Natural Features

03 | Ecology, Resources, Conservation

The purpose of the Natural Features Chapter is to identify Epsom's Natural Features and resources found throughout the town, and to address important natural resource related issues.

This chapter also discusses open space, rural character, wildlife, wetlands, agriculture and forestry, trails, dams, steep slopes, bedrock geology, and floodplains.

Including:

- A Review of Epsom's Water Resources
- Summary of Epsom's Land Resources
- Trends Related to Conservation and Wildlife

Epsom's Natural Features

A Key Part of Epsom's Rural Character

Epsom has a long history of being appreciated for its natural features since the land has had human inhabitants. Today, Epsom is still appreciated for many of those same features. Epsom has a large **Town Forest**, a swimming hole on the **Suncook River**, and various public hiking trails, snowmobile trails, and other recreational uses that take advantage of Epsom's Natural Features. Many residents in Epsom also make use of their own land and the natural features that come with it.

Existing and potential supporting regulatory and voluntary conservation tools were examined. The data to develop this chapter was derived from numerous sources cited in the text or tables, and include the 2001 Master Plan, Town regulations, ordinances and studies, the Hazard Mitigation Plan 2018, Town Reports, and data from state and federal departments.

Photo:
Endangered Blanding's Turtle Found in Epsom

Vision Statement

To preserve Epsom's natural resources; maintain and support recreational trail usage; continue to preserve Epsom's rural character by supporting agriculture, open space and recreation, conservation lands, agriculture and forestry, and wildlife; and ensure greater protections from future flooding and erosion.

In order to maintain Epsom's rural nature, continued steps should be taken to preserve some of these most important characteristics.

Key Actions:

- Continue to maintain Epsom's rural character for current and future generations.
- Protect conservation lands and look for opportunities to enhance recreational trails in Town, including the development of trail connections for foot travel from the Epsom Town Forest to the former Suncook Valley Railroad railbed.
- Protect the community from future significant Suncook River flooding and erosion.
- Protect the community from environmental contaminants and invasive species to ensure safe and healthy living conditions for residents, flora, and fauna.
- Consider the development of aquifer protection measures in coordination with proposed changes.
- Consider revisions to the Cluster Residential Development ordinance to promote its use.

The Town's Thoughts

Throughout the survey, strong appreciation of Epsom's natural resources and recreational opportunities was given, specifically for the rural character and high quality of life they provide. Similar to previous master plans, protection and conservation of natural resources has consistently been supported, including the area surrounding the **Suncook River** and existing agricultural lands. Many stated that they were supportive of preserving as much land as possible throughout Epsom, demonstrating continued appreciation for the town's rural character.

"Riparian zone and aquifers associated with the Suncook River should be the primary focus of conservation"

"Farmland should be protected"

"Protect our water resources!"

"Epsom has rural quality and a community that loves farm and wild animals. "

"Epsom has a nice Town Forest."

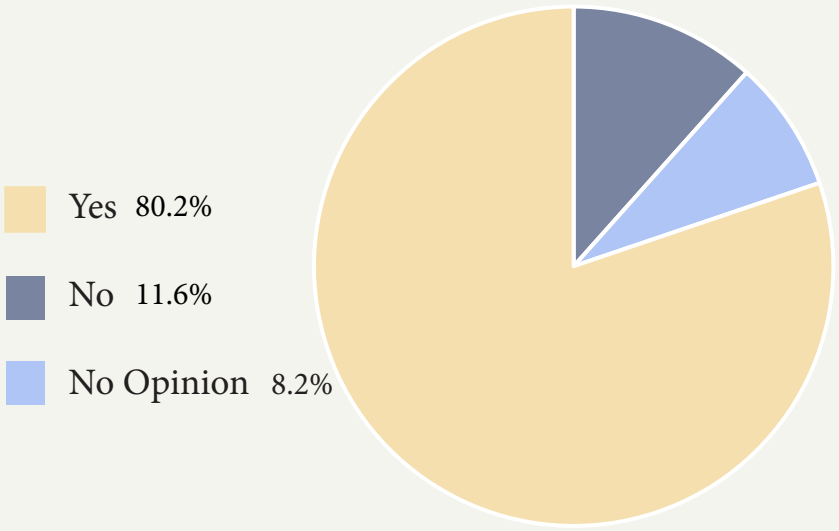
"There are some amazing trails in Epsom."

"Work on the connectivity of conserved lands"

"I want Epsom to be seen as a place that has ample open space, natural beauty, history, and peaceful private living. "

Do you support the protection of Epsom's aquifers through the development of Aquifer Protection Measures?

An aquifer is defined as a geologic formation, group of formations, or part of a formation capable of yielding, storing, or transmitting a usable amount of groundwater to wells or springs for domestic or animal use.



OTHER NOTES FROM THE 2020 COMMUNITY SURVEY

Recreational trails and opportunities were commonly highlighted and praised throughout the survey. Over 84% of respondents were in support of potential trail projects and opportunities in Epsom. Additionally, it was demonstrated that Epsom's water resources are highly valued, with the majority of respondents supportive of protection for Epsom's aquifers through the development of Aquifer Protection Measures.

Epsom's Resources

A Local Overview

Epsom occupies about 22,067 acres (or 34.5 square miles) in the Central New Hampshire region, with approximately 2,128 acres of this total held in conservation. Within the Town's borders is a rich diversity of natural resources and numerous, distinct natural features. Two rivers flow through Epsom, the Suncook River and **Little Suncook River**, along with numerous brooks, and many local ponds dot the landscape.

The terrain contains both flat, floodplain and water feature areas as well as locations dominated by steep slopes and hilly areas, resulting in several scenic viewsheds. **Fort Mountain** at 1,413 feet in elevation above sea level is Epsom's highest peak. The mountain and surrounding lands are held in conservation as the **Epsom Town Forest** and hosts multi-use recreational trails reaching to its summit. This area is mostly unpopulated, has no maintained roads, and sits in a bowl shaped valley surrounded by four mountains (Nottingham, Nat's, Fort and McCoy mountains). Furthermore, the slopes of the mountains feed the headwaters of **Blake's Brook**. As a result, this area is rich with wildlife and natural habitat, a valuable natural resource asset in Epsom.

Agriculture and forestry are essential to the Town's rural character, with prime soils situated throughout the Town. Conservation lands protect certain areas of Epsom, but with the analyses provided in this chapter, other areas may be of interest.

