Telephone Gap Integrated Resource Project

Landscape Assessment

Rochester and Middlebury Ranger Districts
Green Mountain National Forest
_Towns of Chittenden, Goshen, Killington, Mendon, Pittsfield, Pittsford, Rutland Town, and Stockbridge; Rutland, Windsor, and Addison Counties; Vermont_

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**Introduction**

Integrated resource projects are one of the main Forest Service strategies for achieving the 2006 Green Mountain National Forest Land and Resource Management Plan (Forest Plan) goals, objectives, and desired future conditions at the site-specific level. They consist of the planning, implementation and monitoring of multiple resource project activities that are interrelated in their geographical location, scope and intended purpose.

The Telephone Gap Integrated Resource Project (IRP) project area is located on the Rochester and Middlebury Ranger Districts, Green Mountain National Forest (GMNF) within Rutland, Windsor, and Addison Counties, Vermont primarily within the town of Chittenden (75% of Forest Service acres) but also includes small portions of Goshen, Killington, Mendon, Pittsfield, Pittsford, Rutland Town, and Stockbridge (see Project Area Map). The Telephone Gap IRP is planned for completion in separate phases covering a four-year period:

- Phase 1 (2019 and 2020), conduct inventory and determine current resource conditions
- Phase 2 (2021), determine methods to obtain desired future resource conditions, and collaborate with the public to develop proposed activities
- Phase 3 (2022), perform formal environmental analysis of the proposed activities per the National Environmental Policy Act (NEPA), and decide what to implement

Forest Service staff has completed Phase 1 of the Telephone Gap IRP from resource inventory information and data collected during field surveys and analysis of existing information throughout 2019 and 2020. The purpose of Phase 1 is to provide enough information to understand the existing resource conditions within the project area and compare it with the desired future conditions provided by the Forest Plan. The difference between these resource conditions is the basis for determining potential management activities to consider for implementation. The **Telephone Gap IRP Landscape Assessment** is the culmination of Phase 1 for this project. It provides the existing condition, desired condition, and potential management activities to bridge the differences for multiple resources within the project area.

This landscape assessment is not meant to be the final word on what management activities will ultimately be chosen for implementation. It is merely a snapshot of the status of our efforts to consider the best combination of potential resource activities to meet Forest Plan direction.

Although the primary focus of Forest Service efforts will be management of National Forest System (NFS) lands, there is also a strong desire to work with state agencies, towns and private landowners to develop activities that would achieve common objectives across land ownership boundaries. The **Telephone Gap IRP Landscape Assessment** will be the basis for entering the next Phase of the project which is to robustly engage with the public and build on the list of potential management activities to include in our final proposal.

**Proposed Project Location**

The Telephone Gap IRP project area is located on both the east and west sides of the spine of the Green Mountains and is roughly bordered by Route 4 on the south; the height of land between Quimby Mountain, Burbree Peak, Shaw Hill and South Hill to the intersection of Route 100 in Stockbridge on the east; the height of land between Wilcox Peak, Round Mountain, Farr Peak and Goshen Mountain on the north; and the height of land from Waste Hill in Brandon through Birch Hill, Cox Mountain, Blueberry Hill to Route 4 in Mendon on the west. It currently consists of approximately 32,252 acres of National Forest System (NFS) land (45 percent of the area), not including the acreage contained in the potential South Pond acquisition and 40,001
acres of non-NFS land (55 percent of the area) for a total of 72,253 acres. These acreages and percentages may change throughout the course of the project due to pending Forest Service land acquisitions (such as the 2,756-acre South Pond Parcel). The potential changes in acreage by management area are contained in the Table 1. Although non-NFS land is dispersed throughout the project area, the majority is located to the far eastern and western portions.

Table 1 provides the NFS lands within the project area allocated to Forest Plan Management Areas – each having a unique desired condition and emphasis for management to collectively achieve Forest Plan goals, objectives, and desired future conditions. The project area also includes 1,551 acres of Eligible Wild and Scenic River corridor along the Ottauquechee River, which overlays other Management Areas and non-NFS land.

