



Environmental Management Plan

2020–2025

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Prepared by:



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# I. Introduction

Mount Sunapee is dedicated to the protection of the environment and ensuring that the values of environmental stewardship are in the forefront of our planning efforts. We understand the balance between resource protection, recreational opportunity and fiscal responsibility. All three must be in harmony if we are to achieve our management objectives and those set forth in the Lease.

Pursuant to Section 15 of the Lease and Operating Agreement (herein “the Lease”) signed with the State of New Hampshire Department of Natural and Cultural Resources (formally a division of Department of Resources and Economic Development) on April 30, 1998, Mount Sunapee submits this Environmental Management Plan (EMP).

The Master Development Plan (MDP) provides a broad road map for the major improvements over the next five years at Mount Sunapee. The focus of this EMP is to respond to the overall impacts of the proposed MDP, recognizing its generalities.

This EMP addresses existing environmental conditions within the leasehold and anticipated environmental impacts from the proposed expansion into the West Bowl area. We have created this document around the specific environmental categories mentioned in Section 15, Environmental Practices, of the Lease and Operating Agreement. We have also added several categories to address other potential environmental and development concerns. Where appropriate, we have also addressed the continued implementation of the Summer Adventure Park and non-winter uses on relevant criteria of the EMP.

At this time, it is not possible to address all potential impacts from the implementation of the MDP. During the state and local permitting process, additional information will be provided with the Site Plan Review application to the Towns of Newbury and Goshen, and with the applicable applications to the New Hampshire Department of Environmental Services.

When the West Bowl expansion was originally proposed in 2005, many studies were conducted to assess this project’s impacts. These studies included wildlife habitat, rare and endangered species, wetlands, watershed run-off, traffic and economic impacts. As considerable time has passed since these studies were completed, the future pursuit of state and local permits for the West Bowl will likely require an update.

For reference, we have included the original West Bowl impact studies in this EMP, and we have addressed other areas where our planning provides some guidance towards creating an environmental management approach.

As the projects described in the MDP move forward, specific design plans will be created, and the potential impacts will be addressed at a level of detail appropriate to their scale and required permitting.



## II. Water Usage and Conservation

### A. Water Usage

#### 1. Potable Water

Mount Sunapee continues to renovate and improve our potable water system. Mount Sunapee maintains, monitors and tests the potable water supply pursuant to NH-Department of Environmental Services (NHDES) regulations.

A certified hydrogeologist (see Appendix A) tested the Mount Sunapee base area well in 1999 to determine its capacity. The test found that this well has a design flow rate of 73.1 gallons per minute (gpm) or 105,216 gallons per day (gpd). This capacity provides the resort base area with considerable capacity without the need to identify new potable water sources. This well is located at the base of the Duckling Lift within a 400-foot radius Sanitary Protection Area (SPA). The SPA does not allow for the storage of petroleum products or the use of chemical fertilizers in the area.

The vast majority of potable water consumption at Mount Sunapee occurs during the winter ski season. Over the past five years the average annual potable water usage from the base area well has been approximately 1,511,360 gallons. Additional wells service the much lower potable water requirements at the Summit Lodge and the maintenance shop. These wells have averaged 33,652 and 74,388 gallons per year respectively over the past five years. A summary of the recent potable water usage is provided in Table EMP-1.

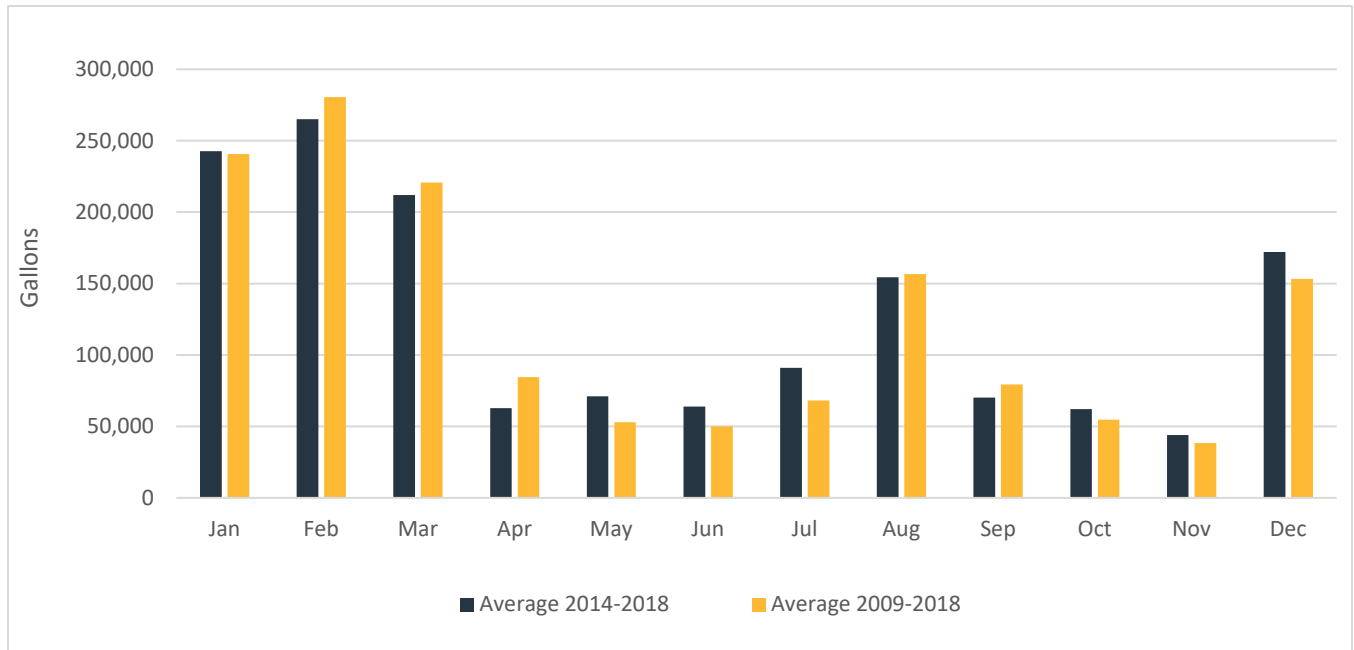
Table EMP-1. Potable Water Usage – 2014 to 2018