Photo: Mill Pond, Epsom Town Forest

Community Visioning Comments

Residents who attended the Master Plan Community Visioning Sessions at the beginning of the Master Plan update process noted several opinions related to Epsom's natural features and opportunities for improvement.

- People enjoy walking on trails in Town and felt more multi-use trail opportunities could be made available.
- Preserving rural character of the Town by managing future growth is essential. Cluster development was noted as one way to accomplish this.
- Recreational uses such as kayaking, canoeing and Town Beach activities are limited since the Suncook River avulsion.
- **Cass Pond** was identified as a potential recreational site for a Town beach or swimming lessons, although access is currently unavailable.
- Concern about current high arsenic levels in some of the Town's drinking water has led to the desire to know where the highest levels are concentrated. Residents are also concerned that the large aquifer under the Suncook River could be in danger of contamination.

Water Resources

Surface waters, such as lakes, ponds, rivers, and streams, are an important resource for the Town of Epsom, as they provide wildlife habitat, aesthetic beauty, and contribute to Epsom's high quality of life. Many of these water bodies are also recreational sites used for boating, fishing and beach access. Maintaining the health of these water resources is critical for all users, wildlife and aquatic life, so that these resources can be enjoyed in the future as they are today. All surface waters in Epsom are located in the Suncook River Watershed, a subwatershed of the Merrimack River. The ***Surface Water Resources*** and ***Groundwater Resources*** maps display the location of Epsom's water resources.

LAKES AND PONDS

Epsom has a total of six lakes and ponds that provide scenic beauty, recreational resources, and are home to a vast array of wildlife habitat. For a large portion of the last fifty years, the purity of some of these water bodies has been greatly impacted by residential development, which occurred before current zoning practices were adopted.

Epsom is fortunate to have four Great Ponds. Great Ponds are defined by state statute (RSA 271:20) as all-natural bodies of fresh water situated entirely in the state having an area of ten (10) acres or more. These are state-owned public waters and held in trust by the state for public use. Some of Epsom's Great Ponds have public access and some are surrounded by private lands. Displayed on the **Surface *Water Resources Map*** are the following large lakes and ponds in addition to all surface waters.

Round Pond: This is a small pond located behind the Epsom Central School near Bear Island and is in close proximity to the Suncook River. A popular fishing location, mercury was also found here in fish during NHDES sampling between 1992-2016.

Town Forest Mill Pond: This pond is part of a wetland area consisting of 50 acres of marshland and 10 acres of open water situated within the Epsom Town Forest, filled with hiking trails, vistas, a cemetery, and old cellar holes.

Northwood Lake: This 653-acre mesotrophic* lake, a Great Pond, is a popular recreational resource in the community. Located in Epsom, Deerfield and Northwood, the lake has a maximum depth of 20 feet and serves as the primary tributary of the Little Suncook River and other brooks. The lake is home to many seasonal and year-round homes located on small lots around the shoreline. A large variety of warm water fish and plant species can be found at Northwood Lake. A public access boat ramp is available near the junction of US 4 and NH 107.

Chestnut Pond: This 28-acre ogliotrophic* pond, a Great Pond, is located in the northeast corner of Epsom. The pond serves as a tributary to Little Bear Brook and has a maximum depth of 20 feet. The shoreline of the pond is comprised of residential development on small lots, generally one-half acres or less in size. With approximately 70% of the bottom of the lake comprised by gravel, the natural habitat includes a variety of warm water fish and plant species. Situated between Lakeview Road and Chestnut Pond Road, a public boat ramp is available at their junction. Pond usage follows State public water restrictions (SAF-C 402.12), including boat speeds not exceeding 10 mph for all hours other than 12pm to 5pm daily and water skiing in a clockwise direction. While a popular fishing spot, the NH Department of Environmental Services (NHDES) reported mercury was found during sampling in fish in Chestnut Pond between 1992-2016.

Odiorne Pond: This 18-acre mesotrophic* Great Pond is located west of Chestnut Pond and is surrounded by swamplands. The pond is relatively undisturbed by development and is a tributary for Locke's Brook, with an average depth of nine feet. The bottom of the pond is comprised primarily of muck and is home to an array of aquatic plant and animal species. Much of the western side is under conservation to Locke's Hill Road. Public access is available off of Range Road.

Cass Bixby Pond: This 15-acre pond, another Great Pond, was formed by damming of the Little Suncook River. Located near US 4 East, Cass Bixby Pond is considered a very scenic area. A shoreline public access location was available along Cass Road near US 4. Conservation easements surround most of the pond.

***Ogliotrophic** - Low primary productivity, nutrients, and vegetation. High oxygen. Fish and clear water.

***Mesotrophic** - Moderate primary productivity and nutrients, mostly clear waters, submerged plants.

RIVERS AND BROOKS

Epsom is fortunate to host two rivers and many brooks and streams that wind through the community, around homes, and under roads. These waters have helped to define Epsom, and have brought the community together, especially during and after the May 2006 avulsion of the Suncook River. Depicted on the ***Surface Water Resources Map***, the two rivers and the named brooks in Epsom are described in Table 6.1.

Suncook River: Originating in Barnstead at Crystal Lake and flowing into the Merrimack River in Suncook Village, the Suncook River is the larger of the two rivers that flow through Epsom, covering 9.5 miles in Town, and 37 miles overall. Cited as Epsom's prime natural resource today and historically, land use along the river includes commercial, industrial, residential, and institutional uses. The river is dammed near Short Falls Road, and contains aquatic life including Eastern Brook Trout, Rainbow Trout, and Brown Trout. A large number of mammal species are found within the corridor, including Black Bear, New England Cottontail, Bobcats, and the more common species of Beaver, Coyote, Moose, and more.

In 2012, a multi-town effort to place the Suncook River into the NH Rivers Management and Protection Program (NH RMPP) was not successful due to landowner concerns.

When the Suncook River flooded and changed course during the May 2006 storm event, the river broke through its banks and carved a new channel through a wetland and an active gravel pit east of Bear Island between the Huckins Dam and the US 4/202 bridge. Notably, the new channel was beyond the documented 100- and 500-year floodplains. Prior to the avulsion, the river followed two dammed channels around what is known as Bear Island. A total of 1.97 miles of former river channel was abandoned on either side of the island.