Table 1. Acreage by management area within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Acres</th>
<th>Percent of Area</th>
<th>Acres with South Pond Parcel</th>
<th>Percent with South Pond Parcel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverse Backcountry</td>
<td>15,703</td>
<td>49</td>
<td>17,901</td>
<td>51</td>
</tr>
<tr>
<td>Diverse Forest Use</td>
<td>7,677</td>
<td>24</td>
<td>7,870</td>
<td>23</td>
</tr>
<tr>
<td>Long National Recreation Trail</td>
<td>1,148</td>
<td>3</td>
<td>1,513</td>
<td>4</td>
</tr>
<tr>
<td>Remote Backcountry Forest</td>
<td>1,736</td>
<td>5</td>
<td>1,736</td>
<td>5</td>
</tr>
<tr>
<td>Remote Wildlife Habitat</td>
<td>4,774</td>
<td>15</td>
<td>4,774</td>
<td>14</td>
</tr>
<tr>
<td>Appalachian Trail</td>
<td>858</td>
<td>3</td>
<td>858</td>
<td>2</td>
</tr>
<tr>
<td>Existing/Candidate Research Natural Area</td>
<td>356</td>
<td>1</td>
<td>356</td>
<td>1</td>
</tr>
<tr>
<td>Grand Total</td>
<td>32,252</td>
<td>100</td>
<td>35,008</td>
<td>100</td>
</tr>
</tbody>
</table>

Landscape Assessment Outline

This landscape assessment provides information for all resources inventoried within the project area and considered for potential project management activities. Each resource section is organized using the following outline:

1. INTRODUCTION AND BACKGROUND
   a. General Description

2. EXISTING CONDITION
   a. Inventory Methodology/Process
   b. Inventory Findings

3. DESIRED FUTURE CONDITION
   a. Forest Plan Goals and Objectives
   b. Forest Plan Desired Future Condition

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION
   a. Gap Description
   b. Opportunities
   c. Initial Possible Activity List

5. ISSUES AND CONCERNS

6. REFERENCES (if required)
Ecological Diversity

1. INTRODUCTION AND BACKGROUND

General Description

The Ecological Diversity resource within the Telephone Gap IRP project area includes current forest composition and age class in comparison with ecological tendencies at the broad scale and the ecologically rare or unique features at the fine scale.

An assessment of ecological diversity within the project area is driven primarily by the National Forest Management Act (NFMA) of 1976, which requires the agency to “…provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives…” (16 USC 1604 (g) (3) (B)). Ecological diversity is analyzed using both a coarse filter and a fine filter approach (USDA FS 2006a, pp. 3-13 to 3-14). A coarse filter approach captures diversity by relying on management that maintains or restores the natural variety of ecosystems in an area – i.e. habitat (Kaufmann et al. 1994); this approach assumes that species diversity will be maintained as a result. Rare species and/or rare habitat often pass through the coarse filter, and so we also apply a fine filter approach consisting of specific management to protect individual species, species groups, and rare habitat.

This section of the Landscape Assessment will focus on natural communities and landscape diversity (above the species scale). Ecological diversity includes (1) diversity in composition of the various types and scales of ecosystems; (2) diversity in vegetation structure, including age class; and (3) diversity in function, focusing on ecosystems that are unique, old, rare, or of other ecological significance, as well as ecological processes like natural disturbances, fragmentation and connectivity associated with these ecosystems. This third element addresses part of the fine filter analysis related to ecological diversity by including an analysis of the less common ecosystems. Other sections will address the species level of ecological diversity, including rare plant and animal species, as well as other aspects of the ecology of the project area, including soils, hydrology, and wetlands.

2. EXISTING CONDITION

Inventory Methodology/Process

Forests are commonly divided into units called “stands” for management purposes. Stands are areas of similar tree composition and structure; stands can range in size from one acre to over 100 acres depending upon the variability of the terrain, underlying soils and geology, and management history. All federal lands within the GMNF have been mapped into stands over time, and those stand boundaries often change because of management, disturbances, inventory protocol changes, new information, and upgraded technology.

Inventory data used to measure composition and age class for general habitat types on the GMNF is gathered through stand exams. A stand exam consists of a series of measurement plots placed within a stand which measure a variety of site, topographic, tree, and other vegetation variables. The stand exam protocols have been standardized since the 1970s, although the protocols have changed periodically based on increasing needs for statistical accuracy. When stand exams are not possible, coarser measurements of composition and age class are gathered through modeling with Geographic Information Systems (GIS) and existing
data and imagery. Stand mapping was revised and updated for the entire project area through January 2021.