Year	Total Potable Water Used (gallons)	Base Area Well (gallons)	Summit Lodge Well (gallons)	Maintenance Shop Well (gallons)
2014	1,764,230	1,629,400	47,500	87,330
2015	1,492,220	1,373,800	42,780	75,640
2016	1,471,950	1,380,000	33,250	58,700
2017	1,445,500	1,342,500	23,670	79,330
2018	1,382,900	1,290,900	21,060	70,940
<b>TOTAL (2014–2018)</b>	<b>7,556,800</b>	<b>7,016,600</b>	<b>168,260</b>	<b>371,940</b>
<b>AVERAGE (2014–2018)</b>	<b>1,511,360</b>	<b>1,403,320</b>	<b>33,652</b>	<b>74,388</b>

## Summer Use

Chart EMP-1 illustrates that non-winter demand for potable water represents a small fraction of the peak winter use. August exhibits the highest water use during the summer, coinciding with the annual League of NH Craftsmen’s Fair which draws approximately 30,000 visitors each year. The expectation is that summer events and the Adventure Park will not generate enough additional visitation to tax the water or wastewater facilities, and any increases would be easily accommodated by the unused capacity during non-winter months.

Chart EMP-1. Average (2014–2018) Potable Water Used (gallons) By Month



Water consumption at Mount Sunapee continues to be far below the capacity of the water supply system and this reserve capacity will continue to meet the demand for potable water anticipated during implementation of the MDP within the existing leasehold.

## West Bowl Expansion

The distance between the existing potable water system and the West Bowl expansion would likely require development of a new water source and system to support the base area of the West Bowl. Detailed engineering studies of water needs and sources may be required to address these issues.



## 2. Snowmaking

Snowmaking is a vital component in the operation of a successful ski resort in the eastern United States. Mount Sunapee is fortunate to have Lake Sunapee and its abundant water supply adjacent to the mountain for its snowmaking water supply. We manage this resource carefully as we recognize how important Lake Sunapee is to our resort and to the greater community and region. The substantial surface area of Lake Sunapee, at 4,090 acres, enables us to withdraw enough water to support our snowmaking operations without causing any measurable impact to the lake.

Mount Sunapee’s water withdrawals for winter snowmaking from Lake Sunapee are regulated by a water withdrawal permit (#2000-02687) from the NHDES. This permit allows Mount Sunapee to use Lake Sunapee for its snowmaking water supply during the winter months.

In 2007, Mount Sunapee purchased 58 new high-efficiency HKD SV-10 snow guns. Since 2007, an additional 80 SV-10 snow guns have been purchased, giving us a total of 138 of these energy efficient snow guns.

The efficiency of these snow guns has allowed Mount Sunapee to retire all four of its diesel air compressors that were used exclusively for snowmaking. This has resulted in the significant savings of over 12,000 gallons of diesel fuel annually. Mount Sunapee currently uses three electric air compressors for snowmaking and uses the energy efficient HKD snow guns as much as possible.

The replacement of all fluorescent lighting to higher efficiency ballasts and bulbs has also contributed to this reduction in electricity consumption. Motion sensor lighting switches have been installed in all restrooms and some other areas to reduce electricity usage when those areas are not being used. The following chart and table summarize the snowmaking activities of Mount Sunapee since the 2004/05 ski season.

Chart EMP-2. Snowmaking Water Consumption – 2004/05 to 2018/19

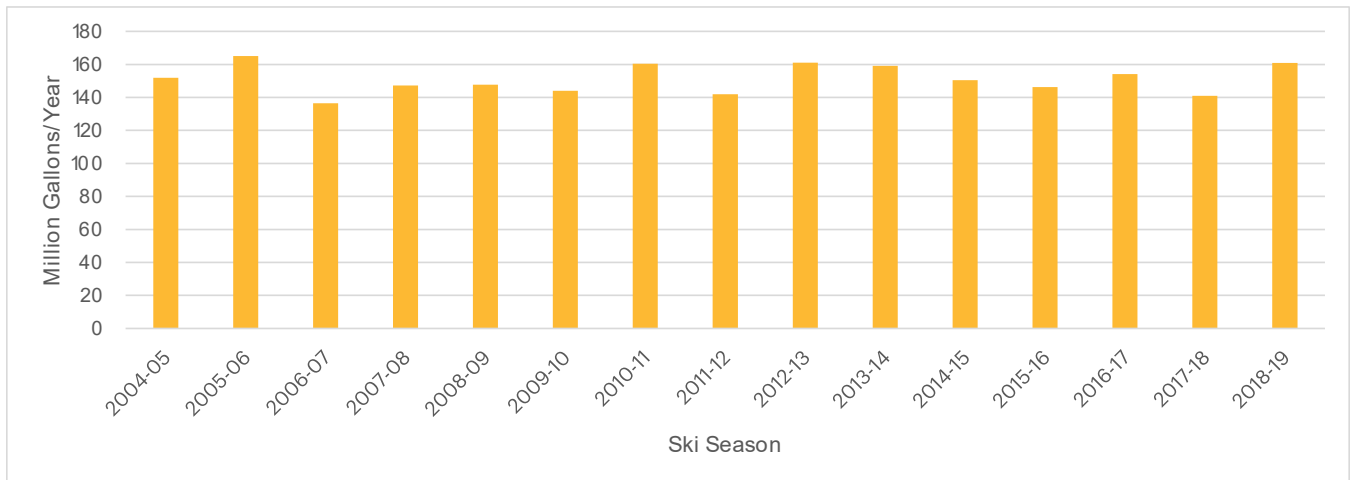


Table EMP-2. Snowmaking Water Consumption – 2004/05 to 2018/19

Snowmaking Season	Gallons Pumped (total)	Maximum Pumping Rate (gpm)	Operating Hours	Acres Covered	Acre-Feet Produced	Average Depth (feet)
2004/05	151,851,000	5,000	690	195	843.6	4.33