Beginning in Epsom, the Suncook River has become shallower and more spread out because of siltation from the gravel pit, which is now located on both sides of the River. Stream bank erosion will likely continue behind the Epsom Central School, near Short Falls Bridge, along the floodplains of the River, and at the avulsion area.

Suncook River Avulsion

An avulsion is rapid and dramatic change in a river channel's alignment occurring during a flooding event. The May 15-16, 2006 Suncook River avulsion in Epsom was the highest profile geologic event occurring in the State, comparable with the collapse of the Old Man of the Mountain in 2003. Rivers commonly change course in the form of meander cutoffs and small-scale avulsions within floodplains of braided systems, but the Suncook River avulsion was unusual because the new channel cut through an area outside the documented 100- and 500-year floodplains. The Suncook River now flows through a gravel excavation site to the northeast of the former Bear Island before rejoining a portion of a preexisting secondary channel that formed the eastern boundary of the island. Nearly two miles of former channel were abandoned, including 1.5 miles of the primary channel that formed the western boundary of Bear Island. The abandoned portions of the Suncook do not maintain significant year-round flow and often are completely dry. See also the VHB Report on the Suncook River Avulsion, 2008.

A woody materials assessment of the Suncook River by the New Hampshire Geological Survey recorded the location of woody debris in the River such as trees, logs and branches, which are recommended to remain in place to slow future high-water flows. In 2017, the Suncook River channel was stabilized south of the US4/202 bridge, with riprap and boulders placed downstream of the bridge to reduce the chance of erosion and channel movement and to ensure the bridge pilings were secured for safe vehicle traffic.

Yet the riverbank continues to erode in many locations. This erosion is reducing available farmland, school athletic fields, and directly threatens Round Pond. One of the most significant downstream impacts of the 2006 Suncook River avulsion has been the deposition of sediment, which has raised the elevation of the river and impacted private property.

In the Hazard Mitigation Plan 2018, the need for enabling further protection of the Suncook River and its floodplains was illustrated by past historical events of flooding and erosion. As a frequently flooded river, the Suncook continues to gently change course with storm events as the river scours into the banking and carries the sand and gravel sediment from the 2006 avulsion area, formerly Bear Island and an excavation site. Ideas for mitigating the flooding impacts include monitoring the large woody material damming the Suncook River, upgrading the Webster Park culvert and several other Town culverts, stabilizing the riverbank downstream of the US4 bridge, upgrading the rail trail between US4 and Short Falls Road, and many more localized projects to reduce flooding, erosion, and washouts.

Because of the multiple existing and new land uses near the Suncook River, the need grows for open land to increase floodwater capacity. The Town can help reduce flooding impacts in these areas by protecting vacant floodplain parcels from future development when the opportunity arises, such as retaining tax deeded lots for flood capacity. For more information, please see the Epsom Hazard Mitigation Plan 2023. Historical information on the avulsion is provided in the 2012 and 2018 Hazard Mitigation Plan and other documentation. The NH Department of Environmental Services developed Guidelines for Naturalized River Channel Design and Bank Stabilization to help communities adapt to the changes flooding can bring to riverbanks.

Table 6.1: Named Rivers and Brooks

Name	Length	Location
Blake Brook	1.7 mi.	Flows from Town Forest, crosses Mountain Road and Center Hill Road to the Little Suncook River
Burnham Brook	n/a	Crosses Short Falls Road and NH 28 (Suncook Valley Highway) to the Suncook River
Deer Brook	3.3 mi.	From Swamp Road, Deer Brook crosses New Rye Road and River Road to the Suncook River
Flat Meadow Brook	n/a	Crosses Old Turnpike Road several times and US 4/202 to the Little Suncook River
Fowler Brook	2.7 mi.	Crosses Jug City Road, Fowler Road, NH 28 and Buck Street Extension to the Suncook River
Griffin Brook	n/a	Flows through the eastern edge of the Town Forest, across Griffin Road, Echo Valley Farm Road, and NH 107 to Northwood Lake
Gulf Brook	1.2 mi.	Begins west of North Road, crosses Old Turnpike Road and into a brook heading to Cass Bixby Pond
Little Bear Brook	2.4 mi.	Begins at Chestnut Pond, follows North Road to the east, crosses Old Turnpike Road and North Road before joining Bixby Pond
Little Suncook River	4.0 mi.	Flows from Northwood Lake, south of and parallel to US 4/ 202, to the Suncook River
Lockes Brook	2.0 mi.	Begins at Odiorne Pond, flows south to cross Lockes Hill and New Orchard Roads, crosses US 4/202, flows into the Little Suncook River
Marden Brook	n/a	Flows north of Copperline Drive, crosses NH 28 above Short Falls Road, to the Suncook River
Mason Brook	3.4 mi.	Flows from US 4/202 south to NH 28 to the old Suncook River channel west of Bear Island
Suncook River	9.5 mi.	Flows into Epsom from Chichester, follows NH 28 to the east, crosses US 4/ 202, continues NH 28 to the east, south into Allenstown and Bear Brook State Park

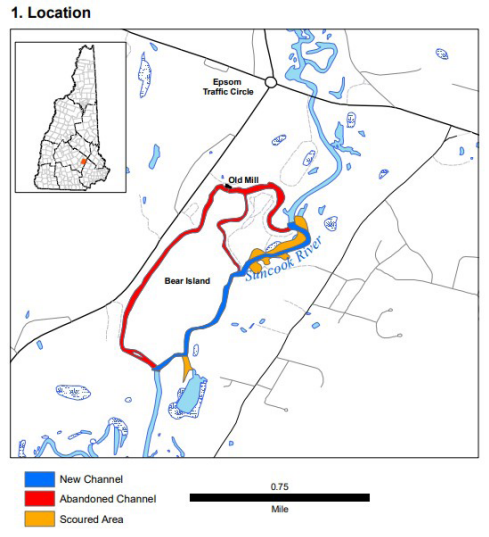
Source: Epsom Master Plan 2001, Epsom Hazard Mitigation Plan Update 2024

Little Suncook River: The Little Suncook River runs 4.0 miles in length from a dam located on Northwood Lake. The river flows parallel to Route 4 on the southern side of the roadway and is currently used for passive recreation. Historically, the river provided power for a variety of textile mills in Gossville Village during the nineteenth century.

Blake Brook: The head water of Blake Brook is in the Epsom Town Forest and is surrounded by conservation lands from the Town Forest to the crossing on Mountain Road.

