the system itself. Each source was ranked according to a number of criteria; a vulnerability ranking is given for each criterion that applies to the source. *An explanation of each column in the report can be found on the last page.*

Source Number	Source Description	Source Type	Date Assessment Completed	Number of Vulnerability Rankings			Susceptibility Ranking Criteria													
				Highs	Mediums	Lows	Detects	Well/Intake	KCSs	PCSs	Highways/RRs	Pesticides	Septics	Urban Land Cover	Ag Land Cover	Animals	Lagoons	Dry discharges	Sanitary radius	Tropic status
System Type: C	C=Community; P=Non-Transient, Non-Community; N=Transient																			
EPAID 2301010	System Name: N SWANZEY WATER AND FIRE PRCT																			
001	KEENE WATER DEPT	E	12/3/2001	0	0	0														
EPAID 2301020	System Name: WEST SWANZEY WATER CO																			
001	GPW	G	1/22/2002	4	2	6	H	L	M	L	M	L	H	H	H	L	L		L	
002	GPW	G	1/22/2002	4	2	6	H	L	M	L	M	L	H	H	H	L	L		L	
EPAID 2302010	System Name: ASHUELOT RIVER APTS																			
001	BRW	G	8/3/2001	2	2	8	L	L	L	L	L	L	H	L	H	L	M		M	
EPAID 2302040	System Name: EASTFIELD CROSSING ASSOC																			
005	GPW	G	1/16/2001	1	0	11	L	L	L	L	L	L	L	L	H	L	L		L	
006	GPW	G	1/16/2001	0	2	10	L	L	L	L	L	L	L	M	M	L	L		L	
EPAID 2303010	System Name: PINE GROVE MOBILE HOME PK COOP																			
006	GPW	G	10/25/2002	1	2	9	L	L	L	L	M	L	H	L	M	L	L		L	
007	GPW	G	10/25/2002	1	2	9	L	L	L	L	M	L	H	L	M	L	L		L	
EPAID 2303020	System Name: CALIFORNIA BROOK ESTATES																			
001	BRW	G	10/4/2001	1	0	11	L	L	L	L	L	L	L	L	H	L	L		L	
002	BRW	G	10/4/2001	1	0	11	L	L	L	L	L	L	L	L	H	L	L		L	
003	BRW	G	10/4/2001	1	0	11	L	L	L	L	L	L	L	L	H	L	L		L	

	Source Number	Source Description	Source Type	Date Assessment Completed	Number of Vulnerability Rankings			Susceptibility Ranking Criteria													
					Highs	Mediums	Lows	Detects	Well/Intake	KCSs	PCSs	Highways/RRs	Pesticides	Septics	Urban Land Cover	Ag Land Cover	Animals	Lagoons	Dry discharges	Sanitary radius	Trophic status
	004	BRW	G	10/4/2001	1	0	11	L	L	L	L	L	L	L	L	H	L	L		L	

System Type N — C=Community; P=Non-Transient, Non-Community; N=Transient

EPAID 2305040 **System Name:** WILCOX ATHLETIC FIELD

001	BRW	G	7/25/2001	2	0	7	L	L	L	H	H	L	L			L	L			

EPAID 2306030 **System Name:** KNOTTY PINE ANTIQUES MARKET

001	BRW	G	9/5/2001	1	0	8	L	L	L	H	L	L	L			L	L			

EPAID 2307010 **System Name:** SWANZEY LAKE CAMPING AREA

001	BRW	G	9/5/2001	2	0	7	L	L	L	H	L	L	H			L	L			

EPAID 2307020 **System Name:** PILGRIM PINES

001	BRW	G	9/19/2000	1	0	8	L	L	L	H	L	L	L			L	L			
002	BRW	G	9/21/2000	1	0	8	L	L	L	H	L	L	L			L	L			

EPAID 2307030 **System Name:** CAMP SQUANTO

001	BRW	G	7/25/2001	1	0	8	L	L	L	H	L	L	L			L	L			

EPAID 2307050 **System Name:** PILGRIM PINES CAMPGROUND

001	BRW	G	7/25/2001	1	0	8	L	L	L	H	L	L	L			L	L			
002	BRW	G	7/25/2001	1	0	8	L	L	L	H	L	L	L			L	L			

EPAID 2307060 **System Name:** CHESHIRE FAIRGROUNDS

001	BRW	G	7/25/2001	3	0	6	L	L	L	H	H	L	L			H	L			
002	BRW	G	7/25/2001	3	0	6	L	L	L	H	H	L	L			H	L			
003	BRW	G	7/25/2001	2	0	7	L	L	L	H	H	L	L			L	L			

EPAID 2306010 **System Name:** SWANZEY DINER

001	BRW	G	7/25/2001	2	0	7	L	L	L	H	H	L	L			L	L			

EPAID 2308020 **System Name:** THE ALPS RESTAURANT

001	BRW	G	9/19/2000	2	0	7	L	L	L	H	H	L	L			L	L			

	Source Number	Source Description	Source Type	Date Assessment Completed	Number of Vulnerability Rankings			Susceptibility Ranking Criteria														
					Highs	Mediums	Lows	Detects	Well/Intake	KCSs	PCSs	Highways/RRs	Pesticides	Septics	Urban Land Cover	Ag Land Cover	Animals	Lagoons	Dry discharges	Sanitary radius	Trophic status
EPAID	2308040	System Name: NICKS RESTAURANT																				
	001	BRW	G	7/25/2001	3	0	6	L	H	L	H	H	L	L			L	L			
EPAID	2308060	System Name: NEIGHBORS CONVENIENCE STORE																				
	001	BRW	G	7/25/2001	2	0	7	L	L	L	H	H	L	L			L	L			
EPAID	2309020	System Name: SWANZEY TOWN HALL																				
	001	BRW	G	9/19/2000	2	0	7	L	L	L	H	H	L	L			L	L			
System Type	P	C=Community; P=Non-Transient, Non-Community; N=Transient																				
EPAID	2305050	System Name: MONADNOCK REGIONAL HIGH SCHOOL																				
	001	BRW	G	8/18/2000	3	2	7	L	L	L	M	H	L	M	L	H	L	L		H	
EPAID	2306020	System Name: MVS FULFILLMENT SVS INC																				
	001	BRW	G	1/30/2001	1	3	8	L	L	L	M	L	L	M	L	H	L	L		M	

Appendix B. Sample Groundwater Protection Ordinance

Section IXX- SAMPLE

Groundwater Protection Overlay District

A. The Groundwater Protection Overlay District comprises of lands overlying sensitive drinking water aquifers that require protection and land management practices to minimize the risk of contamination. The purpose of the Groundwater Protection Overlay District is to balance the value of groundwater as an important source of drinking water for the Town of Swanzey with the economic impact of restricting a variety of uses within the Groundwater Protection Overlay District. The purpose is to be accomplished by regulating land uses which could contribute pollutants to both public and private drinking water wells. Pursuant to the Authority granted under RSA 674:16, the Town of Swanzey hereby adopts the Groundwater Protection Overlay District

B. The regulations in this Article overlay and supplement the provisions on the underlying zoning districts. This ordinance shall apply to all uses within the Groundwater Protection Overlay District except for uses exempt under Item IX of this ordinance. Where any provisions of these overlay zoning districts are in conflict with provisions of the underlying zoning district regulations, other ordinances of the Town of Swanzey, or the State of New Hampshire, the more restrictive provisions shall apply. If any provision of this ordinance is found to be unenforceable, such provision shall be considered separable and shall not be construed to invalidate the remainder of the Ordinance

C. The Groundwater Protection Overlay District is an overlay district superimposed over existing zoning districts. The overlay district is comprised of: (1) Wellhead Protection Areas as defined in Item I of this ordinance and supported by the New Hampshire Department of Environmental Services. (2) Stratified Drift Aquifers as defined in Item I of this ordinance and supported by the US Geological Survey report “Geohydrology and hydrology of stratified drift aquifers in the Lower Connecticut River Basin, Southwestern New Hampshire”. The boundaries of this overlay district are shown on a map titled Groundwater Protection Overlay District, Swanzey NH, Dated TBD.

ITEM I. DEFINITIONS

Aquifer: A geologic unit or formation containing a useable amount of water.

Biosolids: Biosolids is the term used for any sludge derived from a sewage wastewater treatment facility that meets the standards for beneficial reuse, that is or has received a Sludge Quality Certification or SQC.

Bulk Storage of Deicing Materials: Deicing materials that are ordered, stored, issued and sold by weight is known as bulk material.

Groundwater: Water in the sub-surface zone at or below the water table in which all pore spaces are filled with water.

Impervious Surface: A surface through which regulated substances cannot pass when spilled. Impervious surfaces include concrete unless unsealed cracks or holes are present. Earthen, wooden, or gravel surfaces; or other surfaces which could react with or dissolve when in contact with the substances stored on them are not considered impervious surfaces.

Junkyard: An establishment or place of business which is maintained, operated, or used for storing, keeping, buying, or selling junk, or for the maintenance or operation of an automotive recycling yard. The word does not include any motor vehicle dealers registered with the director of motor vehicles under RSA 261:104 and controlled under RSA 236:126.

Leachable Wastes: Waste material, including solid wastes, sludge and agricultural wastes that are capable of releasing contaminants to the surrounding environment.

Mining: The activities performed in the extraction of minerals including the excavation of pits, removal of mineral, removal of dimension stone, disposal of overburden and the construction of roads for the haulage of mining materials.

Non-Contact Cooling Water: Water which flows through a heat exchanger providing a physical barrier between the water and the process being cooled.

Positive Limiting Barrier: A depression (e.g. groove) in the surface of an otherwise level impervious area designed to impede the flow and contain spilled substances with the perimeter of the impervious area.

Process Water: Wastewater from an industrial process.