Inventories to identify and evaluate rare, uncommon, or outstanding natural communities or features were conducted intensively by Vermont Natural Heritage Inventory (VNHI) during the 1990s and has continued periodically by VNHI and Forest Service - GMNF staff since then. These inventories identify rare, uncommon, and outstanding examples of plant and animal species and natural communities, and the Forest Service has maps and data of these occurrences within GIS databases. These inventories were limited by the state of mapping and habitat modeling technology at the time. Substantial updates were completed in 2020, with the State of Vermont documenting more than 30 new state significant natural communities. Areas of potential old forest characterized by numerous old trees were also delineated. These areas are different from old growth forest, which is defined as “a patch of relatively old forest of at least 5 to 10 acres that has escaped catastrophic or stand-replacing disturbance associated with the prevailing natural disturbance regimes of the Forest. Such old growth stands exhibit a long history of continuity and a demonstrated future via replacement dynamics.” USDA FS 2006, page 146).

**Habitat Management Unit Analysis Process**

The 2006 Forest Plan identifies Forest-wide objectives for vegetation composition and age class (pages 10 to 12) to provide a diversity of habitats (including forest types, age-classes, and non-forested habitats) across the landscape. To apply these objectives to a smaller geographical scale, the Forest Service conducts a Habitat Management Unit (HMU) analysis. The primary function of a HMU analysis is to ensure that the Forest-level composition and age class objectives are translated down to a project level scale in a way that also considers localized ecological conditions. The HMU analysis identifies the current conditions of the HMU, compares these conditions with ecological tendencies from Potential Natural Vegetation (PNV) based on Ecological Land Type (ELT) mapping and other sources of information, evaluates this information in the context of both Forest Plan goals and objectives as well as real-world conditions on the ground, and develops HMU-specific habitat objectives based on these considerations.

Potential Natural Vegetation is defined as “the plant community that would become established if all successional sequences were completed without human interference under the present environmental and floristic conditions, including those created by man” (Winthers et al. 2005), and represents the theoretical baseline for optimal composition. Ecological Land Type (ELT) maps were developed for the GMNF in the early 1980s. These maps are based on data from over 1,000 plots on which vegetation, soil, and physiographic variables were measured. These data have been analyzed over the years to identify ecological types that represent certain combinations of vegetation, soil, and physiography that recur in certain geographic regions of the GMNF. Ecological Land Types are mapped for the Telephone Gap IRP project area. In addition to ELTs, the use of aerial imagery in color and black and white also help to validate and modify the PNV predictions from ELTs based on obvious characteristics like the presence or absence of conifers in the canopy and understory of stands. Ecological maps and aerial imagery together are used to predict PNV and thereby identify optimal composition.

**Inventory Findings**

**Composition**

The project area carries the influence of historical land use: Forests were cleared for agricultural purposes then subsequently abandoned in the 1800s to early 1900s. Reforestation has progressed to a landscape of predominantly silviculturally mature and ecologically mid-
successional forests. Due to forest succession, northern hardwood forest with softwood understory dominates the landscape. Most of the Telephone Gap IRP project area has received no management in several decades. Some Forest Service management occurred in the 1980s, with additional timber sales planned at that time but later abandoned. Many previously even-aged stands have developed a clear softwood understory, resulting in development of a two-story structure on much of the suitable landbase.

Table 2 provides the existing forest habitat type composition on all NFS lands within the Telephone Gap IRP project area. It also compares the Forest Plan long term habitat composition objectives with the HMU specific objectives based on the PNV across the project area landscape. The existing forest habitat type on lands suitable for timber management is provided for context.

Northern hardwoods dominate the composition of the project area (76 percent), although 69 percent of these stands occur on ELTs that are considered ecologically to be mixedwood sites. Projected natural succession based on ELTs suggests that the HMU will become dominated by mixedwood (mostly red spruce-northern hardwoods), with much lesser amounts of northern hardwoods. Mixedwood habitat currently comprises around 13 percent of the acreage of the HMU, but ELTs predict 60 percent of the HMU in mixedwood forests. Ninety-four percent of the mixedwood ELT sites that aren’t currently mixedwood are dominated by northern hardwoods. Just over half of current mixedwood habitat (52 percent) falls on softwood ELTs, and so are expected to become spruce-fir or hemlock habitat over time. However, the long-term net increase in mixedwood habitat based on ELTs will occur due to the successional development from northern hardwood habitat.