Leighton Brook: One of the tributaries to the Suncook River, Leighton Brook was shortened 1,600' during the 2006 avulsion event and required stability from advancing headcut erosion. Flowing within feet of many homes, the brook needed to be stabilized to provide strength against upstream erosion and future flooding. This NHDES stabilization project occurred in 2016.

Suncook River Avulsion Area and New Channelization, 2006



Source: Epsom Hazard Mitigation Plan Update 2012

AQUIFERS

Epsom has two stratified drift aquifers in the community. The largest aquifer is located under the NH 28 and Suncook River corridor. This aquifer is a coarse-grained stratified drift aquifer overlying fine-grained stratified drift and is 2,884 acres in size. The general soil composition of this area is medium to coarse sand overlying significant thickness of clay, silt, and fine sand. Areas with the greatest amount of transmissivity are located near Round Pond, Gossville, and NH 28 north of Granny Howe Road. These areas have transmissivity of 2,000-4,000 and greater of square feet of water per day. The second, smaller aquifer area is 45 acres in size and is located along the southerly section of Northwood Lake. This area has a transmissivity of 1,000-2,000 square feet of water per day. Aquifer transmissivity is displayed on the ***Groundwater Resources Map.***

Underground storage tank releases of gasoline are the single greatest source of Methyl tertiary Butyl Ether (MtBE) contamination to aquifers and soil in the state, but contamination from auto salvage operations was also identified. MtBE is a volatile organic compound commonly used as a gasoline additive. The New Hampshire Department of Environmental Services (NHDES) MtBE Remediation Bureau was established as a result of 2014 lawsuit settlements, and several grant programs were made available to New Hampshire municipalities with the goal of cleaning up groundwater contamination. This funding was utilized to support the recent extension of the Epsom Village Water District water distribution line to the US4/NH Traffic Circle.

What is an Aquifer?

An aquifer is defined as an underground body of porous materials, such as sand, gravel, or fractured rock, filled with water and capable of supplying useful quantities of water to a well or spring. The two main types of aquifers, bedrock and stratified drift aquifers vary in composition and the amount of water accessible. Stratified drift aquifers are typically used for public water supplies in New Hampshire, including industrial, commercial, and domestic uses. Transmissivity is how much water flows through the aquifer per day. Aquifers serve three essential functions, filtration, transmission, and reservoir capacity.

In addition to MtBE concerns, the possible encouragement of additional commercial and residential uses in the areas to the north and south of US4, west of NH 28 (as described in the Land Use chapter) could lead to possible impacts on the aquifer in that area. To aid in protecting the aquifer while at the same time allowing for an appropriate level of future development, the following aquifer protection provisions for the stratified drift aquifer areas could be considered:

- Require performance standards within the aquifer areas for commercial activities such as vehicle service and repair shops, junkyards, or other activities that produce liquid waste.
- Identify minimum Water Systems Protection Areas (WSPAs) for domestic wells and public water supplies, and require performance standards within the WSPAs, such as regulating proposed land use activities, drainage to be sloped away, minimum fifty (50) feet distance from roads, driveways or parking, and approved wastewater piping. In addition, incorporate maintenance, testing, and inspection standards.

Essentially, the measures would seek to incorporate best management practices related to future "higher-risk" commercial activities that produce liquid waste.

In addition to potential uses and possible protection measures described above, a long-term study to identify and potentially protect the location of a new public groundwater source in the vicinity of Epsom's aquifer areas has entered its second phase in 2024.

WETLANDS

Wetlands are areas where water is present at or near the soil surface for at least part of the growing season. This influences the plants that grow there, as well as soil characteristics. Wetlands are found throughout the entire community, including along the Suncook River and the numerous named and unnamed brooks in Town, alongside roads and in the woods. Most wetlands are connected systems, influenced by topography. New wetlands may be created by beaver dams and other intervention.

There are three types of wetlands in Epsom. **Palustrine** wetlands are nontidal wetlands areas characterized by the presence of trees, shrubs or emergent vegetation. They are forested wet areas less than two meters (6.6 feet) in water depth and salinity less than 0.5%. They are most commonly referred to as marsh, swamp, or bog. **Lacustrine** wetlands are characterized by large, open water dominated systems such as ponds and lakes over two meters deep and can experience considerable wave action. **Riverine** wetlands are the wet areas located along brooks and rivers and include wooded areas, with water depth of over two meters. They usually have flowing water, contained within a channel. In Town, wetlands encompass nearly 8% (1,687 acres) of Epsom's total acreage. Wetlands are displayed on the ***Surface Water Resources Map*** and are distinguished by type in Table 6.2.

Table 6.2: Wetland Acreages by Type

Wetland Type	Acres	Percentage
Riverine	237	14%
Palustrine	940	56%
Lacustrine	510	30%
Total Acreage	1,687	100%

Source: National Wetlands Inventory

FLOODPLAINS

Floodplains in Epsom are presently located along the Suncook River, Little Suncook River, Burnham Brook, Deer Brook, Marden Brook, Fowler Brook, Blake Brook, Griffin Brook, Northwood Lake, and Cass Bixby Pond. Their locations can be found on the FEMA Digital Flood Insurance Rate Maps (DFIRMs) at the Town Office and on both the ***Surface Water Resources*** and ***Groundwater Resources*** maps. To build in the floodplain, there are additional regulations that apply as stated in the Floodplain Development Ordinance. It is also important to note that the floodplain area is changing due to the erosion of banks along the Suncook River from severe weather events and flooding. With a shallower river channel, the floodplains will be expected to hold greater amounts of water during future flood events. The Epsom Hazard Mitigation Plan 2018 makes several recommendations and would support the purchase of appropriate parcels along the Suncook River for additional flood capacity.

Regarding the Suncook River floodway and floodplain, numerous large, natural woody debris pieces were deposited into the banks and river bottom during previous storms and were inventoried by the New Hampshire Geological Survey. A series of maps were developed which accompany the Epsom Hazard Mitigation Plan 2018 that indicate the location of these tree-like debris pieces. Another map series that accompanies the Hazard Mitigation Plan are the fluvial erosion hazard zone area maps that display where the Suncook River is projected to shift over time. Long term, these areas should be protected from development to ensure people's safety. The New Hampshire Geological Survey has produced supporting materials that explain these maps and processes.