Public water system: A system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

Regulated Substance: Substances listed under 40 CFR 302, 7-1-05 edition or most current, excluding the following substances: (1) ammonia, (2) sodium hypochlorite, (3) sodium hydroxide, (4) acetic acid, (5) sulfuric acid, (6) potassium hydroxide, (7) potassium permanganate, and (8) propane and other liquefied fuels which exist as gases at normal atmospheric temperature and pressure.

Sanitary Protective Radius: The area around a public water supply well which must be maintained in its natural state as required by Env-Dw 301 or 302 (for community water systems); Env-Dw 373.12 and Env-Dw 372.14 (for other public water systems) or most current versions.

Seasonal High Water Table: The depth from the mineral soil surface to the upper most soil horizon that contains 2% or more distinct or prominent redoximorphic features that increase in percentage with increasing depth as determined by a licensed Hydrogeologiest, Soils Scientist, Wetlands Scientist, Engineer or other qualified professional approved by the Planning Board.

Secondary Containment: A structure such as a berm or dike with an impervious surface which is adequate to hold 110 percent of the volume of the largest regulated-substances container. (See Env-Wq 401.03(i) for reference).

Snow Dump: For the purposes of this ordinance, a location where snow, which is cleared from roadways and/or motor vehicle parking areas, is placed for disposal.

Solid Waste: Any discarded or abandoned material including refuse, putrescible material, septage, or sludge, as defined by New Hampshire Solid Waste Rules He-P 1901.03 or more current version. Solid waste includes solid, liquid, semi-solid, or contained gaseous waste material resulting from residential, industrial, commercial, mining, and agricultural operations and from community activities.

Stratified Drift: A geologic formation comprised of sand, gravel, and silt particles transported and deposited by glacial melt waters.

Surface Water: Streams, lakes, ponds, and tidal waters, including marshes, water courses and other bodies of water, natural or artificial.

Wellhead Protection Area: The surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield.

Hazardous Waste Facility: Any location at which hazardous waste is subjected to treatment, storage or disposal and may include a facility where hazardous waste has been generated.

ITEM II. DETERMINATION AND ADJUSTMENT

A. Determination

Where the boundary of the Groundwater Protection Overlay District, as delineated, is doubted or disputed by the owner, applicant, or abutter of the land in question, the burden of proof shall be upon the disputing party or parties to show where it should be properly located. At the request of the Planning Board, the Town of Swanzey may engage services of a professional such as a geologist, soil scientist to determine more accurately the location and extent of the resource in question. The Planning Board shall have the authority to make the final determination as to the location of a disputed boundary.

B. Adjustment

The Planning Board may, based upon appropriate findings and evidence, recommend an adjustment of the boundary or area designation of the Groundwater Protection Overlay District, including reducing or expanding the designation area to more correctly define the location and the extent.

ITEM III. PERFORMANCE STANDARDS

The following Performance Standards apply to all uses in the Groundwater Protection Overlay District unless exempt under Item IX:

A. For any use that will render impervious more than 15 percent or more than 2,500 square feet of any lot, whichever is greater, a stormwater management plan shall be prepared which the Planning Board determines is consistent with the current revision of the "New Hampshire Stormwater Manual, Volumes 1-3".

B. Conditional uses, as defined under Item VII shall develop stormwater management and pollution prevention plans and include information consistent with "Developing Your Stormwater Prevention Plan: A Guide for Industrial Operators" (US EPA, Feb 2009) or more current edition. The plan shall demonstrate that the use will:

1) Meet minimum stormwater discharge setbacks between water supply wells and constructed stormwater practices as found within the "Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, Section 2.1 Permanent (Post-Construction) Stormwater Management", (DES, 2008 or later edition).

2) Minimize the release of regulated substances by developing and implementing a source control plan that identifies pollution prevention measures.

3) Stipulate that the expansion or redevelopment activities shall require an amended stormwater plan and may not infiltrate stormwater through areas containing contaminated soils without completing a Phase I Assessment in conformance with the most current version of ASTM E 1527-05, also referred to as All Appropriate Inquiry (AAI).

4) Maintain a minimum of four feet vertical separation between the bottom of a stormwater practice that infiltrates or filters stormwater and the average seasonal high water table as determined by a licensed hydrogeologist, soil scientist, engineer, or other qualified professional as determined by the Planning Board.

C. Animal manures, fertilizers, and compost must be stored in accordance with the manual Best Management Practices for Agriculture in New Hampshire, NH Department of Agriculture, Markets and Food, July 2008, and any subsequent revisions.

D. All regulated substances stored in containers with a capacity of five gallons or more must be stored in product-tight containers on an impervious surface designed and maintained to prevent flow to exposed soils, floor drains, and outside drains;

E. Facilities where regulated substances are stored must be secured against unauthorized entry by means of a door and/or gate that is locked when authorized personnel are not present and must be inspected weekly by the facility owner;

F. Outdoor storage areas for regulated substances, associated material or waste must be protected from exposure to precipitation and must be located at least 50 feet from surface water or storm drains, at least 75 feet from private wells and outside the sanitary protective radius of wells used by public water systems.

G. Secondary containment must be provided for outdoor storage of regulated substances in regulated containers and the containment structure must be constructed in such a way to minimize the accumulation of water in the containment area and contact between precipitation and storage container(s).

H. Containers in which regulated substances are stored must be clearly visibly labeled in accordance with local state, and federal regulations and must be kept closed and sealed when material is not being transferred from one container to another.

I. On any property within the wellhead overlay district, where land-disturbing activities are to take place, all inactive wells not in use or properly maintained at the time the site work plan is submitted, shall be considered abandoned and must be sealed by the well owner in accordance with the most current version of the New Hampshire Water Well Board Rules (We 604).

J. Blasting activities shall be planned and conducted to minimize groundwater contamination. Excavation activities should be planned and conducted to minimize adverse impacts to hydrology and the dewatering of nearby drinking water supply wells;

K. All transfers of petroleum from delivery trucks and storage containers over five gallons in capacity shall be conducted over an impervious surface having a Positive Limiting Barrier (PLB) at its perimeter.

ITEM IV. SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLANS (SPCC)

Conditional uses, as described under Item VII, Part (A), using regulated substances shall submit a spill control and countermeasure plan (SPCC) to the Swanzey Fire Chief or other official designee who shall determine whether the plan will prevent, contain, and minimize releases from ordinary or catastrophic events such as, spills, floods, or fires that may cause large releases of regulated substances. It shall include at a minimum:

1. A description of the physical layout and a facility diagram, including all surrounding surface waters and wellhead protection areas.
2. Contact list and phone numbers for the facility response coordinator or official designee, cleanup contractors, and all appropriate federal, state, and local agencies who must be contacted in case of a release to the environment.
3. A list of all regulated substances in use and locations of use and storage;
4. A prediction of the direction, rate of flow, and total quantity of regulated substance that could be released where experience indicates a potential for equipment failure.
5. A description of containment and/or diversionary structures or equipment to prevent regulated substances from infiltrating the ground.

ITEM V. PERMITTED USES

A. Permit Required:

All site plan proposals located within the Groundwater Protection Overlay District shall be reviewed by the Planning Board and/or Zoning Board of Adjustment and shall conform to the provisions of this ordinance. No conditional uses shall be conducted within the Groundwater Protection Overlay District unless a Conditional Use permit has been approved by the Planning Board. The Planning Board is hereby authorized to attach any reasonable conditions to such approval regarding construction and operation.

Procedure on Application: The Planning Board shall act upon the applications in accordance with the procedural requirements of the Site Plan Review Regulations and NH RSA 676:4 Boards Procedures on Plats.

ITEM VI. PROHIBITED USES

The following uses are prohibited in the Groundwater Protection Overlay District. (See Table 1).

A. Disposal of solid waste (Brush and stumps are acceptable only if generated from clearing land and buried on the same site. A copy of the site plan which is required to be filed with the Commissioner of the Department of Environmental Services, in accordance with RSA 149-m for on-site burial of stumps, must be submitted to the Planning Board for its files).
B. Subsurface storage of petroleum and other hazardous materials.
C. Aboveground storage of petroleum and petroleum products in quantities greater than 660 gallons for a single tank or 1320 gallons for multiple tank systems.
D. Disposal of liquid or leachable wastes are prohibited, except from a single or multi-family residential subsurface disposal systems, spreading of animal manure using Best Management Practices or approved commercial or industrial systems which discharge human waste only.
E. Industrial uses which discharge contact type process waters on site. Non-contact cooling water is permitted.
F. Bulk outside storage of road salt or other deicing materials.
G. Snow dumps comprised of snow which has been brought from outside of the Groundwater Protection Overlay District.
H. Blasting of bedrock or excavation into the water table.
I. All on site handling, disposal, storage, processing or recycling of regulated substances in greater than household quantities (e.g. five gallons).
J. Automotive service and repair shops, fuel sales, junk yards and salvage yards.
K. Fueling and maintenance of large earthmoving equipment.
L. Hazardous Waste Facility.
M. New large groundwater withdrawals within the Groundwater Protection Overlay District, except as preempted by state statute. If permitted by state statute, the Town of Swanzey requires any and all optional requirements, including, but not limited to a Pre-Testing Conference and Revised Withdrawal Testing Design.

ITEM VII. CONDITIONAL USES

The Planning Board may approve a Conditional Use for a use which is otherwise permitted in the underlying district if the permitted use is involved in one or more of the following:

A. Storage, handling, and use of regulated substances in quantities exceeding 100 gallons or 800 pounds dry weight at any one time, provided that an adequate spill prevention, control and countermeasure (SPCC) plan, in accordance with Item IV, is approved by the Swanzey Fire Department;
B. Any use that will render impervious more than 15 percent or 2,500 square feet of any lot, whichever is greater.
C. Mining or earth excavation.
D. To receive approval for a Conditional Use, the proposed use must either be permitted by right or by special exception in the underlying zoning district.
E. All uses permitted by right or by special condition in the underlying zoning district which are neither prohibited ("P") nor require an approved Conditional Use (CU") under this Section shall be assumed permitted by right or by Conditional Use in the Wellhead Protection Overlay District.