Regarding softwood, spruce-fir currently comprises three percent of the landscape, but 14 percent is expected based on ELTs. Most (86 percent) existing spruce-fir habitat occurs on spruce-fir ELTs; approximately half of existing hemlock-pine (48 percent) occurs on the hemlock-pine ELT, with the other approximate half on mixedwood ELTs. In addition to its importance in deer winter range habitat, numerous bird and mammal species also use hemlock habitat types (DeGraf and Rudis 1986); hemlock also plays an important role in water cycling, regulating stream flow and shading streams to keep water temperatures cooler and more stable, and to keep streams more oxygenated.

Oak is currently a small (less than one percent) but ecologically important component of the landscape. If areas of oak which may have become established due to sheep grazing in the 1800s are unmanaged, they will continue on a trajectory to become stands of maple-beech-birch northern hardwood. Aspen and paper birch are early successional species and are not represented in the ELTs. Ninety-nine percent of existing birch is currently on mixedwood or northern hardwood ELTs. The small number of aspen-dominated areas (13 acres) are on mixedwood or northern hardwood ELTs.

There are 15 acres of upland opening habitat existing within the powerline corridor within the project area. There are an additional 27 acres of upland openings that have also been established. These acres are particularly challenging for maintenance due to access issues and steep terrain. Nine of the 27 acres are being evaluated for continued maintenance as upland openings.
Table 2: Comparison of Forest Plan habitat type long-term composition objectives with Habitat Management Unit objectives for all NFS lands within the Telephone Gap IRP Project Area.

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Existing Habitats (All NFS Land)</th>
<th>Existing Habitats (Suitable Land)</th>
<th>Potential Natural Vegetation (PNV)</th>
<th>Forest Plan Objectives</th>
<th>HMU Long-term Habitat Composition Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres %</td>
<td>Acres %</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Northern Hardwood</td>
<td>24,334 76</td>
<td>19,702 92</td>
<td>20</td>
<td>30-40</td>
<td>15-25</td>
</tr>
<tr>
<td>Mixedwood</td>
<td>4,128 13</td>
<td>1,111 5</td>
<td>60</td>
<td>45-55</td>
<td>50-70</td>
</tr>
<tr>
<td>Mixedwood-Spruce</td>
<td>3,831 12</td>
<td>935 4</td>
<td>51</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mixedwood-Hemlock</td>
<td>297 1</td>
<td>176 1</td>
<td>9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Softwood</td>
<td>1,189 4</td>
<td>461 2</td>
<td>15</td>
<td>15-25</td>
<td>5-20</td>
</tr>
<tr>
<td>Hemlock-Pine</td>
<td>204 1</td>
<td>146 1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Spruce-fir</td>
<td>928 3</td>
<td>315 1</td>
<td>14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Swamp Softwoods</td>
<td>57 &lt;1</td>
<td>- -</td>
<td>&lt;1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Aspen-Birch</td>
<td>1,328 4</td>
<td>90 &lt;1</td>
<td>NA</td>
<td>1-5</td>
<td>1-2</td>
</tr>
<tr>
<td>Aspen</td>
<td>13 &lt;1</td>
<td>13 &lt;1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Birch</td>
<td>1,315 6</td>
<td>77 &lt;1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Oak-Hardwoods</td>
<td>76 &lt;1</td>
<td>0 0</td>
<td>1</td>
<td>1-5</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Open Upland</td>
<td>42 &lt;1</td>
<td>- -</td>
<td>&lt;1</td>
<td>1-5</td>
<td>0.5 - 1</td>
</tr>
<tr>
<td>Open Wetland</td>
<td>1,073 3</td>
<td>- -</td>
<td>3</td>
<td>1-2</td>
<td>3-4</td>
</tr>
<tr>
<td>Totals</td>
<td>32,170 100</td>
<td>21,364 100</td>
<td>100</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>

1 Represents the proportion of all lands in the Telephone Gap IRP project area suitable for timber management by habitat type; shown for context, as some habitat types (e.g. Aspen/Birch) require timber management to exist at the levels defined by the Forest Plan and Project objectives.