Snowmaking Season	Gallons Pumped (total)	Maximum Pumping Rate (gpm)	Operating Hours	Acres Covered	Acre-Feet Produced	Average Depth (feet)
2005/06	165,000,000	5,000	745	195	916.7	4.70
2006/07	136,416,000	5,000	696	202	757.9	3.75
2007/08	147,268,000	5,000	674	204	818.2	4.01
2008/09	147,730,575	5,000	735	204	820.7	4.02
2009/10	144,028,387	5,000	622	204	800.2	3.92
2010/11	160,413,000	5,000	777	204	891.2	4.37
2011/12	141,872,528	5,000	653	207	788.2	3.83
2012/13	161,007,579	5,000	766	207	894.5	4.34
2013/14	159,058,098	5,000	670	207	883.7	4.29
2014/15	150,456,780	5,000	697	207	831	4.01
2015/16	146,237,886	5,000	736	207	807	3.9
2016/17	154,126,505	5,000	743	207	854	4.13
2017/18	140,933,032	5,000	666	207	776	3.75
2018/19	160,973,166	5,000	736	207	882	4.26
5-YEAR AVERAGE	150,545,474	5,000	716	207	830	4
10-YEAR AVERAGE	151,158,169	5,000	707	204	838	4.07

*Notes:*

Maximum snowmaking pumping rate has been maintained at 5000 gpm since 2001/02.

Six acres (Elliot Slope) added to snowmaking system coverage in 2006.

Four acres (Eastside and Portage) added to snowmaking system coverage in 2007.

Snowmaking was added to Outer Ridge in 2012.

Acre feet are calculated by using an average of 180,000 gallons/acre feet of snow.



Based on the past five ski seasons, Mount Sunapee is averaging about 150,500,000 gallons of snowmaking withdrawal per year. Higher withdrawal volumes for snowmaking generally occur in years with mild winter temperatures and/or lower natural snowfall amounts. Mount Sunapee's current snowmaking water withdrawal permit is sufficient to meet its future needs.

To put Mount Sunapee's snowmaking water usage into perspective, if 100% of Mount Sunapee's annual snowmaking water were to be instantaneously withdrawn from Lake Sunapee, the lake level would be reduced by only 1.33 inches (one and one-third inches).

Snowmaking water withdrawals typically occur over a four-month period from mid-November to early March. Based upon the total hours of snowmaking during this period, the average daily water usage would impact the lake level by approximately 1/32nd of an inch. Natural recharge to the lake on any given day most likely exceeds any snowmaking water withdrawals.

## West Bowl Expansion

The current MDP terrain upgrading plan identifies 104.5 acres of additional terrain to be added to Mount Sunapee's developed trail network.

A total of 56.2 acres of new ski terrain is proposed for the West Bowl expansion area. The currently permitted water reserve capacity is adequate to accommodate this projected growth.

Once constructed, the addition of this new terrain would bring the total developed trail area to 321.5 acres. In addition, Mount Sunapee currently has 17 acres of glades and the upgrading program adds another 7 acres. Glades are not covered by the snowmaking system.

## B. Water Conservation

Mount Sunapee's focus on encouraging water conservation since the inception of the lease in 1998 has resulted in a reduction in wastewater flows. In 2006 all fixtures (water closets and lavatories) in the Spruce Lodge were replaced with low flow fixtures as part of these continuing efforts.

Chart EMP-3 compares the five-year average wastewater flows (2014–2018) with the ten-year average wastewater flows. Most months (with the exception of January and April) indicate a reduced demand on the wastewater system. As would be expected, the vast majority of wastewater flows from Mount Sunapee occur during the ski season (Chart EMP-3).

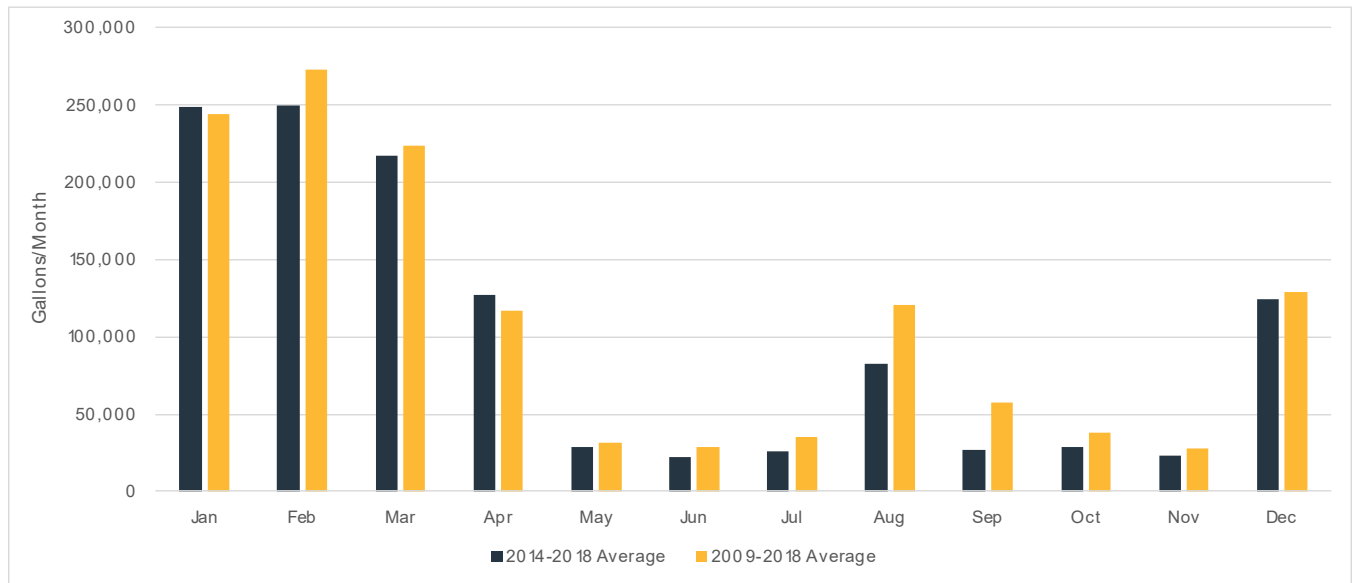
Table EMP-3. Annual Wastewater Flows – 2014 to 2018

Year	Wastewater Influent (gallons)
2014	1,305,536
2015	1,314,822
2016	1,045,474
2017	1,031,220
2018	1,319,102
AVERAGE (2014–2018)	1,203,231
AVERAGE (2009–2018)	1,270,657

**Notes:**

Attendance figures do not include summer operations.  
 1999 water consumption was 5.32 gallons per person.