In granting such approval the Planning Board must first determine that the proposed use is not a prohibited use (as listed in Item VI of this Ordinance) and will be in compliance with Performance Standards in Item III as well as all applicable local, state, and federal requirements.
The Planning Board may, at its discretion, require a performance guarantee or bond, in an amount and with surety conditions satisfactory to the Board, to be posted to ensure completion of construction of any facilities required for compliance and Performance Standards.
The Planning Board may also require, at its discretion, the recipient of a conditional use exemption acquire a liability insurance policy to cover any remediation costs resulting from the release of any substance on the property.
The Planning Board may require that the applicant provide data reports prepared by a professional engineer or qualified groundwater consultant to assess any potential damage to groundwater aquifers that may result from the proposed use. The Planning Board may engage such professional assistance as is required to adequately evaluate such reports and to evaluate in general, the proposed use. Costs of any of the above mentioned services shall be paid by the applicant.
In the Groundwater Protection Overlay District, the requirements of the underlying districts continue to apply for permitted and conditional uses. Uses that are prohibited are indicated by "P" in Table 1. Uses indicated by CU require a conditional use approval from the Swanzey Planning Board.

Table 1. List of Prohibited Uses and Conditional Uses which require approval by the Planning Board in the Groundwater Protection Overlay District, Swanzey, NH ("P" Prohibited; "CU" Conditional Use).

A. Disposal of Solid Waste	Brush and stumps are acceptable only if generated from clearing land and buried on the same site. A copy of the site plan which is required to be filed with the Commissioner of the Department of Environmental Services, in accordance with RSA 149-m for on-site burial of stumps, must be submitted to the Planning Board for its files.	P
B. Subsurface storage of petroleum and other hazardous materials.		P
C. Aboveground storage of petroleum and other hazardous materials in quantities greater than 660 gallons in a single tank or 1320 gallons for multiple tank systems.		P
D. Disposal of liquid or leachable wastes	Except from a single or from a multi-family residential subsurface disposal systems, spreading animal manure using Best Management Practices or approved commercial or industrial systems which discharge human waste only.	P
E. Industrial uses which discharge contact type process waters on site. Non-contact cooling water is permitted.		P
F. Bulk Storage of		P

salt/deicing materials		
G. Snow Dump	Specifically a snow dump comprised of snow and materials brought from outside the Town Wellhead Overlay District Protection Districts.	P
H. Mining	Except sand and gravel removal where excavation does not extend into bedrock or into the water table, and where petroleum products are not stored on-site.	CU
I. Regulated Substance(s)	Substances listed under 40 CFR 302, 7-1-05 edition, excluding the following substances: (1) ammonia, (2) sodium hypochlorite, (3) sodium hydroxide, (4) acetic acid, (5) sulfuric acid, (6) potassium hydroxide, (7) potassium permanganate, and (8) propane and other liquefied fuels which exist as gases at normal atmospheric temperature and pressure.	P
J. Automotive service and repair shops,		P
K. Junkyards and salvage yards		P
L. Fuel Sales		P
M. Concrete, asphalt, and tar manufacturing		P
N. Permanent facilities for fueling & maintenance of large earthmoving		P

equipment		
O. Hazardous waste facility		P
P. Industrial, commercial, institutional and governmental uses	(That are not otherwise prohibited by this Overlay District).	CU
Q. Stormwater infiltration pond and leaching basin		CU
R. Cleaning Service (i.e. laundry, auto)		CU
S. Food processing plant		CU
T. Wood preserving & furniture stripping		CU
U. Excavation/grading		CU
V. Electronic circuit assembly		CU
W. Metalworking Shop		CU
X. General Service and Repair shop		CU
Y. Laboratory		CU

ITEM VIII. EXISTING NONCONFORMING USES

Existing nonconforming uses may continue without expanding or changing to another nonconforming use, but must be in compliance with all applicable state and federal requirements, including Env-Wq 401, Best Management Practices Rules.

When any existing non-conforming use of land or building has been discontinued for one year the land and building shall thereafter be used only in conformity to this Ordinance, except that the Zoning Board of Adjustment, after public hearing, may permit the resumption of said non-conforming use. If an existing non-conforming use presents a direct and immediate threat of contaminating the aquifer, the Board of Selectmen shall issue a cease and desist order to stop the offending activity or process.

ITEM IX. EXEMPTIONS

The following uses are exempt from the specified provisions of this ordinance as long as they are in compliance with all applicable local state, and federal requirements:

A) Any private residence is exempt from all the Performance Standards;
B) Any business or facility where regulated substances are stored in containers with a capacity

less than five gallons is exempt from Item III, Performance Standards, section E through H;
C) Storage of heating fuels for on-site use or fuels for emergency electric generation, provided that storage tanks are indoors on a concrete floor or have corrosion control, leak detection, and secondary containment in place, is exempt from Item III Performance Standard E;
D) Storage of motor fuel in tanks attached to vehicles fitted with permanent fuel lines to enable the fuel to be used by that vehicle is exempt from Item III Performance Standards E through H;
E) Storage and use of office supplies is exempt from Item III Performance Standards E through H;
F) Temporary storage of construction materials on a site where they are to be used is exempt from Item III Performance Standards E through H if incorporated within the site development project within six months of their deposit on the site;
G) The sale, transportation, and use of pesticides as defined in RSA 430:29 XXVI are exempt from all provisions of this ordinance;
H) Household hazardous waste collection projects regulated under the NH Code of Administrative Rules Env-Wm 401.03(b)(1) and 501.01(b) are exempt from Item III Performance Standards E through H.

ITEM X. ENFORCEMENT PROCEDURES AND PENALTIES
Any violation of the requirements of this ordinance shall be subject to the enforcement procedures and penalties detailed in RSA 676 or RSA 485-C.

ITEM XI. APPEALS
Any person who is aggrieved of an administrative decision made under the provisions of this ordinance may appeal to the Zoning Board of Adjustment, under the provisions of RSA 674:33. The Zoning Board of Adjustment shall also have the power to authorize such variance from the terms of the Ordinance as will not be contrary to the public interest, if, owing to special condition, a literal enforcement of the provisions of this Ordinance will result in unnecessary hardship so that the spirit of the Ordinance shall be preserved and substantial justice done. The Zoning Board of Adjustment shall request from the Planning Board and the Conservation Commission an advisory decision before rendering any decision on a request for a variance under this Section.

ITEM XII. LIABILITY
Nothing in this ordinance shall be construed to imply that the Town of Swanzey has accepted any liability if a permitted facility or use contaminates groundwater in any aquifer.

ITEM XII. EFFECTIVE DATE
This ordinance shall be effective upon adoption by the Town of Swanzey.

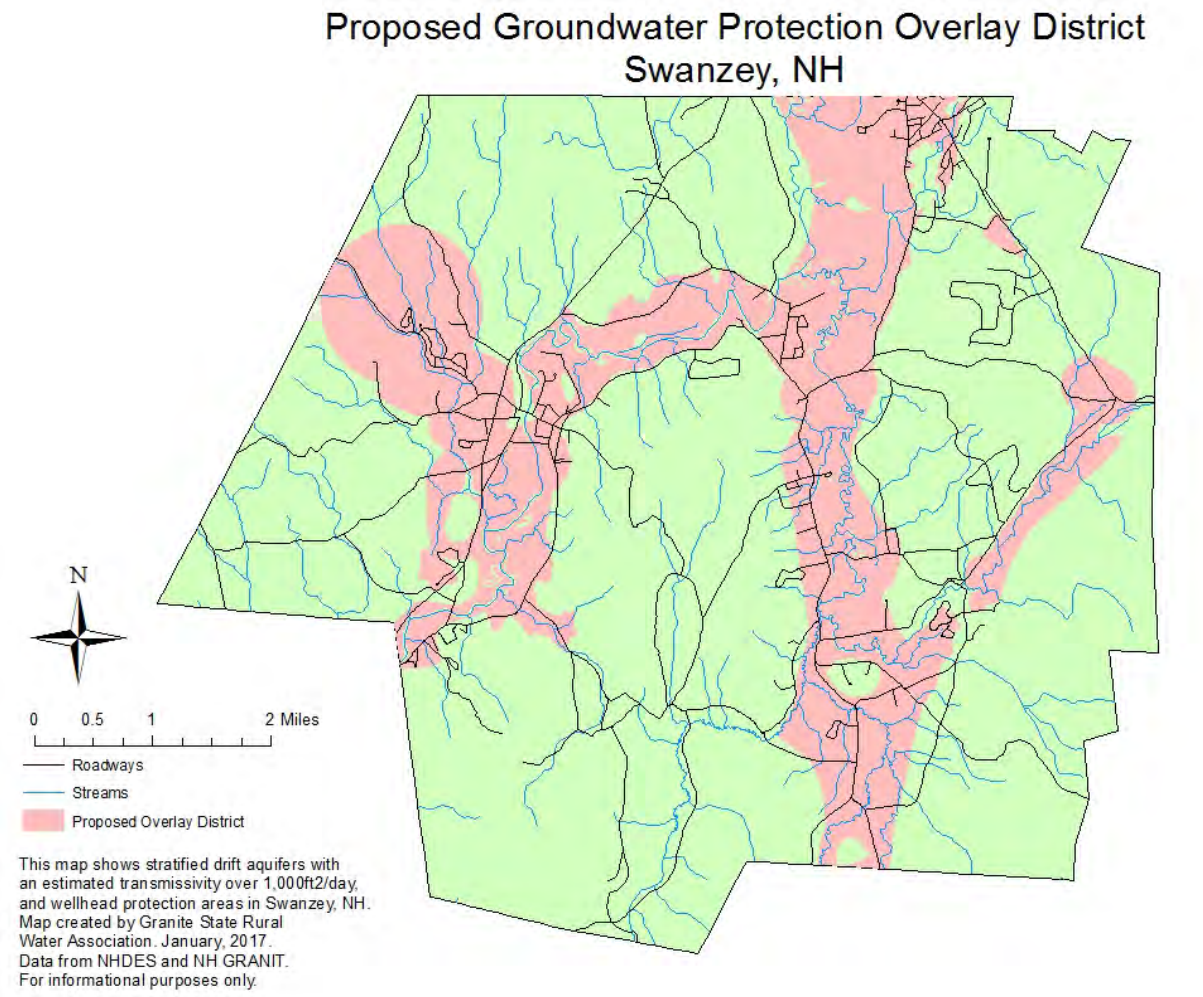


Figure 13. Swanzey Groundwater Protection Overlay District Boundaries. Data from NHDES and NH GRANIT.