Age Class and Structure

Table 3 provides the existing age class distribution for important forest habitat types on NFS lands suitable for timber management within the Telephone Gap IRP project area compared to Forest Plan and HMU age class distribution objectives. The existing forest habitat type age class distribution on all NFS lands is also provided for context. Age class objectives are only applied to forested lands suitable for timber management which are currently in even-aged condition (single-story tree structure; 6,768 acres). The remaining 68 percent of the suitable landbase (14,597 acres) are in an uneven-age condition (two-story, multi-story, or mosaic tree structure), well above the 20 percent minimum required by the Forest Plan. It should be noted this amount of uneven-age conditions differs from the amount provided in the Timber Resource section of this landscape assessment. This difference is attributed to categorizing uneven-aged stands with just a two-story canopy structure from an ecological perspective versus a more multi-storied canopy structure used to define uneven-aged stand conditions from a silvicultural perspective.

The vast majority (92 percent) of the suitable landbase is currently in northern hardwoods: 55 percent in mature northern hardwoods (slightly over the Forest Plan objective range), 20 percent in old northern hardwood (within the Forest Plan objective range), and 17 percent in young northern hardwood which are all below Forest Plan objectives (Table 2). Five percent of the suitable landbase is currently in old mixedwood (at the bottom of the Forest Plan objective range).
The remaining three percent of acreage in the suitable even-aged landbase accounts for all remaining habitat type age classes, which are also all below the Forest Plan objective ranges. The regenerating age class for all habitat types is absent. The 55 acres of birch in the suitable even-aged landbase are entirely in mature (seven acres) or old (48 acres) age classes.

Table 3: Comparison of the existing age class distribution on NFS lands suitable for timber management within the Telephone Gap IRP Project Area with Forest Plan and HMU age class distribution objectives.

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Age Class</th>
<th>Existing Condition (All NFS Land)</th>
<th>Existing Condition (Suitable)</th>
<th>Forest Plan Objectives (Suitable)</th>
<th>HMU Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Years</td>
<td>Class</td>
<td>Acres</td>
<td>%</td>
<td>Acres</td>
</tr>
<tr>
<td>Northern hardwood</td>
<td>0-9</td>
<td>Regen.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10-59</td>
<td>Young</td>
<td>2,176</td>
<td>7</td>
<td>1,122</td>
</tr>
<tr>
<td></td>
<td>60-119</td>
<td>Mature</td>
<td>16,907</td>
<td>54</td>
<td>3,744</td>
</tr>
<tr>
<td></td>
<td>120+</td>
<td>Old</td>
<td>5,252</td>
<td>17</td>
<td>1,324</td>
</tr>
<tr>
<td>Mixedwood</td>
<td>0-9</td>
<td>Regen.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10-39</td>
<td>Young</td>
<td>59</td>
<td>&lt;1</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>40-99</td>
<td>Mature</td>
<td>794</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>100+</td>
<td>Old</td>
<td>3,275</td>
<td>11</td>
<td>336</td>
</tr>
<tr>
<td>Softwood</td>
<td>0-9</td>
<td>Regen.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10-39</td>
<td>Young</td>
<td>11</td>
<td>&lt;1</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>40-99</td>
<td>Mature</td>
<td>363</td>
<td>1</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>100+</td>
<td>Old</td>
<td>815</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Aspen</td>
<td>0-9</td>
<td>Regen.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10-39</td>
<td>Young</td>
<td>13</td>
<td>&lt;1</td>
<td>13</td>
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<tr>
<td></td>
<td>40-59</td>
<td>Mature</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>60+</td>
<td>Old</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Birch</td>
<td>0-9</td>
<td>Regen.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10-49</td>
<td>Young</td>
<td>0</td>
<td>&lt;1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>50-79</td>
<td>Mature</td>
<td>7</td>
<td>&lt;1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>80+</td>
<td>Old</td>
<td>1,308</td>
<td>4</td>
<td>48</td>
</tr>
<tr>
<td>Oak</td>
<td>0-9</td>
<td>Regen.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10-59</td>
<td>Young</td>
<td>0</td>
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<tr>
<td></td>
<td>60-99</td>
<td>Mature</td>
<td>76</td>
<td>&lt;1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>100+</td>
<td>Old</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All Types</td>
<td>Regen.</td>
<td></td>
<td>2,021</td>
<td>7</td>
<td>1,192</td>
</tr>
<tr>
<td></td>
<td>Young</td>
<td></td>
<td>14,551</td>
<td>57</td>
<td>3,852</td>
</tr>
<tr>
<td></td>
<td>Mature</td>
<td></td>
<td>4,792</td>
<td>35</td>
<td>1,724</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td></td>
<td>31,056</td>
<td>100</td>
<td>6,768</td>
</tr>
</tbody>
</table>

1 For extended rotations, age at start of old age class is 150 years for northern hardwoods, mixedwood, softwoods, and oak.
2 Condition across all National Forest System (NFS) lands within the Telephone Gap IRP project area.
3 Applies only to NFS lands suitable for timber management which are currently in even-aged condition.
Acre range represents potential natural vegetation of suitable NFS lands assigned to an even-aged management status (60-80 percent of suitable lands), adjusted for conversions to or maintenance of existing aspen, birch, and openings.