Chart EMP-3. Average (2014–2018) Wastewater Flows (gallons) by Month





### III. Wastewater Disposal/Treatment

Mount Sunapee Resort currently operates a lagoon and spray field system for on-site wastewater treatment and disposal under NHDES permit #GWP-198801026-N-006. Mount Sunapee staff, licensed with the State of New Hampshire, operates, monitors and maintains this system. The monitoring program utilizes a series of monitoring wells with chemical and biological sampling requirements.

Currently a separate septic tank and leach field system provides sewage disposal at the Summit Lodge. Annual pumping of the septic tank at each lodge is part of a routine maintenance program for the system.

Mount Sunapee continues to use the engineering services of Hoyle Tanner Associates for its wastewater systems as they have over twenty years of experience with the Mount Sunapee system. They are retained to:

1. evaluate the integrity of the existing systems,
2. evaluate the capacity and utilization of the existing systems,
3. study the future wastewater requirements at Mount Sunapee,
4. make recommendations on how to meet the future wastewater requirements at Mount Sunapee, and
5. design appropriate expansion measures to meet future requirements.

In the spring of 2000, Mount Sunapee completely rebuilt the existing spray field lines due to the age and condition of the existing disposal lines. The new spray lines can operate nozzles individually, increasing spray effectiveness within the disposal area.

An additional engineering report by Hoyle Tanner and Associates, Inc. in March 2003 (see Appendix B), suggested that the wastewater system (lagoons and spray fields) provides adequate capacity. Mount Sunapee does not propose to expand the wastewater lagoons.

The current permitted capacity of the spray fields is 250,000 gallons per week of lagoon effluent. Mount Sunapee has proposed to expand the spray field by 15–20% to allow better ability to dispose of lagoon effluent during the permitted spring, summer and fall spraying seasons. In very rainy spring and fall periods, the soil conditions may be too saturated to permit spraying. Although Mount Sunapee has not expanded the spray fields to date this remains a viable option in the overall management of the wastewater system. Our primary lagoon management objective is to have the full storage capacity of the lagoons maximized by completely emptying the lagoon by October 31st of each year.

## Summer Use

The current use and planned expansion of the Summer Adventure Park does not adversely affect the ability of the current wastewater treatment system. The attendance for non-winter uses, in addition to representing only a small fraction of the overall resort attendance, also occurs during months when use of the spray fields is permitted.

Overall, the current wastewater systems are expected to meet all anticipated wastewater disposal requirements for implementation of the MDP within the existing leasehold.

## West Bowl Expansion

The proposed expansion in the West Bowl area will require the development of a new wastewater disposal system to service the proposed base lodge in that area.

The West Bowl base lodge is envisioned as a smaller “satellite” base lodge with limited services compared with the primary base lodges. The type of wastewater disposal system needed has not been determined. Mount Sunapee will work with professional engineers and the State of New Hampshire to develop a certified wastewater disposal system to meet the required demands for the West Bowl.

## IV. Drainage, Erosion and Water Quality Issues

Two named permanent streams, Beck Brook and Johnson Brook, flow out of the Mount Sunapee drainage basin. As named permanent streams, they are afforded protection under the Shoreline Zoning Regulations of both the Town of Newbury and NH-DES. The general location of the existing Mount Sunapee base area is depicted on Figure EMP-1. These named streams are identified on Figure EMP-2.

Mount Sunapee recognizes the importance Johnson Brook has as one of the major tributaries flowing into Lake Sunapee. Mount Sunapee continues to prevent degradation of Johnson Brook by using Best Management Practices to prevent soil erosion in the Sun Bowl area. For example, we have evaluated the size of culverts on the summit work road and on ski trails in the Sun Bowl area. New water bars on the summit road minimize erosion in the gravel road base. All of these measures continue to provide protection of Johnson Brook.

Mount Sunapee has continued to work in cooperation with the Lake Sunapee Protective Association (LSPA), to develop measures that prevent or minimize sedimentation along Beck Brook as it flows through the base areas. Since 1998, measures have included the development of small sediment basins to catch parking lot run-off, creation of new drainage swales and sediment dams, and creation of stabilization systems along important segments of Beck Brook. In some instances, LSPA has provided design services with construction and maintenance by Mount Sunapee. Based on the annual maintenance of these systems, it appears that substantial amounts of sediment are being captured.

Mount Sunapee utilizes the New Hampshire Stormwater Manuals, volumes 1-3, published in December 2008 for guidance in managing storm water run-off, soil stabilization and erosion control methods.

When soils are disturbed on the mountain, Mount Sunapee utilizes the Vermont Conservation Mix, a highly recommended seed mixture for ski slopes containing a mixture of fast germinating annual rye grasses and other perennial grasses for re-vegetation of the disturbed areas. Mount Sunapee owns an agricultural tractor and a power mulcher for effectively blowing hay over the Vermont Conservation Mix when re-seeding and stabilizing disturbed areas.

Mount Sunapee also protects groundwater resources from fuel and other hazardous materials. Employees are educated on the proper techniques for handling, storing and disposing of hazardous materials. Mount Sunapee has procedures and technologies in place for protecting and monitoring above and below ground tanks. Beyond regular safety meetings, Mount Sunapee personnel routinely inventory containment systems and materials. These personnel are equipped and trained to respond to fuel spills of less than 25 gallons in a safe and expeditious manner. For spills in excess of 25 gallons, personnel are familiar with procedures for notifying the NHDES Oil Response Team.

### West Bowl Expansion

Within the West Bowl, one unnamed brook is noted moving downhill through the center of the site. The location of this drainage is also noted on Figure EMP-2. Pioneer Environmental Associates conducted a hydrologic resource inventory along the portions of this unnamed brook within the project site in 2001 and again in 2004 (see Appendix C). In general, they characterize the drainage as being perennial in nature and having been impacted by intense logging within the private lands.

This brook flows westward then south through a known wetland area into Gunnison Brook (see Photo 1). At this point, Gunnison Brook continues to move westward parallel to Brook Road.