Appendix C. Town of Swanzey Zoning Map

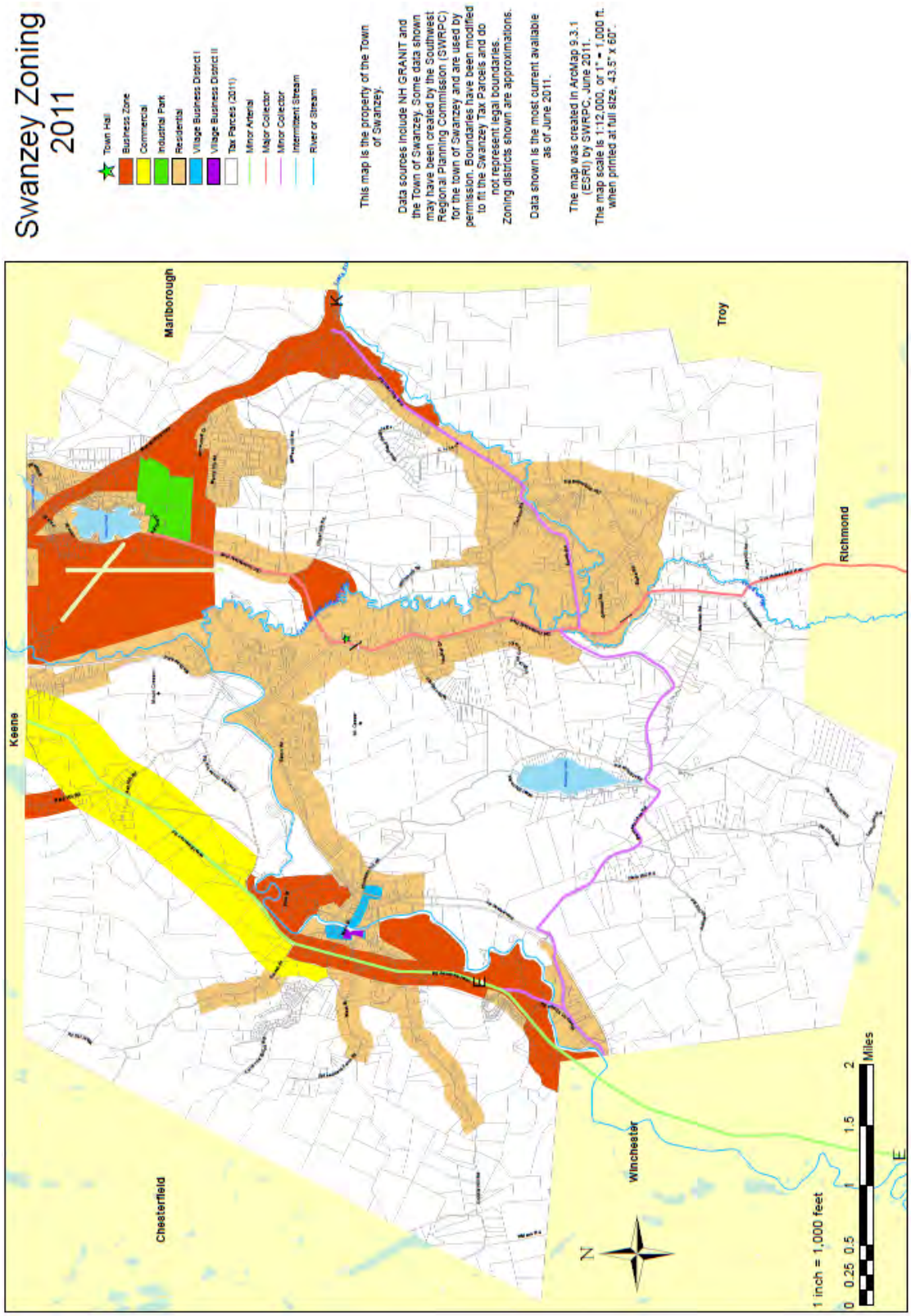


Figure 14. Town of Swanzey Zoning Map.

Appendix D. Example Outreach Materials

Sample Letter #1

DATE

Official Town of Swanzey Letterhead

Dear _____: (Homeowner)

The Purpose of this letter is to ask for your cooperation in ensuring safe drinking water. If we are all careful, we can protect our source of drinking water from contamination.

Your property has been identified as being located within the area from which water flows to one of the wells serving the _____ system (see map attached). As such it is important that you are aware that what you do on your property could affect the quality of the groundwater that serves the _____ system wells. If you are not served by this water system, you should be aware that the activities that occur on your property may affect the water quality of your private well.

No one wants to drink polluted water. Who would pour gasoline, motor oil, paint, garden chemicals, or household chemicals into their drinking water? Yet, the equivalent is done when someone pours any of these products down their toilet, sink drain, or onto the ground. By following the "Do's and Don'ts" on the attached flyer, your household can avoid activities that could threaten water quality.

Please take the time to review and follow the flyer's instructions. We need your help to protect this valuable source of drinking water!

We appreciate your cooperation.

Sincerely,

Contact Person's name

Sample Letter #2

DATE

Official Town of Swanzey Letterhead

Dear _____: (Business Name)

The Purpose of this letter is to ask for your cooperation in ensuring safe drinking water. If we are all careful, we can protect our source of drinking water from contamination.

Your facility has been identified as being located within the area from which water flows to one of the _____ system wells (see map attached). As such it is important that you are aware that what you do on your property could affect the quality of the groundwater that supplies these wells. If you are not on _____ system water, you should be aware that the activities that occur on your property may affect the water quality of your facility's well.

No one wants to drink polluted water. Who would pour gasoline, motor oil, paint, garden chemicals, or household chemicals into their drinking water? Yet, the equivalent is done when someone pours any of these products down their toilet, sink drain, or onto the ground. By following the guidelines on the attached flyers, your facility can avoid activities that could threaten water quality. Every business wants to be a positive force in their community, being a good neighbor to the community water system is a perfect start.

Please take the time to review the attached information. We need your help to protect this valuable source of drinking water!

We appreciate your cooperation.

Sincerely,

Contact Person's name

Is Gasoline Contaminating Your Drinking Water?

Gasoline is one of the most dangerous products commonly found around the home, yet people often store and use it with little care. Some of the chemicals in gasoline have been found in drinking water with increasing frequency, including benzene, toluene and MtBE (Methyl t-Butyl Ether), which is *easily dissolved in water* and is a possible carcinogen. Even a gasoline spills as small as a gallon can contaminate your drinking water wells or a public water supply.

To Protect Your Drinking Water From Gasoline

Avoid Spilling Gasoline on the Ground, Especially Near Wells

- Don't drain gasoline from lawn mowers, snow blowers, etc. onto the ground.
- Don't burn brush with gasoline.
- Don't top off your fuel tank.
- Keep refueling and engine work away from water supply wells, and if possible, over a concrete floor or similar barrier. Immediately clean up any gas or oil spills.

Avoid Spilling Gasoline in Lakes, Ponds, and Rivers

- Keep special gasoline-absorbing pads on your gas-powered boat and know how to use them.
- If you own a larger boat, make sure it has no-spill tank vents.
- Fill portable tanks from outboard boat engines on shore.
- Refuel snowmobiles and ice augers on shore; do not take gasoline storage tanks onto ice-covered ponds.

Store Gasoline Properly

- Use a clearly labeled container made for gasoline and with a spout to avoid spills.
- Keep gasoline containers in a dry, well ventilated shed or detached garage away from water supply wells. Don't keep metal gasoline cans on a dirt floor for extended periods.

Dispose of Waste Gasoline Properly

- Handle old or dirty gasoline as hazardous waste. Bring it to a household hazardous waste collection center in a proper gasoline container.

If a spill occurs: For *any size* spill that is not immediately cleaned up, first contact your local 911 responder or fire department, then call the DES emergency spill number at (603) 271-3899 (Mon-Fri, 8-4), or weekends and evenings at (603) 223-4381 (NH State Police).

Revised August 2011

Got Clean Drinking Water?



It's up to you!

The DOs and DON'Ts for maintaining clean Drinking Water

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

For more information please contact the Drinking Water Source Protection Program at (603) 271-7061 or visit our website: http://des.nh.gov/organization/divisions/water/dwgb/dwspp/index.htm.

Where does your drinking water come from?

Your drinking water comes from either groundwater or surface water. Groundwater is the water that flows through the spaces between soil particles and through fractures in rock. It comes from rain and snowmelt percolating through the ground. Surface water comes from rainfall and snowmelt running over land and from *groundwater* seepage into lakes, rivers and reservoirs.

Why should you be concerned?

While some pollutants, such as bacteria, viruses and phosphorus, can be reduced by passing through soil under certain conditions, groundwater can be easily contaminated by chemicals and oils. Surface water is also affected by soil and pollutants picked up as water flows over land.