DAMS

According to the New Hampshire Department of Environmental Services (NH DES), there are **eight active dams** located within Epsom. Of these, six are classified as Non-Menace, which means failure would likely not result in loss of life or property. The ten foot high Cass Pond Dam on the Little Suncook River impounds fifteen acres of water and is a Low Hazard dam, meaning if breached, structural damage to road infrastructure would occur, but otherwise is of low consequence. A High Hazard dam is located on Northwood Lake at the head of the Little Suncook River in Epsom. This thirteen foot high dam impounds **688** acres of Northwood Lake, and if it were to breach, the water would flood the Little Suncook River, nearby US 4/202, and the Suncook River into which the Little Suncook flows. A High Hazard classification means loss of property, infrastructure and human life is probable. The descriptions and locations of each Epsom dam are displayed in Table 6.3.

NHDES conducts a drawdown of Northwood Lake every fall to help prevent water levels from rising too high in the spring in an attempt to avoid flooding conditions of the crowded lakeside community and the Little Suncook River.

Table 6.3: Dams and Impoundment Acreage

Facility Name, Number and Owner	Height in Feet & Acres Impounded	NHDES Hazard Classification	Location
D79.1 Northwood Lake Dam (NHDES)	Active - 13 Feet (688 acres)	High (H) Hazard	Little Suncook River
D79.5 Cass Bixby Pond Dam (NHDES)	Active - 10 Feet (15 acres)	Low (L) Hazard	Little Suncook River
D79.10 Huckins Mills Dam 2 (WGR LLC)	Active - 13 Feet (5 acres)	Non-Menace (NM) Hazard	Suncook River
D79.14 Farm Pond Dam (Elkins)	Active - 6 Feet (0.1 acres)	Non-Menace (NM) Hazard	Tributary of Burnham Brook
D79.15 Branch Marden Brook (Town)	Active - 6 Feet (0.25 acres)	Non-Menace (NM) Hazard	Tributary of Burnham Brook
D79.16 Sherburn Stream Dam (Abbott)	Active - 6 Feet (2 acres)	Non-Menace (NM) Hazard	Tributary of Lockes Brook
D79.21 Mason Brook Dam (Circle 9 Ranch)	Active - 7 Feet (1.4 acres)	Non-Menace (NM) Hazard	Mason Brook
D79.23 Farm Pond Dam (Ellis)	Active - 10 Feet (0.3 acres)	Non-Menace (NM) Hazard	Natural Swale

Source: NHDES Dam Hazard Classification GIS Database, Mar 2016 from Epsom Hazard Mitigation Plan 2018

Land Resources

Numerous maps accompany the Land Resources section to provide visual context to the topics addressed. The ***Conservation and Public Lands***, ***Geological Resources***, ***Groundwater Resources***, ***Important Farmland Soils***, ***Surface Water Resources***, ***and Significant Wildlife Habitat*** maps each detail and display the location of Epsom's diverse land resources.

CONSERVATION LANDS

Properties considered conservation lands are those temporarily or permanently protected from development, and the restrictions for land use activities, public access, recreation, expansion of structures, and more are contained within the deeds. They can be under private ownership, owned by the town, county, state, or federal government, or owned by a non-profit organization. Either the land is fee owned or an easement is held. Town Forests are not typically permanently protected lands, although they are used for public benefit and often have a Forest Management Plan.

Table 6.4 displays the numerous conservation lands in Epsom, of which 2,260 acres are permanently protected, including a few Town facilities such as the Police Department, Highway Department and Library/ Old Town Hall. Another 80 acres of publicly owned land are not permanently protected from development, including lands owned by Epsom Village Water Precinct, NHDOT, and the Town. Most of the permanently protected conservation lands are privately owned (1,538 acres), while 739 acres are Town-owned, and 63 acres are state-owned. This provides the Town with long-term protection of land for conservation and recreation purposes and opportunities to develop a long term acquisition strategy for key parcels that could connect corridors or protect other lands of high value. The current conservation lands are displayed on the ***Conservation and Public Lands*** map.

Table 6.4: Permanent and Public Conservation Lands

Name	Acres	Ownership	Cons. Type	Protection Entity
Bartlett	260.5	Private	CE	USDA NRCS
Bronstein Conservation Area	17.3	Epsom	CE	Epsom
Carlson Easement (2 parcels)	87.3	BearPaw	CE	BearPaw
Champney	29.2	Private	CE	Epsom
DOT - Epsom Scenic Easement (2 parcels)	63.1	NH DOT	SE	NH DOT
Eames	128.8	Private	CE	USDA NRCS
Epsom Town Forest (Tarleton Road)	659.7	Epsom	CE	Epsom
Fredyma Municipal Open Space	8.6	Epsom	FO w/DR	Epsom
Griffin	12.9	Epsom	FO	Epsom
Harkness Easement	61.6	BearPaw	CE	BearPaw
Hickey Easement (2 Parcels)	114.9	BearPaw	CE	BearPaw
Jackson	74.8	Private	CE w/DR	Epsom
Olsen / Villnave	309	Private	DR	SPNHF
Ottinger (2 parcels)	171	Private	CE	SPNHF
Popple Island	142.9	Private	FO	Audubon
Smith	107.1	Private	CE w/DR	Epsom
Stewart Easement	50.7	Private	CE	BearPaw
Town of Epsom Land	2.1	Epsom	FO	Epsom
Town of Epsom Land	3.8	Epsom	FO	Epsom
Town of Epsom Land	6.3	Epsom	FO	Epsom
Webster Park (2 parcels)	17.2	Epsom	FO	Epsom
Whitehouse Acres Open Space	11.5	Epsom	Set Aside OS	Epsom
Total Acreage	2,340.30	*Source: NH GRANIT, compiled by CNHRPC*		

CE = Conservation Easement SE = Scenic Easement DR = Deed Restrictions
OS = Open Space FO = Fee Ownership

TOPOGRAPHY AND STEEP SLOPES

Epsom's identity is marked by the views of and from roadways and the major rivers. In addition, the areas of historical and existing agricultural operations create a pastoral landscape that helps to define the community. Epsom, with its variable topography, offers numerous scenic views of fields, hills, ponds, and streams.

The topography along with the mountains and hills are displayed on the ***Geological Resources Map***. The highest peak in Epsom, Fort Mountain, hosts many year-round multi-use recreational trails and is a popular destination for residents and visitors alike. Fort Mountain land is owned by the Town, and maintained by the Conservation Commission with the assistance of volunteers. The other mountains and hills, also important wildlife habitat, should be considered for permanent conservation. Neville Peak lies within the Epsom Town Forest and is the secondary summit of Nottingham Mountain. Neville Peak is named for the scoutmaster who donated the land within the Epsom Town Forest.