It is important to note that Gunnison Brook does not flow into Lake Gunnison. Lake Gunnison, also known locally as the “Goshen Ocean,” lies within the Sugar River Watershed area on Blood Brook (see Photo 2). The Blood Brook was dammed in this part of the valley to create the lake. Although Gunnison Brook and Lake Gunnison both lie within the Sugar River Watershed, Lake Gunnison is fed by Blood Brook, and is not hydraulically connected to Gunnison Brook. Chandler Hill and other mountain peaks create a drainage divide between the Gunnison Brook and Blood Brook, separating these two watersheds. Waters from these two brooks meet in Goshen, across Route 10 from Brook Road, where the South Branch of the Sugar River begins.

Due to the hydraulic separation of the lake from Gunnison Brook, there is no potential for the water level or water quality to be affected by snowmelt or runoff from the proposed trails and improvements within the West Bowl area.

A second major water body, Rand Pond, lies within the Gunnison Brook Watershed. The pond’s watershed



**Photo 1. Confluence of unnamed brook and Gunnison Brook near Brook Road**

area is approximately 270 acres and does not receive any runoff from the West Bowl area. Rand Pond is fed by numerous tributaries, and it outflows drain into the Gunnison Brook. Since the pond is located hydraulically up-gradient of the Gunnison Brook, its inflows and water quality will not in any way be affected by runoff from the West Bowl area. These watershed areas are depicted on Figure EMP-3.

The analysis of the hydrologic conditions within this watershed, prepared by Bruno Associates was completed to identify the characteristics of the watershed so that an appropriate BMP strategy for water quality can be created (see Appendix D). The results of this study show that Gunnison Brook presents the major drainage in

which runoff and snowmelt will flow from the West Bowl area. It also shows that the amount of runoff projected from snowmelt will have little impact on overall stream flows during the spring melt-off period.

Given this background, while Mount Sunapee's efforts within the current leasehold has been to create new solutions within existing developed areas, the expansion with the West Bowl will allow for more proactive efforts to protect and preserve water quality within the new watershed. Mount Sunapee fully anticipates working closely with the NHDES, LSPA, professional engineers and hydrogeologists and our local communities, to develop storm water and erosion control systems that provide the necessary detention and treatment of runoff at all times of the year.



**Photo 2. Lake Gunnison looking northeastward to Mount Sunapee**



## V. Solid Waste Disposal

Although solid waste is generated in many forms at Mount Sunapee, the handling of these wastes is done pursuant to the relevant regulations and guidelines for the disposal of such waste.

Mount Sunapee does not use the transfer stations in the Town of Newbury or Goshen for any of its solid waste. All solid waste removal is done on a contract basis with Casella Waste Management.

The waste reduction and recycling efforts at Mount Sunapee have increased dramatically over the past ten years. Currently cardboard, glass, maintenance shop waste oils, food service cooking oils, light bulbs, batteries and scrap metals are all recycled.

In the fall of 2010, Casella Waste Management began offering single stream recycling and Mount Sunapee began using that program to increase its recycling efforts. Currently, approximately 38% of all waste generated in our winter operations is recycled through this program. Each year, we try to increase the percentage of recycled waste.

Mount Sunapee expects to be able to fully manage the solid waste for all future upgrades and increases in CCC as described in the MDP.



## VI. Air Quality and Traffic Congestion Mitigation

### A. Air Quality

On January 31, 2014, the NH Department of Environmental Service's Air Resources Division approved a General State Permit (#GSP-EG-0427) to Mount Sunapee for the operation of the four emergency evacuation engines on the chair lifts.

For the past five winter seasons (2014/2015 to 2018/2019), the maximum operation for our emergency evacuation engines has been between 44 and 78 hours. Evacuation engine use consistently operates within the limits set forth in the permit.

Mount Sunapee continues to investigate ways to reduce fuel usage through both conservation and through capital investment in newer, more fuel-efficient technologies.

An example of this was the replacement of the original 1962 boiler in the Spruce Lodge in the summer of 2013. The existing boiler was a single stage, 100% duty fuel oil boiler. It was replaced with a two stage, propane fired boiler. Only the first stage of the boiler operates when the demand on the boiler less than 50% of its capacity. Only when the demand is greater than 50% capacity does the second stage come on-line.

### Summer Use

Summer operations are not expected to generate significant evacuation engine usage, and given the current operation only presents 15% of the maximum allowable, usage is expected to be below operational limits.

### West Bowl Expansion

The proposed chairlift in the West Bowl will be required by ANSI B77.1 Passenger Tramway Code to include an emergency evacuation engine. This will likely be a 500 to 600 horsepower diesel engine.

Mount Sunapee will modify its General State Permit with NHDES to include the additional emissions from this engine.

### B. Traffic Congestion

At present, Mount Sunapee has approximately 2,130 parking spaces to accommodate visitors and employees. This total does not include the 272 spaces in parking lot #4 which have not been built yet and would have to be re-permitted as the previous permits have lapsed.

Mount Sunapee has a Special Use Permit from the New Hampshire Department of Natural and Cultural Resources (DNCR) which allows overflow parking at the Lake Sunapee State Beach parking area on peak winter days. Over the past five years this overflow lot has been used approximately five to six days per winter season.

Usually, the State Beach parking lot is used on peak holiday periods such as during the Christmas to New Year's holiday week, the January Martin Luther King weekend, and the February President's Day weekend.

When the State Beach parking lot is used, Mount Sunapee provides employees and guests with shuttle bus service from the beach parking area to the main base area.

As a condition of this permit, Mount Sunapee provides winter plowing of the beach access road and parking area for DNCR. Plowing happens regardless of whether the parking area is used for overflow during the winter season. Plowing allows public winter access to Lake Sunapee for ice fishing, snowmobiling, hard water sailing and other recreational activities.

Heavy traffic volume at Mount Sunapee is generally associated with a few predictable days throughout the year. Approximately eight to ten days, typically the peak holiday periods described above, during the ski season experience very heavy traffic volumes.

## Summer

Similarly, during the summer months, the nine-day period during the Craft Fair has increased traffic volumes, although it is spread out over a greater part of the day. Peak arrival traffic generally occurs between 8:30 a.m. and 10:30 a.m. Peak departure traffic occurs in a more concentrated pattern generally between 3:30 p.m. and 4:45 p.m. The continued implementation of the Summer Adventure Park has not materially changed the observed traffic pattern due to the much lower car counts for the summer operations.