Keep Household Hazardous Wastes Out of your Drinking Water! Such as …
Automotive Fluids • Auto Batteries • Used Motor Oil
Oil-Based Paint • Paint Thinner • Antifreeze
Pesticides • Cleaning products • Gasoline

DO –



- Use non-toxic and less-toxic alternatives to pesticides and household chemicals.
- Take leftover household chemicals to your town's household hazardous waste collection day.
- Follow package directions on pesticides, fertilizers and other household chemicals.
- Check your underground fuel storage tank (UST) frequently for leaks. If a UST is more than 20 years old, replace it with an aboveground storage tank that has a concrete slab underneath it, a cover and secondary containment.
- Take care of your septic system. Inspect it every year and get it pumped out every 3-5 years.
- Avoid damage to your leach field and distribution lines by keeping vehicles, livestock and other heavy objects off of them.
- Test soil every two years to determine existing nutrient levels and pH before applying fertilizers.
- Use slow or controlled release nitrogen sources of fertilizer.
- Measure the area of your lawn to be fertilized to determine how much to use and calibrate or adjust spreader settings to match the recommended rate for fertilizers.
- Use drip pans large enough to contain motor vehicle or power equipment fluids being replaced or drained.
- Fully drain oil over a drip pan or pail before disposal. Most solid waste transfer stations accept used oil filters for recycling. Store and transport used oil filters in a covered leak-proof container until disposal.
- Keep absorbent materials such as rags, pads, "Speedi-Dry" or kitty litter near the work area and clean up all spills as soon as they occur.
- Dispose of all used absorbents immediately in a leak-proof container.
- Refuel or repair engines over an impervious surface, such as a concrete floor or tarp.
- Drain all fluids from motor vehicle parts before removing them from the vehicle.
- Follow medicine disposal guidelines described at www.nh.gov/medsafety.



DON'T –

- Buy more pesticides or hazardous chemicals than you need.
- Dispose of hazardous chemicals by pouring them down the drain or onto the ground.
- Over-use pesticides or household chemicals. More is not necessarily better.
- Have your UST removed by a contractor who is not familiar with state guidelines for UST removal.
- Overload your septic system with solids by using a garbage disposal, unless the system is specifically designed for one.
- Pour chemicals down the sink or toilet.
- Use septic system cleaners or additives containing acids or chemical solvents such as trichloroethylene (TCE).
- Use fertilizers if heavy rains are anticipated as the nutrients will be flushed from the lawn into drains and low areas.
- Apply fertilizers within 25 feet of most lakes and streams.

ENVIRONMENTAL Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-SSB-13 2011

You and Your Septic System

A Homeowner's Guide to Septic System Maintenance

Your septic system is a highly efficient biological system that can effectively digest and disperse your household sewage and other organic wastes. Properly designed, installed and maintained, it should give you many years of trouble-free service, **but only if it is properly maintained.** The key to the life and service of any septic system is proper maintenance.

How Does Your Septic System Work?

A septic system is designed to condition untreated liquid household waste (sewage) so that it can be readily dispersed and percolated into the subsoil. Percolation through the soil accomplishes much of the final purification of the effluent, including the destruction of disease-producing bacteria.

Your septic tank is the first step in the process of sewage conditioning. Without it, the untreated sewage would quickly clog the receiving soil and prevent the purification process of leaching and soil percolation. Septic tanks serve three functions:

- Removal of solids.
- Bacterial action.
- Sludge and scum storage.

In the first step, as sewage enters the septic tank, its rate of flow is reduced so that the larger solids sink to the bottom or rise to the surface. These solids are retained in the tank, and the clarified effluent with suspended and dissolved solids is discharged.

Bacterial action is the second function. The solids and the liquids in the tank are partially decomposed by bacteria and other natural processes. These bacteria are called anaerobic because they thrive in the absence of free oxygen. This decomposition of sewage under anaerobic conditions is termed "septic," hence the name of the system (and the cause of the odor).

Storage is the third function of your system. Sludge is the accumulation of solids at the bottom of the tank, while scum is a partially submerged mat of floating solids that may form at or near the surface. Space must be provided in the tank to store the residues during the intervals between cleaning. Otherwise, the sludge and scum will eventually be scoured from the tank and will clog the leach field and receiving soil. PERIODIC CLEANING OF YOUR TANK IS ESSENTIAL TO ITS PROPER FUNCTION.

Finally, the treated effluent from the septic tank is discharged to the leach field where it percolates through suitable gravel and finally into the subsoil for further purification.

Remember: A properly maintained septic system will adequately treat your sewage. A septic system failure is unhealthy, illegal if not corrected and a nuisance. Also, replacing an existing system can be costly! The life of the system can be prolonged by proper maintenance and frequent tank pumping.

What You Can Do to Properly Maintain Your Septic System

First and foremost, inspect your septic tank every year. If the sludge and surface scum combined are as thick as 1/3 the liquid depth of your tank, have the tank pumped out by a licensed pumper. Your tank should be pumped out **at least every two to three years**.

Do not flush bulky waste or grease into the system. It can plug the sewer and/or distribution lines.

Do not flush toxic materials into the system. Paint thinner, gasoline, pesticides, chlorine, drain cleaners and other caustic or toxic substances can kill the naturally-occurring bacteria in the tank and impair its function. If in doubt, don't flush it.

Conserve water. Too much water can overload your system and adversely affect its function.

Don't allow vehicles or livestock on your leach field. The weight can compact the soil and/or break pipes.

Any soggy areas around the system, or disagreeable odors, could indicate system failure. Have it checked.

Additional Suggestions

Minimize or eliminate use of kitchen "disposal" units, which grind up food wastes and place a burden on the septic tank, especially if the original septic design did not accommodate one.

If water treatment system backwash has been directed into the home septic system, check to make sure that the additional volume from the discharge can be accommodated by your septic system. Unfortunately the majority of treatment systems are installed after the home and septic system are built. The additional water to the septic tank and leaching field may cause problems with septic system operation or may overload the existing leaching area and result in premature failure. Additionally, some experts believe that the brine from backwashing may have detrimental effects on bacteria growth and may influence the soil's ability to infiltrate water.

Maintaining a Record

On the next page, is a template for creating a permanent maintenance record of your septic system for your files.

For More Information

For more information, please contact the DES Subsurface Systems Bureau at (603) 271-3501 or go on-line at http://des.nh.gov/organization/divisions/water/ssb/index.htm for detailed information.

Septic System Maintenance Record for: _____

First, in the space below, make a sketch of the location of your septic tank in relation to your house. Measure and record on your sketch the distances from the house foundation to the septic tank or cesspool cover, to the distribution box, leaching system and to other permanent features such as nearby trees or rocks.

Date System Installed: _____ Installer: _____

Record of Pumping Service/Maintenance	
Date	**Septic Service Provider**

For More Information

For more information, please contact the DES Subsurface Systems Bureau at (603) 271-3501 or go on-line at http://des.nh.gov/organization/divisions/water/ssb/index.htm for detailed information. Subsurface Systems Bureau; 29 Hazen Drive, PO Box 95; Concord, NH 03302-0095.

Appendix E. Drinking Water Protection Committee Meeting Minutes

Swanzey Source Water Protection Committee

Thursday, July 14th 2016. 4:00PM-5:00PM
Swanzey Town Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Beverly Bernard- Conservation Commission
Jim McConnell- Planning Board
Andrew Madison- Granite State Rural Water Association

1. West Swanzey Water
   -System owner indicated that while she understood the goals behind a drinking water protection plan, she felt she didn't have the time to be involved in the planning process. She also mentioned that she felt the best thing the town could do to protect her system would be to acquire the system.
   -Andrew Madison asked committee members if they would be willing to approach West Swanzey Water and ask them to reconsider joining the initiative.
   -The Water Study Committee recommended against the town acquiring the system unless funding could be found to make necessary system upgrades.
   - NHDES met with the Swanzey Water Study Committee to discuss what upgrades would be needed in order for the town to acquire the system. They will be looking into options for financing an engineering study to determine what exactly will be needed with regard to system upgrades. Funding from federal sources or the MtBE remediation fund are being considered, Jim McConnell will be following the issue closely.
   -The idea of applying for funding from USDA Rural Development was discussed. Funding would come in the form of grants or low-interest loans. Andrew Madison said he would find more information for the committee.

2. Additional stakeholders/systems
   - Currently Eastfield Crossing is the only system that has signed onboard with the plan. West Swanzey Water Co. indicated that they weren't interested, and the remaining four systems that develop water in town (Pine Grove, View Point, Ashuelot River Apartments, Forest View Estates) have not yet joined the effort. North Swanzey Water will not likely be included since they receive transferred water from Keene.

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-Andrew Madison will work on reaching out to the remaining systems to invite them into the process, however if any committee members have personal contacts at these systems, those could be useful.
- Statistics were given for the community public drinking water systems in Swanzey:

PWS ID	System Name	Address	Population	Connections
2301020	WEST SWANZEY WATER	WINCHESTER ST	203	81
2302010	ASHUELOT RIVER APTS	57 HOMESTEAD AVE	100	40
2302040	EASTFIELD CROSSING	BELLVIEW RD	113	45
2302050	FOREST VIEW ESTATES	OWENS DR	180	72
2303010	PINE GROVE MOBILE HOME PARK	935 W SWANZEY RD	305	122
2303020	VIEW POINT COOP	POND VIEW DR	248	99

3. Next Meeting: August 30th, 2016. 4:00PM at the Swanzey Town Hall

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Swanzey Source Water Protection Committee

Tuesday, August 30th 2016. 4:00PM-5:45PM
Swanzey Town Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Beverly Bernard- Conservation Commission
Stephen Stepenuck- Conservation Commission
Sylvester Karasinski- Board of Selectmen
Roberta Visser- Local Resident
Stephen Runcy- Local System Operator
Barbara Skuly- Ashuelot River Local Advisory Committee
Andrew Madison- Granite State Rural Water Association

1. West Swanzey Water

-Andrew spoke with David McClain (GeoInsight) and Scott Clang (Granite State Rural Water) regarding West Swanzey Water Co. The system has received funds from the State's MtBE remediation fund to perform an engineering study and evaluation of the distribution system. Dave has encouraged the system to support this effort.