**Process and Function**

Designated rare and ecologically special areas include The Cape Research Natural Area, Blue Ridge Fen Candidate Research Natural Area, and North Pond montane yellow birch-red spruce forest:

- The Cape Research Natural area is a high-quality mature and old growth enriched northern hardwood and red spruce-yellow birch forest.
- Blue Ridge Fen is currently designated as a Candidate Research Natural Area (cRNA) as documented in the 2006 Forest Plan. An updated and detailed Establishment Record and administrative review and approvals are needed to complete and finalize designation as a Research Natural Area (RNA). Some documentation for an Establishment Record for final Research Natural Area designation was completed in the 1980s.
- North Pond sits at approximately 2,500 feet elevation and is surrounded by very undisturbed old montane spruce-fir forest, a cold air talus woodland, and some calcareous seepage. Trees are large-diameter and well over 200 and 300 years old.

Evidence of calcium enrichment has been observed on several sites in the project area, including higher elevations, resulting in rich woods communities and northern hardwood forests extending higher in elevation than observed elsewhere on the GMNF (such as Blue Ridge).

Thirty-five new state significant natural communities were described by the State of Vermont in the project area in 2020 and inventory will continue in 2021.

Swaths of forest totaling over 1,600 acres were preliminarily delineated as potential old forest, which are areas characterized by numerous old trees, with old growth characteristics not yet evaluated or documented. These areas predominantly coincide with steeper slopes in forest unsuitable for historical and current timber management. Further investigation and inventory will document the old forest characteristics of these areas, investigate what documentation is available on their historical land use, and evaluate these areas for wildlife habitat characteristics and presence of rare plants.

The effects from the of extirpation of the beaver, a landscape engineer and keystone species, more than 100 years prior to European settlement remain on the landscape. At least two-thirds of the wildlife species listed as Regional Forester Sensitive Species (RFSS) and numerous RFSS plant species would benefit from improving or increasing the types of habitats that beavers create and maintain.

**3. DESIRED FUTURE CONDITION**

**Forest Plan Goals and Objectives**

Forest-wide goals and objectives relating to ecological diversity are located in Section 2.2.2 of the Forest Plan (USDA Forest Service 2006). Specific, relevant, goals and objectives for the ecological diversity include:

- Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.
Forest-wide Habitat Composition and Structure Objectives

- Maintain habitat types on sites that ecologically support them.
- Increase mixedwood and softwood forests on mixedwood and softwood sites and enhance existing habitat.
- Increase aspen and paper birch forests.
- Increase late-successional and old forest habitats within lands unsuitable for timber management.
- Increase upland opening habitat.
- Maintain forested and non-forested wetlands.
- Apply long-term composition objectives in Table 2.2-1 in the context of these other noted composition objectives.

Age Class Objectives

- Maintain a full range of age classes on lands suitable for timber management, including late successional, multi-age, and regenerating forest conditions, using objectives outlined in Table 2.2-2.
- Manage at least 20% of suitable lands using uneven-age silvicultural systems to create multi-age conditions.
- Apply extended rotations found in Table 2.2-3 to the Diverse Backcountry and Remote Wildlife Management Areas (MAs), and other suitable lands as appropriate, to enhance wildlife habitat and ecological diversity.

Threatened, Endangered, Proposed, and Sensitive Species; Species of Local Interest; Rare and Exemplary Natural Communities Objectives

- Coordinate with the Vermont Agency of Natural Resources (VANR) to maintain and enhance habitat conditions for the State’s rare species and natural communities.
- Protect critical habitat and key habitat features upon which federally listed endangered, threatened, proposed species, and Regional Forester’s Sensitive Species depend.

Goal 4: Maintain or restore aquatic, fisheries, riparian, and wetland habitats.

- Objective
  
  - Restore and improve aquatic, riparian, fisheries, and wetland resources.