## West Bowl Expansion

In 2004, Mount Sunapee commissioned a study of traffic impacts and site access associated with the implementation of the MDP, including the West Bowl expansion (see Appendix E). This study, among other things, noted roadways in the area generally had additional capacity to handle new vehicle trips, some intersections in the area have a pool “Level of Service” and may require some mitigation strategies including use of police officer controls or lane widening.

The baseline conditions for the traffic study may need to be updated prior to any finalizing of planning for the West Bowl Expansion. This update would clarify existing traffic flows and ascertain the appropriate mitigation measures.

## VII. Forestry Management

Mount Sunapee recognizes that it must balance natural resources and outdoor recreation. Our identity is linked to how well the natural environment contributes to the sense of being “in” nature. Protection of our forest resources is a critical component in creating this identity.

### A. Timber Management

The forest within the Lease area is not currently managed for timber harvesting nor is timber harvesting an activity in which Mount Sunapee is engaged. Tree clear-cutting is done solely for the purpose of new ski trail construction. Selective cutting of trees and brush is a routine maintenance activity along the edges of existing ski trails. Although large portions of the West Bowl area have been extensively logged in the past, we do not anticipate managing those private lands for timber extraction.

### B. Old Growth Forest

Old growth forest characteristics have been identified by New Hampshire Natural Heritage Inventory in portions of two areas of Mount Sunapee known as “polygon 23” and “polygon 20” in the East Bowl section of Mt. Sunapee. A 1999 report titled “Old Forests and Rare Plants at the Mount Sunapee Ski Lease Area,” identified these two areas as old growth forest.

A more recent study commissioned by DNCR and paid for by Mount Sunapee was completed in 2003. This report entitled, Natural Heritage Inventory of the East Bowl, provides a full documentation of the characteristics and issues involving these two areas. The report states three important facts: 1) that the forest consists of higher elevation natural communities (northern hardwoods and northern-hardwood-spruce-fir) and is the only exemplary site for this combination in southern New Hampshire. Second, that the East Bowl contains a “substantial area that is in old growth condition, nearly 65 acres, which is very rare, especially in this part of New Hampshire.” And third, “the mature forest surrounding these patches of old growth is significant in and of itself and is an essential and integral part of the exemplary forest in the East Bowl. It contributes critically to the long-term integrity and viability of the old growth and over time will acquire certain old forest characteristics as well.”

Consistent with the recommendations of these studies, Mount Sunapee’s management approach to these old growth areas has been avoidance. Lift “J” and associated ski trail were approved in the 2000–2004 MDP within a portion of “polygon 23” outside of the area identified as having “old growth characteristics.” Mount Sunapee will maintain a 200-foot natural wooded buffer between ski trails and areas within “polygon 23” identified as having “old growth characteristics.” Furthermore, Mount Sunapee agreed in 2000 that “polygon 20” would remain in its current state with no new ski trail or lift development.

Mount Sunapee, working cooperatively with the DNCR, agreed to abandon their original expansion plans in the East Bowl and took steps to analyze the capacity of the West Bowl for ski potential. The West Bowl was found to have favorable ski terrain potential. Mount Sunapee is seeking expansion within the West Bowl area to avoid the old growth characteristic areas identified within the East Bowl.

Mount Sunapee commissioned a field review of the forest within the West Bowl by W.D. Countryman and Associates (see Appendix F). Completed in May 2004, the study noted that the private land portions of the West Bowl expansion area have been extensively logged for decades, while the public lands have been left relatively intact. The scientists described the general forest cover as young and relatively sparse.

The Countryman field study did not find any areas of old growth forest or areas with “old growth characteristics.” These field results are consistent with the findings outlined in the 1999 study by New Hampshire Natural Heritage. In that study, they identified polygon five (including portions of the public lands area within the West Bowl) as having “little, if any, clear evidence of old growth” (Old Forests and Rare Plants at the Mount Sunapee Ski Lease Area, page 12).

In September of 2004, the NH Natural Heritage Bureau conducted an evaluation of the proposed ski lease area expansion in the West Bowl. They found that there was considerable historical evidence much of the lower slopes of the mountain had a history of agricultural use (mostly haying and pasturing), timber harvesting, or both. Areas of elevations above 1800 ft were identified as having potential ecological significance, these 4 areas were labeled as Polygons A, B, C, and D. Polygon C was considered ecologically significant in a statewide context as it is one of only a few known examples of high-elevation spruce-fir forest south of the White Mountains. However, given that this polygon is small, isolated, and in very close proximity to existing ski trails, it is of lesser significance when compared to other statewide significant examples in the White Mountains. Polygon D was considered of statewide significance for the following reasons: 1) the condition is good to very good in that it appears to have never been logged (indicators of this are the forest history, the considerable dead and downed woody debris, and the old trees); 2) even small patches of old examples of this natural community type (northern hardwood – spruce-fir forest) are rare in throughout central and southern NH; 3) it is part of a larger mosaic of mature and old growth patches of exemplary forest on Mt. Sunapee; and 4) it is contiguous with and forms the northern extent of the large, un-fragmented forest block to the south (the Sunapee-Pillsbury Highlands).

In 2014, NHB revisited this area and confirmed the original assessment of the forest condition. Polygon D was generally dominated by red spruce, with scattered hardwoods, primarily yellow birch. Conditions within Polygon D were not uniform, with patches of smaller trees interspersed with large spruce and birch stems. Red spruce in the 22-30” diameter range were frequent, and ages for two individuals based on trees cores were approximately 120 years old. More trees were cored in this polygon in 2004, and six of eight of those showed ring counts exceeding 170 years old.

A summary of NHB field assessment information can be found in Appendix G.

## C. Rare Plant Resources

The New Hampshire Natural Heritage Bureau identified populations of two state-threatened plants. First, a state-threatened orchid, Loesel’s wide-lipped orchid (*Liparis loeselii*), existing on the Elliot Slope trail. Second, a plant called greater fringed-gentian (*Gentianopsis crinita*) on the Jet Stream trail. Both plants are apparently perpetuated “in part by management of the open ski runs.” The proposed MDP is not expected to affect the populations. Additionally, the greater fringed gentian population will continue to be protected by mowing the trails after October 25, allowing time for flowering and seed dispersal. The populations have been inventoried annually by New Hampshire Natural Heritage Bureau.



According to the inventory of Rare Plants, Rare Animals and Exemplary Communities in New Hampshire Towns (updated in July 2013) prepared by the New Hampshire Natural Heritage Bureau, no rare plants are noted within the Town of Goshen.