2. Swanzey Water Resources

- Maps were distributed showing the extent of Swanzey's high-yield groundwater aquifers. They were divided into north, east, south and west for clarity. The aquifer boundaries were delineated by NHDES.
-Mr. Karasinski mentioned that some homeowners along Route 12 likely obtain their drinking water from aquifers located under Mt. Huggins.
- The aquifer boundaries, along with delineated source protection areas could serve as the boundaries of any potential groundwater protection overlay district. Mr. Madison mentioned that some communities used aquifer boundaries as the boundaries of their overlay districts while others used pre-delineated wellhead protection areas, and some communities used both. Both private well-owners and public water suppliers would benefit.
- The plan would include Transient and Non-Community Non-Transient water suppliers such as school and campgrounds.
- Ms. Visser asked if the plan and ordinance would address water quantity. Mr. Madison stated that the primary focus of a groundwater protection ordinance was to protect groundwater quality. Protecting quantity from large withdrawals is largely the responsibility of NHDES. The ordinance would not have any jurisdiction beyond

Swanzey's Town Line, however drought guidance could be included in the source protection plan.

3. Next Steps

-Andrew will provide members of the committee with example ordinances from similar communities around the state.
-Mr. Madison will also begin the land-use analysis

3. Next Meeting: September 27th, 2016. 4:00PM at the Swanzey Town Hall

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Swanzey Source Water Protection Committee

Tuesday, September 27th 2016. 4:00PM-5:30PM
Swanzey Town Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Beverly Bernard- Conservation Commission
Stephen Stepenuck- Conservation Commission
Sylvester Karasinski- Board of Selectmen
Roberta Visser- Local Resident
Jim McConnell- Planning Board
Barbara Skuly- Ashuelot River Local Advisory Committee
Tim Joyal- Eastfield Crossing
Ed Kaufmann- Eastfield Crossing
Andrew Madison- Granite State Rural Water Association

1. Updates from last meeting
    -Mr. Madison has not had much time in the last month to work on the Swanzey plan due to other commitments. However with those commitments now being satisfied, Swanzey will become his priority project.
    -Mr. Madison explained the purpose behind the source protection plan, what it entailed, and the goal of an aquifer protection ordinance.

2. Land Uses and Zoning
    -Much of the delineated aquifer in East Swanzey is rural/residential and zoned for residential land uses with the exception of a few areas.
    -Much of the aquifer in West Swanzey is covered zoned for commercial and business.
    -Individual source protection areas are largely residential, rural, or forested.
    -Mr. Madison gave a quick description of the soils and geology of the Swanzey area, explained how the stratified-drift aquifers were formed, and explained where the recharge for these aquifers comes from. The impacts of the drought were also discussed.

3. Example Ordinances
    -Example ordinances were provided to committee members, these ordinances came from Walpole, Winchester, and Moultonborough, all in New Hampshire.
    -Walpole's source protection ordinance covers only delineated source protection areas around the town's two wells. It was asked why this did not cover a larger area. Mr.

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Madison indicated that the town had a good relationship with property owners near the wells and did not feel it needed to expand the radii of the source protection areas. The town also had concerns about balancing wellhead protection with economic needs along NH Route 12.
-Winchester's aquifer protection ordinance covers the delineated stratified-drift through the center of town along NH Route 10.
-Moultonborough's Drinking Water Protection ordinance covers both delineated stratified-drift aquifers, and wellhead protection areas. Moultonborough is similar to Swanzey in that it does not have a municipally owned public water source, but instead has a number of small, privately-owned systems.
-Ms. Visser asked whether an ordinance could be used to regulate land uses beyond Swanzey's Town Limits, with regard to commercial activity and construction along Rte. 10 in Keene. Mr. Madison explained that a town zoning ordinance in Swanzey would not have any jurisdiction outside of the Town of Swanzey.
-Mr. Madison mentioned that many communities in NH adopted aquifer or source water protection ordinances since inspection and enforcement staff are limited within NHDES, so many communities have taken it upon themselves to protect their water supplies.
- Mr. Stepenuck mentioned that the concern regarding a water bottling plan drawing down the aquifer and potentially drying up wells was serious and should be addressed by any ordinance.
-Road salts were discussed as a water quality issue. Mr. Madison indicated that some communities along I-93 have had issues with regard to chlorides in groundwater as a result of road salts. It was mentioned that the committee could work with the DPW, state DOT, and private committees to implement reduced-salt areas to protect sensitive water supplies.
-It was noted that the airport is located above an aquifer and is subject to frequent salting and de-icing. Mr. Karasinski informed the committee that this was due to FAA regulations that the runway be kept open and free of snow/ice in all but the most severe weather. Mr. Madison added that the FAA regulations, being a federal mandate, would likely preempt any local zoning ordinance, however a conversation could be started with the airport to look at salt alternatives and that NHDES may have more information available on the subject.
-A few committee members mentioned that a list of definitions related to drinking water quality and drinking water rules and regulations may be useful.

4. Next Steps

-Some committee members will meet separately in October to review ordinances from other communities to find a format suitable for Swanzey, and will present their recommendations to the full committee in November
-Mr. Madison will be conducting the land use analysis within the source protection areas and will be working on the plan as a priority project.

5. Next Meeting: November 1st, 2016. 4:00PM at the Swanzey Town Hall

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Swanzey Source Water Protection Committee

Tuesday, October 25th 2016. 12:00PM-2:30PM
Mt. Caesar Library
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Beverly Bernard- Conservation Commission
Stephen Stepenuck- Conservation Commission
Sylvester Karasinski- Board of Selectmen
Jim McConnell- Planning Board
Barbara Skuly- Ashuelot River Local Advisory Committee
Andrew Madison- Granite State Rural Water Association

1. Zone Boundaries
    -Some ordinance boundaries extend only to wellhead protection areas, while others include delineated aquifers, and some include both.
    -Aquifers were delineated by NHDES and were classified as GA2, meaning they are potentially high-yielding aquifers with no active management (see WD-DWGB-22-2).\
    -Some questions were raised about the aquifer boundaries, including why some areas such as the fairgrounds were included but Marcy Hill was not. Mr. Madison said he would discuss the boundaries with NHDES to get some clarification.
    -The group decided any potential ordinance should include both wellhead protection areas and the delineated GA2 aquifers. The group also decided that any ordinance should also protect potential future municipal sources such as Marcy Hill.

2. Grandfathered Uses
    -Existing land uses are typically allowed to continue after the adoption of an ordinance even though they may be non-conforming.
    -The group felt that existing land uses should be grandfathered even if the property ownership changes so long as the use is continuous.
    -Properties and uses should lose their grandfathered status if the use or non-conforming activity is discontinued for at least one year.
    -A clause should be included stating that: If a grandfathered non-conforming use presents a direct hazard to the aquifer, the Board of Selectmen shall issue an immediate cease and desist order to stop the offending activity or process.

3. Prohibited and Conditional Uses
    -Proposed prohibited and conditional uses are in attached table.
    -The list of prohibited and conditional uses should follow the tabular format from the Walpole example.

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4. Other Clauses within the Ordinance

-Best management practices should be required for any AST/UST facility anywhere in town.

-Stormwater management plans should be required for any property with impervious surfaces covering more than 15% of the property or 2,500 sq ft, whichever is less.

-Liability insurance (in case of a spill or release) should be required for any conditional use.

-Minimum lot sizes should not be required.

-Any ordinance should include a saving clause similar to the clause found in the Moultonborough example (attached).

-An appeals process for discontinued uses should be established that includes input from the Conservation Commission, Planning Board, and Zoning Board of Appeals.

-Pesticide use with regard to agriculture could be address, however there is limited agricultural activity within the town and near the aquifer zones.

5. Time Frame for Ordinance

-Ordinance is currently planned for the 2018 Town Meeting and will not be on the 2017 docket.

-Mr. Madison will work with the committee to have a proposed ordinance created by March 31, 2017. The committee will be responsible for moving forward with the ordinance after that date.

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Swanzey Source Water Protection Committee

Tuesday, November 15th 2016. 4:00PM-5:00PM
Swanzey Town Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Beverly Bernard- Conservation Commission
Stephen Stepenuck- Conservation Commission
Sylvester Karasinski- Board of Selectmen
Jim McConnell- Planning Board
Sally Brown- West Swanzey Water
Roberta Visser- Resident
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Andrew Madison- Granite State Rural Water Association

1. Minutes and New Participants
    -Minutes were reviewed from the last meeting and the October 25th Ordinance Review Meeting
    -Sally Brown, owner of the West Swanzey Water System, was updated on the purpose behind this project and the objectives of the committee.

2. October, 25th Workshop
    -The committee was provided with the minutes of the October 25th ordinance workshop and they were reviewed.
    -The boundaries of the district were discussed. The committee that met on Oct. 25th decided that they should extend to the delineated aquifer boundaries as well as source protection areas. Mr. Madison stressed that even though groundwater movement is fluid and aquifer boundaries are typically based on estimations, the district boundaries will need to be legally defensible and clearly defined for the ordinance to be effective.
    -Mr. Madison met with NH DES to discuss the work of the committee and to seek clarification on stratified drift aquifer boundaries. NHDES sent him a map detailing highly transmissive and moderately transmissive areas within Swanzey immediately before the meeting, Mr. Madison will forward this map to committee members.
    -Mr. Madison gave a brief explanation of transmissivity and of how groundwater moves through stratified drift aquifers in the region.
    -The committee reviewed land use regulations discussed during the October Meeting and derived from other, similar ordinances.
    -The disposal of sludge or the spreading of manure on agricultural lands located within the district was discussed. Some committee members mentioned concerns regarding

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bacteria that could be introduced into the aquifer from manure. Mr. Madison said he would look into what best management practices are recommended by NHDES and CCCD for agricultural lands located near water sources. Mr. Madison also said he would reach out to NHDES to look into regulations regarding the bulk storage of salt and deicing materials.

-Conditional uses were discussed and conditions were decided on for those uses. These include: Planning Board Approval, Spill Prevention, Containment, and Countermeasure requirements, and liability insurance specifically for the event of a spill. Conditions for the operation of a wastewater treatment plant will include the installation of test wells and their regular monitoring. Mr. Madison will add these items into the draft ordinance.