Goal 6: Maintain or restore ecological processes and systems on the Green Mountain National Forest (GMNF) within desired ranges of variability, including a variety of native vegetation and stream channel types, and their patterns and structural components.

- Objective
  
  - Manage at least 5 percent of each ecological type for old growth characteristics.

Goal 7: Protect rare or outstanding biological, ecological, or geological areas on the GMNF.

- Objective
  
  - Maintain or enhance areas with rare or outstanding biological, ecological, or geological features.

Goal 9: Demonstrate innovative, scientifically, and ecologically sound management practices that can be applied to other lands.

- Objective
➢ Develop demonstration forestry projects where state-of-the-art silvicultural practices are applied (e.g. silviculture to enhance softwoods and oaks, and for extended rotations).

Forest Plan Desired Future Conditions

Forest Plan Composition and Age Class desired conditions are provided in the Forest Plan Tables 2.2-1 and 2.2-2, respectively. The HMU analysis applied the composition and age class objectives more locally to the Telephone Gap IRP project area (Tables 2 and 3).

Composition

The optimal composition for the Telephone Gap IRP project area can be defined generally as a mixture of broad, large patch, and small patch natural communities in areas of the landscape that are ecologically well-suited to these communities. This mixture would include natural communities that have developed through natural disturbance processes, as well as those that have been created through direct management of vegetation. The composition objectives found in the Forest Plan represent general habitats at the broad or large patch scale and are the most straightforward to use in defining these objectives on NFS lands given our current information and technology. The optimal composition of these more general habitats on NFS lands can be found in Table 2 under the columns labeled “HMU Long-term Habitat Composition Objectives.”

Age Class and Structure

The optimal condition for age class and structure is to have a diversity of ages and structures present across the various habitat types within the Telephone Gap IRP project area. On NFS lands, the Forest Plan identifies a variety of desired structures across various management areas. For instance, within the Diverse Backcountry and Remote Wildlife Habitat Management Areas (MAs), extended rotations are recommended, where forests will have a generally even-aged structure but with representative ages extending to 150-200 years and older. With the extension of rotation age, these forests will also have the opportunity to develop more botanical diversity, more canopy diversity, and a more diverse structure below the canopy (Carey and Curtis 1996). The Diverse Forest Use MA will have a similar even-age structure, but with most stands and trees being less than 100-120 years old. On suitable lands, Forest Service staff may also use the “shelterwood with reserves” even-age regeneration method to regenerate species more tolerant of shade, which creates a two-age forest structure by leaving a light overstory of trees during regeneration harvesting. On unsuitable lands within MAs where timber management may occur, natural disturbance processes generally regulate structure and age class. The optimal condition for these forests is a forest age structure similar to that modeled for pre-settlement forest conditions in the Northeast by Lorimer and White (2003), with 1 to 6 percent of the landscape in early successional young age classes and 60 to 90 percent over 150 years old. For the Appalachian National Scenic Trail, Long National Recreation Trail, Remote Backcountry Forest, and Existing and Candidate Research Natural Area MAs, age class and structure are not managed in these areas and so there are no optimal conditions defined.

For all suitable forested lands within the GMNF, the Forest Plan further defines age class objectives for even and uneven-age conditions. Suitable forested lands are collectively required to have at least 20 percent under uneven-age management, meaning forested stands and landscapes under this management will have trees of several sizes and ages. For the Telephone Gap IRP project area, suitable forested lands account for 31,056 acres, and so the acreage under uneven-age management or in that condition should be at least 6,211 acres.
Based on the suitable even-age management objectives in the Forest Plan (page 11), we have calculated a preliminary range of acreage in each age class by habitat types to represent the theoretical optimal age class distribution for NFS lands in the project area (Table 3). These ranges are based on the preliminary HMU long-term composition objectives for the area, with adjustments for conversions of hardwood and mixedwood stands to aspen and opening habitats. Additional inventory may lead to adjustments in these numbers.