Steep slopes greater than 20% are located throughout the community and especially found along these hills and mountains. They are illustrated on the ***Geological Resources Map***. Much of the southeastern quadrant of Town, from east of Black Hall Road, south of US 4/ 202, and north of Mount Delight Road, is covered by steep slopes. Western slopes include Copperline Drive and Lane Road (connecting to NH 28 south), while northeastern Epsom accommodates steep slopes from Lockes Hill all the way east to Goboro Road, north of US 4/ 202. Steep slopes comprise 6,057 acres, or 27.5%, of Epsom's total 21,990 acres.

View from the summit of Fort Mountain, Epsom Town Forest

EXISTING AND FUTURE TRAIL DEVELOPMENT

The Conservation Commission has worked to develop the well-used trail system in the Epsom Town Forest area. In addition, Epsom recently participated in the development of the Suncook Valley Trails Plan with the communities of Allenstown, Chichester, Pembroke and Pittsfield. In Epsom, a number of the recommendations found in the Plan for future development of trails were related to the use of the former rail bed (see the Transportation Chapter). Beyond those potential trails, the Plan also recommended that the Town consider the formation of a Trails Committee and consider a future connection between the rail bed and the Town Forest. Specifically, the recommendation from the 2019 Suncook Valley Trails Plan is as follows:

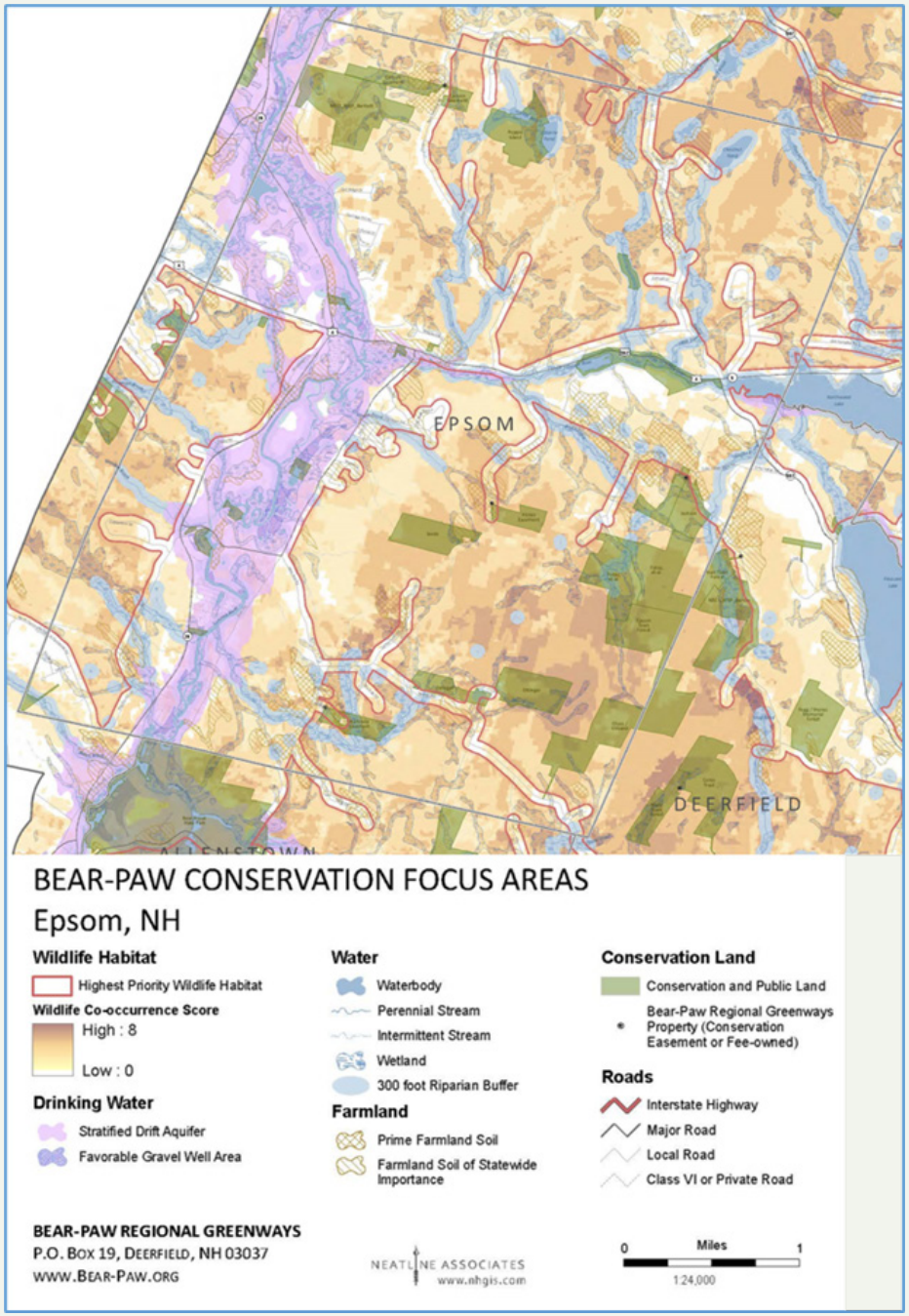
"Connect from the Town-owned railroad bed (Epsom Rail Trail) along Black Hall Road to the Epsom Town Forest on Tarleton Road. The large blocks of forest land between the Epsom Rail Trail and the Town Forest are ready for trail development. The Epsom Trails Committee should identify the potential connection corridors for multi-use, then obtain support from user groups and landowners to move forward. The next steps are establishing kiosks and trailheads, obtaining property owner agreements for trail building and usage on the private land, and considering additional trail connections to nearby conservation lands, including Fort Mountain."