3. Next Steps

-The ordinance is currently planned to be on the 2018 town warrant, Mr. Madison will work with the committee to have a complete draft of the ordinance along with the source protection plan complete by March 31, 2017. After that date it will be up to the committee to build support for the ordinance and see that it makes it onto the docket.

-Mr. Madison has not had much time lately to complete a full land-use analysis, however he will be working on completing it for the next meeting.

4. Next Meeting

-TBD, Mr. Madison will send out a Doodle poll along with the aquifer map from NHDES.

-Mr. Madison will keep Sally Brown appraised of the next committee meeting.

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Swanzey Source Water Protection Committee

Tuesday, December 20th 2016. 4:00PM-5:00PM
Swanzey Town Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Beverly Bernard- Conservation Commission
Sylvester Karasinski- Board of Selectmen
Jim McConnell- Planning Board
Roberta Visser- Resident
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Andrew Madison- Granite State Rural Water Association

1. Minutes and New Participants
   -Minutes were reviewed from the last meeting.

2. Land use survey
   -No existing study of land uses in Swanzey could be found, Mr. Madison estimated town-wide land use from the 2015 National Cropland Data Set from the US Department of Agriculture. Mr. Madison stated that although the focus of the data set is agricultural types, it does differentiate between human development types, and forest types.
   -Mr. Madison also estimated soil types in Swanzey using the Natural Resource Conservation Service's Web Soil Survey. Mr. Madison briefly explained the geology and soil types in Swanzey.
   -Mr. Madison stated that Swanzey has a high proportion of privately owned forest land (74%) including the Yale Forest. Forest land helps protect groundwater quality, Mr. Madison stated that the loss of forest land to development is a major cause of groundwater recharge loss, and of contamination. He stated that policies that encourage private forest owners to keep land as forest will do much to protect groundwater resources.
   -Some committee members expressed concern that the Yale Forest might be sold to developers, however other committee members stated that there was nothing to indicate that would happen in the foreseeable future.
   -It was mentioned that only one percent of land in Swanzey is currently protected under conservation easements. Mr. Madison indicated that he felt the proportion is higher.
   -Mr. Madison stated that increased development pressure on Swanzey could result in the loss of forest land. Mr. McConnell stated that growth has been approximately 1% a year in Swanzey, so it may be many years before major development pressure is seen.

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-Ms. Visser expressed concern about major groundwater withdrawals in Keene and asked whether an ordinance could address that. Mr. Madison stated that Keene depends on a surface water reservoir for its municipal supply and only uses wells as a backup and that those wells were located in North Keene, and near the Monadnock Marketplace and should not present a concern to Swanzey. Mr. Karasinski stated that any potential major water user would have to prove that their operation would not impact downgradient users as a part of the state permitting process. He added that a municipal ordinance in Swanzey could not govern land uses in another town.
-Mr. Karasinski asked Mr. Madison if he could investigate potential sites where a Swanzey Town Well could hypothetically be developed. Mr. Madison said he would look into it.

3. Next Steps

-Mr. Madison stated that would begin looking at specific land uses and activities that have the potential to impact drinking water resources. He will also work on completing a first draft of the aquifer protection ordinance.

4. Next Meeting

-TBD, Mr. Madison will send out a Doodle poll for the next meeting. The next meeting will be during the daytime and will likely take more than two hours.

Land Cover in Swanzey, Data from USDA Agricultural Statistics Service

Land Cover Type	Acres	Percent of Coverage
Agriculture/Cultivated Crops	297	1.0%
Hay/Pasture	972	3.4%
Water	335	1.2%
Developed Open Space	1102	3.8%
Developed Low Intensity	890	3.1%
Developed Med. Intensity	310	1.1%
Developed High intensity	67	0.2%
Vacant	142	0.5%
Deciduous Forest	7420	25.6%
Coniferous Forest	14013	48.3%
Mixed Forest	2083	7.2%
Shrub land	92	0.3%
Wetlands	1263	4.4%
Total	**28985**	**100.0%**

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Swanzey Source Water Protection Committee

Monday, January 30th 2016. 2:00PM-4:45PM
Whitcomb Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Barbara Skuly- Ashuelot River Local Advisory Committee
Sylvester Karasinski- Board of Selectmen
Stephen Stepenuck- Conservation Commission
Roberta Visser- Resident
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Andrew Madison- Granite State Rural Water Association

1. Minutes and New Participants
   -Minutes were reviewed from the last meeting.

2. Land use survey
   - Mr. Madison has completed the potential sources of contamination inventory for West Swanzey and Eastfield Crossing and is currently working on an inventory for Pine Grove Co-Op.
   -West Swanzey Water: The group reviewed the source protection area and the sanitary protective radius for West Swanzey's Wells. Mr. Madison noted that during his review of land uses along Route 10, the most concerning was the number of junkyards and auto repair shops within the WHPA. Permits, including autos salvage yard, and hazardous waste generator permits, could not be found for many of these facilities. Mr. Madison stated that he felt these salvage yards represented the biggest concern for the water system. The underground storage tanks at the gas station were installed in the last year and are fully equipped with leak detection and spill containment measures, and are likely down gradient of the system wells.
   -Eastfield Crossing: The group reviewed the source protection area for the Eastfield Crossing system including aquifers supplying the system. Mr. Madison noted that the system is located in a rural area with minimal residential development, no industrial or commercial development, and pasture-based agriculture. A small business near Eastfield Crossing advertised auto care services, but likely does not perform those services on a large-scale basis. Mr. Madison stated that he felt that residential septic systems presented the greatest concern to the Eastfield Crossing system, however he felt given the low housing density in the area, they still presented a minimal risk. Mr. Madison also noted that well maintained, properly sized septic systems often do not present a risk to near-by drinking water wells.

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-Pine Grove Co-Op: Mr. Madison spoke with Jimmy Tempsta from the community to discuss their interest in participating. Mr. Madison is currently working on the Pine Grove Co-Op chapter of the plan.

3. Proposed Ordinance

-The group was sent the first draft of the ordinance the previous week and asked to review the document and bring their comments.
-A discussion on overlay district boundaries was had and Mr. Madison showed several maps displaying what the boundaries would look like with wellhead protection areas and aquifers of differing estimated transmissivity. Ms. Skuly noted that there was a significant difference in the area covered between the transmissivity zones. It was agreed that the boundaries of the district should include all wellhead protection areas and aquifers with an estimated transmissivity greater than 1,000 ft^2/day.
-There was a discussion on how the ordinance would affect the Keene Airport. Mr. Karasinski indicated that the rules would apply to private operations at the airport, but not to property owned by the airport itself.
-Concrete and asphalt manufacturing was discussed. Mr. Karasinski asked what the major water quality concerns were regarding concrete and asphalt manufacturing, which Mr. Madison indicated were the use of petroleum products and the manufacture of cement, which can cause issues with hard water and a rise in pH. Mr. Karasinski asked if a concrete or asphalt plant would remain a hazard if natural gas was used in lieu of oil, and if cement was not manufactured on-site. Mr. Madison indicated that that would address the most pressing concerns, but concerns regarding large groundwater withdrawal and excavation to the water table would remain an issue. Mr. Karasinski indicated that concrete and asphalt manufacturing could be a conditional use provided that petroleum was not kept on-site, there was no excavation to the water table, and cement was not produced on site. Other committee members indicated that this would be acceptable.
-The committee discussed the number of auto repair shops and salvage yards in West Swanzey and whether they could be considered a conditional use to accommodate businesses in West Swanzey. It was discussed that conditions should include best management practices for the storage of hazardous materials and restrictions on the storage of junked or derelict vehicles.
-Mr. Stepenuck expressed his concern regarding large groundwater withdrawals and the risk of a water bottling plant moving into Swanzey and cited the case in Nottingham as an example. This concern was echoed by Ms. Skuly and Ms. Visser, who added that a bottling plant could also move into Keene. Mr. Madison indicated that large groundwater withdrawals are regulated by the state through NH DES since groundwater is considered a “shared resource”. The committee expressed an interest in adding a clause into the ordinance that would prohibit large groundwater withdrawals and specifically drinking water bottling plants.
-Mr. Madison clarified that Item IX-A exempted private residences from all performance standards, so homeowners would not be impacted by Item III-K.

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4. Future of Committee

-Mr. Madison mentioned that his full-time involvement with the committee would end on March 31st, although he would try to make himself available occasionally. Mr. Madison added that it is the committee's responsibility to move forward with the proposed ordinance and to take ownership of the ordinance and the report. He urged the committee to begin thinking about its long-term future and to begin planning to meet regularly to discuss how it can continue to protect drinking water in Swanzey.
-Ms. Skuly mentioned that she would like to see more frequent meetings leading up to March 31st, Mr. Madison indicated that he would be willing to accommodate that and would follow up with the committee with some new meeting dates.

5. Next Meeting: TBD

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Swanzey Source Water Protection Committee

Thursday, February 23rd 2017. 2:00PM-4:45PM
Whitcomb Hall
Prepared By: Andrew Madison, GSRWA

Minutes

Present
Sylvester Karasinski- Board of Selectmen
Beverly Bernard- Conservation Commission
Glenn Page- Planning Board
Jane Johnson- Conservation Commission
Andrew Madison- Granite State Rural Water Association

1. Minutes and New Participants
    -Minutes were reviewed from the last meeting.

2. Draft Source Protection Report
    -Mr. Madison completed the draft source protection report and submitted it to the committee for review on 2/14/17. He has not received any comments back yet.
    -Mr. Karasinski indicated he had some minor street name corrections for the report.
    -The committee discussed the Route 10 Mini-Mart MtBE issue as it is discussed in the report. Mr. Madison indicated that he considers the site to remain a risk to near-by wells, especially since it has had eight violations since the new tanks were installed in 1998. Ms. Bernard asked what the nature of the violations were, Mr. Madison said he would look into it but from what he recalled they involved vapor testing and piping tightness. Mr. Madison added that he would include a table of the violations in the report. There was a discussion on the oversight of underground storage tanks in New Hampshire. Mr. Madison stated that NH DES oversees the enforcement of UST rules and inspections, but has a limited staff to accomplish this. Town Code Enforcement Officers could assist by enforcing local ordinances regarding underground petroleum storage. Mr. Madison stated that Gomarlos had installed tanks in 2016 that were double walled and equipped with leak detection.
    -The NHDES Source assessment reports prepared by NHDES were included in the Source Water Protection Plan. Mr. Madison stated that NHDES performed its assessments during the late 1990's and early 2000's and that these assessments may differ from his.