To better verify this inventory, Mount Sunapee retained W.D. Countryman and Associates to complete a field review. During their two-day field visit in May of 2004, their field ecologist did note only one species of potential concern. According to this study, "One species listed on the New Hampshire Natural Heritage Bureau proposed list of Endangered, Threatened, Watch, Extirpated and Intermediate Plant Species was noted during field work. A single butternut tree (*Juglans cinerea*) occurs on the north side of the existing access road off Brook Road. The area appears to have been an old house site, and there are likely to be additional butternuts nearby. Butternut is of concern because of the threat posed by canker dieback (*Melanconis juglandis*), a widespread fungus disease that weakens and then kills the tree. The tree noted at Brook Road can likely be avoided and therefore not be affected by the project." The summary of this field work can be found in Appendix F.

## VIII. Wetlands Impacts

Wetlands at Mount Sunapee are regulated by Local, State and Federal rules. In general, wetlands fall under the jurisdiction of the NHDES and the U.S. Army Corps of Engineers.

### West Bowl Expansion

The National Wetlands Inventory mapping (see Figure EMP-2) shows a wetland complex on the western edge of the West Bowl area. This complex is identified as a scrub-shrub/forested wetland.

Pioneer Environmental Associates conducted onsite field investigations in 2001 and 2004 confirming this known wetland feature (see Appendix C). These field investigations concentrated their efforts on the lower portions of the mountain, where the majority of potential development impacts could occur.

The wetland scientists concluded that the majority of the West Bowl area has been heavily impacted by logging activities that have continued within the parcel for decades. Hardwood species identified include northern red oak (*Quercus rubra*), American beech (*Fagus grandifolia*) and paper birch (*Betula papyrifera*). In general, the site is comprised mostly of samplings with a limited overstory. The study also noted that the National Resource Conservation Service (NRCS) soils survey for Sullivan County, New Hampshire identified the soils within the site from Mondadock (well-drained) to Lyme-Mooskilauke (somewhat to poorly drained).

The site has several small, unnamed streams and drainages moving downhill. The largest of these was observed to flow toward Brook Road through the known Class II wetland and into the Gunnison Brook south of the site. Along this and other smaller drainages some potential riparian wetlands (forested and scrub-shrub) were noted. Some potential wetland areas were observed within obviously constructed drainage ditches. The quality of these wetlands appears to have been largely influenced by the logging activities of the site.

The Best Management Practices (BMPs) employed by Mount Sunapee rely on two basic techniques: avoidance where possible and minimization of impacts elsewhere. The resort has attempted to minimize wetlands impacts within the existing leasehold. The West Bowl expansion provides Mount Sunapee with a new opportunity to implement our BMPs from the earliest point. As the design phase for improvements move forward within the West Bowl, Mount Sunapee will seek ways to avoid or minimize wetland impacts.

Mount Sunapee will update and complete a more detailed delineation of regulated wetlands within the West Bowl as design plans are refined. Based on our current understanding of the site, and with effective design and use of our BMPs, plans for the West Bowl area can be completed with minimal disruption to natural wetland systems.

## IX. Wildlife Habitat Preservation

The State of New Hampshire's Wildlife Action Plan (WAP) has been evolving since 2006. Over this time, the State of New Hampshire Fish and Game Department considered existing field data, established lists of rare or threatened species and worked closely with many conservation partners to identify Species of Greatest Conservation Need (SGCN) along with the habitats they rely on. The current 2015 WAP identifies 169 species and 26 key habitat types to which they were correlated. The process of developing the WAP builds upon a broad habitat evaluation and risk assessment process. As such, the purpose of the WAP is not to explicitly identify specific areas for conservation, but rather to guide decision-making on wildlife and land use/management policy on a statewide basis. The WAP has also been approved by the US Fish and Wildlife Service.

The WAP mapping process identifies three tiers of habitat rankings:

*Highest Ranked in the State* – These areas generally reflect the top 15% of habitats as ranked by the State, but also include very rare or unique habitats and those habitats supporting state-listed wildlife species.

*Highest Ranked in the Biological Region* – The WAP process has broken down the state into regions with similar characteristics such as climate and geology. Within this breakdown, the WAP considered the top 30% of habitats that don't intersect with the highest rank ones described above. Additionally, the WAP included some high priority natural communities to address the role that plant diversity plays with respect to habitats.

*Supporting Landscapes* – The WAP process identifies the top 50% of habitats as informed by the Nature Conservancy's Resilient and Connected Network project.

As shown on Figure 6, within the Mount Sunapee lease area areas within each tier are identified. Again, the methodology used to develop the WAP does not include field verification and validation of any specific listed species. So, while potential habitat for identified species may exist, more site-specific evaluation of species and habitat qualities is needed. As identified in the Town of Newbury Master Plan, several important benefits are imparted by wildlife resources as follows:

- *"An abundant and diverse supply of wildlife and plant resources provides opportunities for education, entertainment, leisure, and recreation, including hunting, fishing, photography, bird watching, nature studies, art and similar activities."*
- *"The presence or absence of native wildlife species, sensitive to pollution or loss of habitat, helps to indicate the condition of the natural environment."*
- *"Abundant and healthy wildlife and plant resources help attract visitors and support entertainment, educational and recreational business opportunities."*

Mount Sunapee Resort supports these values and is committed to managing the leased lands in a manner that does not threaten wildlife habitat. This includes not only the protection of habitat, but also the implementation of programs that enhance and educate the public about the resources and the value of their protection.



No critical wildlife habitat has been identified within the confines of the Mount Sunapee Resort lease lands. Per the most recent New Hampshire Fish and Game Department mapping, no deer wintering areas or deer yards were identified within the lease lands. Improvements currently proposed as part of the proposed MDP will not affect any identified critical habitat.

## West Bowl Expansion

Both the public and private lands within the proposed West Bowl expansion have also been screened for potential wildlife habitat. No critical wildlife habitat was found in the review of information from the State of New Hampshire (Rare Plants, Rare Animals and Exemplary Communities in New Hampshire Towns, July 2013).