Peak/Mountain/Hill	Elevation (Feet)
Fort Mountain	1,413
McCoy Mountain	1,270
Neville Peak	1,191
Nat's Mountain	1,180
Brush Hill	960
Epsom Mountain	960
Sanborn Hill	920
Barton Hill	800
Locke's Hill	680

BEAR-PAW CONSERVATION FOCUS AREAS

Bear-Paw Regional Greenways prepared a Conservation Plan in 2008, and updated the associated mapping in 2014 that resulted in the identification of specific conservation focus areas as shown in the figure to the tight. The focus areas were the result of a Natural Resources Inventory (NRI) co-occurrence mapping process that essentially scored specific wildlife habitat, drinking water resources, and agricultural areas to specify the areas of highest need for future protection. The information is an import form of support for decisions regarding the acquisition of conservation lands through purchase or easement.

For more information related to the Conservation Plan: http://www.bear-paw.org/conservationplan.html



BEDROCK GEOLOGY

Bedrock is the solid material that underlies the soil or other unconsolidated material of the earth. The last glacier retreated from New Hampshire about 10,000 years ago but has been glaciated several times in recent geologic history. Knowing where geological formations are located is important for building homes, infrastructure, and utilities, protecting groundwater resources, siting sand and gravel pits, extracting rock, evaluating geologic hazards (earthquake, landslide, erosion and land subsidence potential), and more. There are several types of bedrock found in Epsom, 99% of which are metasedimentary and metavolcanics rocks of the Central Maine Trough, and 1% of the Town's bedrock is comprised of plutonic and associated volcanic rocks (Concord Granite). The specific types and locations of bedrock formations in Epsom are displayed on the ***Geological Resources Map***.

Above: Yeaton Dairy Farm with Cows

Below: Bachelder Dairy Farm

FARMLAND SOILS

The preservation of farmland capacity is important for the State, and locally in Epsom, to retain the rural identities that define New Hampshire and contribute to the high quality of life here.

Of Epsom's 22,026 acres, 13,579 acres (62% of the Town) have a designation of important farmland. Particularly essential are the soils of Prime Farmland (769 acres) located along the southern end of New Rye Road, along Center Hill Road, sections of NH 28 north and south, in areas along New Orchard Road and other areas. These are displayed on the ***Important Farmland Soils Map***. The second most important soils of significance are the Farmland of State Importance (594 acres), which are found from US 4/ 202 to Black Hall Road, Center Hill Road, Jug City Road, northern Goboro Road, and Chestnut Pond Road. The Important Farmland Soils are indicated in Table 6.5.

Several active farms are still raising hay, livestock, produce, and providing dairy. Bachelder Dairy Farm (Center Hill Road) produces dairy products, Kimball Farm/New Orchard Farms (New Orchard Road) raises sheep and goats, McClary Hill Farm (Griffin Road) produces ingredients used in beer brewed onsite, the Yeaton Dairy Farm (Suncook Valley Highway) produces dairy products, and Epsom Berry Patch produces fruit. These five working farms are important for the community to support to ensure rural character, local food sourcing, and economic diversity remain in Epsom for future generations.

Table 6.5: Important Farmland Soils

Farmland Soil Type	Acres	Percentage of Town
Prime Farmland	769	3%
Farmland of State Importance	594	3%
Farmland of Local Importance	11,954	54%
Prime Farmland if Protected from Flooding or Not Frequently Flooded during the Growing Season	271	1%
Totals	13,588	61%
Total Town Acreage	22,027	

Source: Merrimack-Belknap County Soils Survey, 2017 and NH Soils Data Dictionary, 2013

WILDLIFE RESOURCES

The large variety wildlife in Epsom is highly desirable to maintain, as it ensures the community itself retains its rural nature. Yet the Town is geographically segmented into four quadrants by NH 28 and US 4. The Town does host several areas of the highest ranked habitat in New Hampshire according to the NH Fish and Game's *NH State Wildlife Action Plan 2015*.

The areas along much of the Suncook River, Burnham Brook, Fowler Brook, Griffin Brook, Blake Brook, Lockes Brook, Flat Meadow Brook and Gulf Brook and Odiorne Pond host this most desirable habitat. High elevation areas also containing this prime habitat include Fort Mountain, Nat's Mountain, Epsom Mountain, and Brush and Barton Hill. The Wildlife Action Plan habitats are displayed on the ***Significant Wildlife Habitat Map***, which indicate some of the most important areas to consider in a conservation plan or land protection strategy.

According to the NH Natural Heritage Bureau, Epsom is host to several rare species and exemplary natural communities. The *endangered* animals in Epsom are Blanding's Turtle and Brook Floater mollusk. The *threatened* animal species in Town are the Common Loon, Northern Black Racer snake, Spotted Turtle, and Bridle Shiner fish.

Common bird species, invertebrates, and cold- and warm-blooded animal species are believed to be living in or migrating through Epsom. The Conservation Commission reports deer, moose, black bear, coyotes, otter, beaver, fox, raccoons, fisher cats, bobcats, grouse, wood ducks, hooded mergansers, brook trout, turtles, porcupines and other species occupy the Town. The Suncook River is a special habitat, where nearly 24 native fish species thrive in warmwater communities. These include Alewife, Blueback Herring, Common Shiner, Yellow Perch, Banded Sunfish, and introduced species such as Largemouth Bass, White Perch, and Black Crappie.

INVASIVE SPECIES (PLANT AND ANIMAL)

In New Hampshire, invasive or "exotic" plant, pest, fungus, and animal species have been introduced and spread throughout the local communities. The definition of invasive is "... one that is not native to a particular ecosystem, whose introduction does or is likely to cause economic or environmental harm or harm to human health. It is capable of moving aggressively into an area, monopolizing light, nutrients, water, and space to the detriment of native species" according to the UNH Cooperative Extension. For instance, the Asian Long-Horned Beetle, Sirex Wood Wasp, Spotted Lanternfly, Hemlock Woody Adelgid (HWA), Emerald Ash Borer (EAB), White Pine Blister Rust (WPBR) fungus, and Southern Pine Borer have limited the transport of firewood across county lines in recent years as this spreads the contamination. Specifically in Epsom, the HWA, EAB, WPBR, and red pine scale insect were recently found in Town locations.

The Suncook River hosts an infestation of variable milfoil, which has been treated and managed along its length from Gilmanton to Allenstown with assistance from the NHDES since 2005. Since milfoil easily carries to tributaries, it is important to monitor any progression. The Northwood Lake Watershed Association supports a Milfoil Control Diving Program on an annual basis. The Town of Epsom provides financial support for this effort.