3. Proposed Ordinance
    -The committee reviewed edits made to the proposed ordinance. Mr. Madison indicated that he would make corrections to the asphalt/concrete section of the ordinance.
    -Mr. Karasinski asked how the ordinance would impact businesses in North Swanzey between Routes 32 and 12. Mr. Madison indicated that area is congested and does

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possess a large number of businesses that could be impacted by the ordinance. Mr. Karasinski asked if Mr. Madison could look into the prospect of changing overlay district boundaries to include only the portions of the business and industrial zones with estimated transmissivities greater than 2,000ft^2/day. Mr. Madison said he would look into it to see if any other communities have adopted similar ordinances and would obtain the shapefiles needed to amend the maps.
-Mr. Madison stressed that it would be the committee's responsibility to move forward with the ordinance after March 31st. He also advised the committee to consult with the Town Attorney regarding the ordinance.

4. Next Meeting: TBD

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Appendix F

Ashuelot River Corridor
Management Plan

Ashuelot River Corridor Management Plan 2006
The Branch River, Keene – Swanzey - Mill Street Bridge, Winchester

Summary of Issues This chapter addresses three river segments: a 6.1-mile Rural segment between the confluence of the Branch River in Keene to the confluence of an unnamed brook at the north edge of West Swanzey village, a 1-mile Community segment through the West Swanzey Village, and a 9.3-mile Rural segment from the Denman Thompson Bridge in West Swanzey to the Mill Street Bridge in Winchester.

Both rural segments are mostly undeveloped floodplain as the river adopts the extreme meandering path of a mature river on the valley floor. The geomorphology and ecology of the riparian lands here are dominated by the millennial history of meandering and flooding. Access to much of this segment is impaired by its wetlands, thick shrub growth, many small tributaries, and oxbow ponds. These same characteristics make this segment a de facto wild area for plants and animals. Mount Cresson is a notable upland feature. Land use is largely residential with several large tracts of hay field and pasture, but again, most of the segment is undeveloped. The Kelly family dairy farm is adjacent to the river near the southerly end of the Winchester segment, and there are several other locations where hay, pasture, or tillage approaches the river banks in Swanzey and Winchester.

Flat water canoeing and kayaking are popular here spring through fall. The Ashuelot Rail Trail runs near the river, crossing it twice - the “Ashuelot Line” is under development as a multi-use trail. The segment has plentiful undisturbed natural scenery visible from local and state roads. Four covered bridges cross the Ashuelot in this from Keene to Winchester: the Cresson, Thompson and Slate bridges in Swanzey and the Coombs Covered Bridge in Winchester just south of the Swanzey town line. The Slate Bridge in the Swanzey village of Westport was destroyed by fire in 1993 and was rebuilt in 2001 with public fundraising. The river courses a short rapid through the ruins of a mill dam adjacent to Westport. NH route 10 runs parallel and quite near the river for several miles of the southerly rural segment and local roads closely parallel the river bank throughout all three segments. The River also receives discharge from two municipal wastewater treatment facilities in Swanzey: the City of Keene discharges effluent into the Ashuelot upstream of the Cresson Bridge and West Swanzey’s treatment plant discharges south of the Denman Thompson Bridge.

West Swanzey is a village with agricultural and industrial beginnings. Today there are a number of businesses and about 400 homes in the village. Most of the households there are served by municipal sewer. The Homestead Woolen Mills dam and the Thompson Covered Bridge are significant cultural features associated with the River in West Swanzey. NH DES has mandated that the privately owned Homestead Woolen Mills dam be either improved or breached. A

comprehensive feasibility study was completed by NH DES in 2005 to identify alternatives regarding: attaining dam safety, whether through dam removal or dam repair; ensuring the stability of the Thompson Covered Bridge (1832) and the historic integrity of West Swanzey Village and the Homestead Woolen Mills; and restoring fish movement past the dam, whether through dam removal or installation of a fish passage system. March 2006 Town Meeting voted to not purchase the dam. Planning began in 2006 to remove the dam while ensuring the structural integrity of the Thompson Bridge.

The Town of Winchester zoning regulations restrict construction of structures within the 100-year floodplain. The segment of the River located in Winchester is also within the Town's Aquifer Protection District. This overlay district regulates lot sizes and impervious surface area in an effort to minimize storm water runoff and maximize recharge of the aquifer. The Ashuelot Rail Trail in Winchester, maintained by the Winchester Trail Riders, provides safe and convenient four-season public access within the Corridor.

The following specific issues further characterize this rural segment.

-water quality suffers cumulative effects of sediment and upstream non-point source pollution;

- high bacteria concentrations with increased storm water and high water conditions, and low oxygen concentration under summer low flow conditions;

- phosphorus loading from the Keene waste water treatment plant which adds to the large amounts of nutrients in the river sediment;

-extensive stratified drift aquifers;

-riparian natural areas (undeveloped private land and conservation land including Yale Forest, Dickinson Forest, Mount Cresson, and the Muster property);

-The 2003 Swanzey Master Plan includes the December 2001 Ashuelot River Corridor Management Plan as an appendix. Thoughtful implementation of the land use and other development and conservation goals of the Swanzey Master Plan can support the goals of the Corridor Plan. Swanzey also adopted an Open Space [conservation] Plan in 2004.

-Mitigate or prevent the spread of invasive plant species along the river corridor, particularly Japanese knotweed and purple loosestrife.

-Potential negative effects of brush cutting along Beaver Brook and Ash Swamp Brook.

-development encroaching on scarce agricultural soils and farm landscape;

- potential for undetected effluent of untreated residential sewerage;

- various historic features, including the Cresson, Thompson, and Coombs covered bridges, and the Homestead Woolen Mill site;

- state threatened species: Blue-gray Gnatcatcher (warbler), Sprout muhlenbergia and Long-fruited anemone, and state endangered Wild Sensitive Senna (Cassia nictitans), and dwarf wedge mussel (Alasmidonta heterodon).

- paleo-Indian archeological sites and a stone fish weir in the River between Ash Swamp Brook and West Swanzey.

- The confluence of the Branch River nearly doubles the water volume in the Ashuelot River, and the South Branch Ashuelot River is also a significant tributary in terms of water volume. Mirey Brook and it tributary Roaring Brook provide high quality anadromous fish habitat due to hydrography and relatively unfragmented watershed.

There is another condition arising in the northerly rural segment. The River channel is filling with sediment. The low gradient in this segment (i.e. the River is flowing through relatively flat land so the water flows languidly and does not have the power to move material), the high sediment load from upstream storm water runoff, and attenuation of annual runoff peaks by Surry Dam flood control management (i.e. the River does not flood as high in the spring or during other big runoff events, rather, the runoff from upstream is stored in the reservoir and released slowly and not allowed to spill onto the floodplain) is filling the River channel with sediment. Without the flood control structures at Surry Mountain and Otter Brook that protect thousands of homes and businesses and structures and infrastructures valued in the hundreds-of-millions of dollars from flooding, the River would have periods of flooding, especially spring snow melt, when the river water would scour out sediment deposited in the River bed since the last flood and move it downstream or deposit it on the floodplain areas. That has not been happening since those two flood control dams were installed. Sediment washed into the River upstream settles to the bottom in this slow moving water and is not removed. Effects of this situation are several: disruption of river ecosystem: the river water, river bed, and floodplain; reduction in volume of the river channel; and accumulation of pollutants in River bed sediments.

Growing amounts of impervious surfaces upstream and within this segment result in “spikey” runoff episodes: rain water and snowmelt flow directly from roof tops, pavement and storm drains into the River without attenuation by localized flooding of low-lying areas or infiltration to groundwater. This results in higher erosive forces in the River following runoff events, increasing the potential for stream bank erosion in the sandy soils of this segment.

Management Goals

• Reduce nutrient load and chemical pollutants from upstream riparian sources within this segment, and from the Keene and Swanzey waste water treatment plants.

• Reduce sediment load.

• Continue the Volunteer Water Quality Monitoring program from May to September and consider monitoring the presence of metals (Appendix 6).

• Preserve historic and archeological features.

• Collect baseline water quality data before any instream structures are removed from the river.

• Monitor impacts of dam removal regarding flow, including the introduction of invasive species.

• Create formal public access to the River and ensure responsible access to the River and adjacent natural areas.

• Indicate the importance to the City of Keene of annual water testing for metals including lead and copper in river water

Site/Issue Specific Analysis and Recommendations

- Ensure appropriate storm water management and minimal impervious surfaces associated with existing and future commercial and industrial development on riparian lands

- Continued support of private and municipal land conservation, including cooperation with the efforts of Monadnock Conservancy, Society for the Protection of NH Forests, and The Nature Conservancy (Appendix 7).

- Encourage land conservation in the Yale Forest.

- Encourage community support for public education regarding stewardship of private and public riparian lands and the River proper, including cooperation with the Monadnock Regional School District, Winchester School District, Keene High School and Keene State College

- Monitoring and management of public use of Ashuelot Line Trail to prevent destruction of resources by overuse or misuse by the public

- Inclusion of Monadnock and Winchester School Districts in corridor planning and stewardship activities

- Encourage community support for development and maintenance of the Ashuelot Rail Trail

- Determine and eliminate causative factors for the observed high E. coli counts, nutrient load, and sediment load

-Discourage development on floodplain lands

- Protect intact riparian “natural areas”, e.g. oxbow/wetland/floodplain forest systems

- Support efforts by towns to implement regulations to protect water quality such as steep slope ordinances, setback requirements and storm water plans.