A field analysis by W.D. Countryman and Associates, completed in May of 2004, more fully evaluated these issues within the West Bowl area. This study confirmed that the observed wildlife is typical of large wooded tracts within the State of New Hampshire. Evidence of deer and moose was noted during the site walk, most commonly in areas where prior logging had occurred. The field investigators found no evidence of tree scaring by bears, but some potential denning areas were seen at upper elevations along the southern edge of the proposed ski terrain in the West Bowl. The study document can be found in Appendix F.

The field investigation also reviewed the site for the presence of bird species. Due to the timing of the fieldwork, migratory species were not observed in large numbers. The majority of species observed were resident and common to northern hardwood forests. The forests are expected to support a wide variety of both resident and migratory species. Evidence of two twig nests near the Summit Hiking Trail was also noted. These nests were not complete and did not suggest recent use. The field scientists suggest that great blue herons (*Ardea herodias*) were most likely responsible rather than raptor species, due to their position in the canopy. It is noteworthy that these nests were located adjacent to the hiking trail, an area of persistent human presence.

Mount Sunapee is committed to environmental stewardship. We will continue to be vigilante during the implementation of the MDP to address wildlife issues.

## X. Scenic and Aesthetic Qualities

The proposed MDP has carefully considered the aesthetic character of Mount Sunapee. Lift and trail improvements are consistent with the existing visual characteristics of the mountain as a ski area. New trail and lift clearing will be performed in a manner that is consistent with the recreation character of the ski area.

Night skiing and lighting was previously approved in the 2000–2004 MPD for the South Peak area, Elliot Slope, Billy Goat (Pipeline), Duckling (Jet Stream), Eggbeater, Upper Flying Goose, Lower Flying Goose, and Lynx trails. Although night skiing has not been implemented since its approval, it remains an option that may be pursued. These trails are low on the mountain, which will minimize off-site lighting impacts.

Mount Sunapee will comply with the design standards for ski slope lighting as established by the Illuminating Engineering Society of North America (IESNA) and the National Ski Area Association (NSAA). Additionally, other design techniques will be employed to limit the off-site visibility of the proposed lighting. These techniques may include:

- Limiting the height of light poles.
- Locating light poles within the tree line and below the forest canopy.
- Light is directed downward and limited above the horizontal by utilizing high cut-off, shielded and louvered luminaires.

### Summer Use

The existing and expected uses associated with the Summer Adventure Park are wholly compatible with the aesthetic character of Mount Sunapee as a resort area. Contemporary resorts routinely include activities such as canopy tours, zip lines and similar features which are woven around the natural features of the mountain setting and enhance the public's ability to appreciate the natural beauty of the setting. These features and activities are placed low on the mountain and indiscernible from off-site vantage points.

### West Bowl Expansion

The West Bowl expansion presents the opportunity for new recreational skiing terrain at Mount Sunapee which is consistent with the formation and use of Mount Sunapee as a ski area in 1948. Mount Sunapee has always been and will continue to be a leader in alpine skiing recreation in New Hampshire. New architecture and building additions will be designed to be consistent with the recreational and historic character of the region and the surroundings. The use of indigenous materials and colors will be incorporated into new structures.

With the exception of upper lift terminal, new buildings within the West Bowl will be placed on the lower elevation portions of the mountain. This, coupled with appropriate setbacks from Brook Road, will make views of the project very limited in scope and intensity.

As the master plan process continues, Mount Sunapee will address local aesthetic concerns and issues through landscaping and site design.

Night skiing and lighting is not proposed for ski trails in the West Bowl area.

An analysis of potential visibility of the West Bowl area has also been completed. The first step in this process was to determine the general topographic characteristics of the area and define the extent of likely views. This was accomplished by examining the United States Geologic Survey 1:24,000 topographic contour maps of the area surrounding the West Bowl.

Based on this analysis (see Figure EMP-4), we believe that the base area improvements will be seen from very few vantage points. These areas are mostly within the short stretch of Brook Road between NH103 and just south of the site. Even within these areas, the extensive roadside canopy creates effective screening of the project. Other manmade elements, such as those at the Goshen transfer station, are also visible in the foreground within these areas. Photographs from these various vantage points can be found on Figure EMP-5. We also believe that although the proposed ski terrain will likely be visible from a variety of vantage points around the region, they will be viewed at a great distance. In general, the areas to the south and west will have better views of the proposed ski terrain.

Mount Sunapee will work closely with the Sunapee-Kearsage-Ragged Greenway Coalition to address ski trail crossing with the Summit Hiking Trail within the West Bowl. Hikers will be allowed to cross ski trails during the winter ski season.

Mount Sunapee believes that the implementation of the MDP including expansion into the West Bowl area would not create a significant impact to the scenic or aesthetic qualities of the region. Although ski trails and the West Bowl lift may be visible from distant vantage points, these elements are consistent with the scenic context of Mount Sunapee and its role as a winter recreational destination within the region. Base area improvements would be screened from offsite views due to extensive woodland cover and setbacks. Mount Sunapee is also proposing several important mitigation measures for long-term protection of other areas surrounding Mount Sunapee. On balance these measures seem reasonable and consistent with appropriate management of the aesthetic resource.



## XI. Archaeological and Historical Resources

Past discussions with the State of New Hampshire Division of Historical Resources (NHDHR) have not identified any known or documented archeological and/or historical resources within the lease lands or within the private lands proposed for the West Bowl expansion. Furthermore, a review of the state and federal register of historic places found no structures designated as historic NHDHR has been asked to comment on the MDP in the past and will be involved, as necessary, in reference to cultural resources.

# Figures

**Figure 1: Base Map**

**Figure 2: Resource Map**

**Figure 3: Watershed Map**

**Figure 4: Viewshed**

**Figure 5: Photographs**

**Figure 6: Wildlife Action Plan Map**

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# Appendices

**Appendix A. Mount Sunapee Base Area Well Yield Evaluation**

**Appendix B. Wastewater Facilities Evaluation Report**

**Appendix C. Wetland and Surface Water Delineation Study Reports**

**Appendix D. Mount Sunapee West Bowl Expansion Snowmelt Drainage and Watershed Analysis**

**Appendix E. Traffic Impact and Site Access Study**

**Appendix F. Preliminary Wildlife and Habitat Assessment, Mount Sunapee West Bowl Expansion**

**Appendix G. NH Natural Heritage Bureau Mount Sunapee State Forest Assessment Report (2004) and Addendum (2015)**

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