Wildlife Action Plan

The NH Fish and Game Department worked with partners in the conservation community to create the state's first Wildlife Action Plan (WAP) in 2005 and updated in 2015. The Plan identifies New Hampshire's wildlife habitats and presents conservation strategies and tools for restoring and maintaining critical habitats and populations of the state's species of concern. For purposes of prioritizing wildlife habitats for conservation across the state, a system was created to rank habitats between and amongst each other. For each habitat type, the top-ranking habitats are combined and titled Highest Ranked Wildlife Habitat in New Hampshire. Recognizing that New Hampshire has a wide range of conditions, both natural and human altered, the state was divided into biological regions. Highest Ranked Habitat in Biological Region includes the top 30% of all terrestrial and wetland habitats with exception for the high elevation spruce-fir and floodplain habitats based on their ecological importance and rarity. Aquatic habitats are only ranked statewide and not ranked in this category.

A Summary of Existing Regulatory and Protection Tools

The Town currently utilizes regulatory protections and voluntary measures to support the Town's goals of rural character and protected natural features. These regulations will change over the time this version of the Master Plan is in use. For the most updated regulations please contact the Town.

Conservation Easements

Area: Town-wide

A conservation easement is a permanent, legally binding agreement that ensures that certain uses will never be allowed on the property under easement. Conservation easements are designed to keep land undeveloped and to promote open space land uses like agriculture, forestry, wildlife habitat, and watershed protection. Land affected by a conservation easement can be sold by the original and subsequent owners but the easement "runs with the land" and is binding on all future owners.

The Town's Conservation Fund is an existing source that has been used to help fund the acquisition of conservation parcels and easements. Other sources for purchasing easements may include fund-raised dollars and grants. Easements are held and enforced by land trusts and nonprofits such as Bear-Paw Regional Greenways and the Society for the Protection of New Hampshire Forests or governmental entities such as the Town of Epsom.

Cluster Residential Developments

Area: Town-wide with Special Use Permit

Epsom currently allows cluster subdivisions, also known as open space or conservation subdivisions, on lots that are fifteen (15) acres or larger in the three Town zones. Its purpose is to encourage the preservation of open space for agricultural, recreational, and scenic use; to encourage flexibility in design for residential development by permitting single-family residences to be grouped on lots of reduced dimensions to allow for a more economic provision of street and utility systems; and to establish living areas within the Town that provide for a balance of community needs.

Conservation subdivisions often work best when used with a conservation plan that identifies key protection areas that have been identified through the natural resource inventory or a conservation priorities/open space protection plan.

Options for improving the Cluster Residential Development provisions are discussed in detail in the Housing Chapter. Specific recommendations related to the protection of Epsom's natural features include requiring additional clarity provided for what can be done in planned open spaces within a cluster development and the possible addition of density bonuses that could granted for different types of open space. As described in the Housing Chapter:

> ***"... a Cluster Development that protects prime farmland or scenic vistas may have the opportunity for more units than a development that simply preserves the land that is more difficult to build on. Density incentives can also support affordability, such as limits on the number of bedrooms, first-floor only units, and agreements to sell to first-time home buyers or seniors. In any event, these recommendations would seek to enhance the cluster subdivision tool by making it easier to use and to provide additional benefits to Epsom, namely in the form of open space and housing affordability."***

Wetland Setbacks

Area: Town-wide

As a zoning regulation, the Town states "All building or structures, in all zones, shall be set back no less than fifty (50) feet from "wetlands" as defined by the New Hampshire Department of Environmental Services." Setbacks ensure wetlands are provided with some protection from development of buildings. Larger setbacks from wetlands would provide an even greater level of protection.

Photo: Historic cellar hole in Epsom Town Forest, lined with vegetation and trees

Shoreland Water Quality Protection Act (RSA 483-B)

Area: Suncook River, Little Suncook River, Cass Bixby Pond, Chestnut Pond, Deer Meadow Pond, Northwood Lake, Odiorne Pond

Originally enacted into law in the 1991 as the Comprehensive Shoreland Protection Act (CSPA), the Shoreland Water Quality Protection Act (SWQPA) establishes minimum standards for the subdivision, use and development of shorelands adjacent to the state's public water bodies of ten (10) acres or more and fourth order and greater streams. The review and permitting process is designed to provide a level of oversight for construction, fill, and excavation activities to ensure that projects are carried out in a manner that meet the minimum standards of the act and protect water quality. Setbacks are mandated, but the Town could consider an increase these distances to ensure protection of essential surface water resources.

Objectives & Recommendations

1 Continue to protect, preserve and enhance Epsom's natural features and rural character for current and future generations.

- **Consider revisions to the Cluster Residential Development Ordinance to identify what can be done within the open spaces and offer potential density bonuses for protection measures that would promote the uses of the Cluster Residential Development option.**
- **Support the development of trail connections from the Epsom Town Forest to the former Suncook Valley Railroad railbed (Compatible with the Suncook Valley Trails Plan 2019).**
- **Continue to consider the Bear-Paw Conservation Focus Areas and the Wildlife Action Plan when seeking to obtain conservation easements on Town's hills and mountains and along its streams to preserve highly ranked habitat areas.**
- **Continue to support the transfer of the Land Use Change Tax to support the Conservation Fund for the purchase of new conservation lands or easements.**
- **Support continued activities to identify and potentially protect the location of a new public groundwater source in the vicinity of Epsom's aquifer areas.**

2 Protect the community from future significant Suncook River flooding and erosion.

- Review prospective purchase of select parcels in the floodplain along the Suncook River to enhance the Town's flooding capacity. (Compatible with the current Epsom Hazard Mitigation Plan.
- Consider areas to protect from future development around the Suncook River to reduce the impacts of flooding. (Compatible with the current Epsom Hazard Mitigation Plan.
- Review the 2015 fluvial geomorphic feature maps accompanying the current Epsom Hazard Mitigation Plan to review areas of existing and current erosion, bank failure, and woody debris in the Suncook River for the purposes of monitoring and mitigation.

3 Protect the community from environmental contaminants and invasive species to ensure safe and healthy living conditions for residents, flora, and fauna.

- Consider aquifer protection regulations to incorporate best management practices related to future "higher-risk" commercial activities that produce liquid waste.
- Promote public education on the existence of invasive species, who to contact for assistance, and/or how to safely remove such plants and insects, etc.
- Monitor the Suncook River and its tributaries to ensure milfoil is being managed and is not being transported to other locations via boats.
- Continue to support efforts by the Northwood Lake Watershed Association to control Milfoil in Northwood Lake.