**Process and Function**

The optimal condition related to ecosystem process and function is that ecosystems of various types and scales are present and distributed across the project area consistent with the ecological potential of the landscape to host them, with most if not all of their full complement of associated native biodiversity. These ecosystems would be able to accommodate disturbance or change, either through being resistant to change, or being resilient and able to recover from or adapt to change with minimal losses in biodiversity. Natural disturbance processes, or human disturbances that mimic them, are able to operate within these ecosystems to enhance structural and compositional complexity. Organisms can move across the landscape to access habitats important to them at various life stages, to find more suitable habitat, or as dispersal from natal areas. On NFS lands, MA allocation and composition and structure objectives are designed to enable ecosystems on the Forest to function effectively in providing for biodiversity at several scales. These objectives represent the coarse filter approach to biodiversity, focusing on more common natural communities and species. Rare, uncommon, or outstanding examples of ecosystems of various scales are sometimes missed by the coarse filter approach.

Goals 2 and 7 define the optimal conditions related to these less common ecosystems on federal lands. The Forest Plan requires protection of ecological types that are rare or outstanding, and requires management to perpetuate both their value as habitat for individual species, and their value as functioning small or large patch ecosystems nested within larger scale systems. These patches generally include examples of ecological types considered very rare in Vermont (e.g. less than 6 examples), high quality examples of types which are rare or uncommon in Vermont or on the GMNF, and outstanding examples of common habitats in Vermont or the GMNF (e.g. a patch of old growth forest).

Goal 6 addresses ecosystem process and function by ensuring that natural disturbance regimes are allowed to regulate some of our ecosystems. Some species and natural communities have developed in concert with disturbances that are now missing or occurring more or less frequently than in the past. For example, beavers were mostly absent from the landscape during the nineteenth and first half of the twentieth century. Steeper terrain on GMNF may limit their dispersal and recolonization. Beaver-based restoration (e.g., improving habitat for beavers or installing structures that mimic beaver activity) has the potential to restore process and function historically provided by beavers on a site-specific basis.

Old growth conditions are also rare on the Forest. Land clearing for homesteading and farming dramatically reduced forest cover in the 19th and early 20th centuries. Timber harvesting since land abandonment in the early 20th century has perpetuated more frequent and larger-sized disturbances than would be typical under natural disturbance regimes (i.e. from insects, disease, wind, ice, floods, or beaver activity). Stands that have generally remained unmanaged since land abandonment have the greatest potential to develop old growth conditions over the next 100 years.
Other Sources for Desired Future Conditions

Forest management will seek to improve forest resilience to changing climate and forest pests. Climate change models predict wetter winters with long shoulder seasons with more frequent freeze/thaw cycles, and summers which are hotter and dryer (Janowiak et al. 2018).

Connectivity has become increasingly understood as a critical ecosystem function, particularly considering climate change and the need for species to move to more suitable habitats. The Telephone Gap IRP project area roughly coincides with a highest priority interior forest block (Sorenson and Zaino, Vermont Conservation Design 2018). The desired future condition would consist of decreasing, to the extent practicable, the barriers between this interior forest block and others located nearby. Newly funded collaborative research will seek to identify the locations and relative contributions of connectivity corridors within the GMNF for a diversity of wildlife species.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

Tables 2 and 3 provide a comparison between the existing and desired future conditions of the Telephone Gap IRP area for composition and age class for the major habitat types on the Forest, and so provide insights into existing gaps between current and desired conditions. The last column in each table provides project-specific long-term objectives. It is unlikely that many of these objectives will or can be met with any one project or at any one time, but each project helps to move habitats toward these objectives.

Overall, the landscape is dominated by the northern hardwoods habitat type, whereas Potential Natural Vegetation based on Ecological Land Types predict predominantly mixedwood forests. This was caused by successional reforestation after agricultural clearing and abandonment and subsequent management. Smaller but ecologically important habitat types including oak and aspen/birch require management to remain on the landscape.

Many waterways have reduced complexity, incision issues, and loss of wetlands and wet meadows due to the extirpation of beavers in the 1600s. There has been some recolonization by beavers since then, but valleys are largely developed so dispersal opportunities may be limiting recolonization opportunities at higher elevations.

Opportunities

Timber harvests and silvicultural treatments can help move portions of the project area toward composition and age class objectives set by the Forest Plan for the following forest habitat types:

**Hardwood**

Silvicultural treatments may shift a portion of northern hardwood stands closer to their ecological tendencies based on ELTs.

**Mixedwood and Softwood**

Strong softwood and mixedwood understories present opportunities to increase these habitat types on the landscape closer toward Forest Plan objectives. Retain softwoods in cool pockets where they are most likely to be resilient to changing climate.
Hemlock
Retention of current levels of hemlock habitat and conversion of mixed hemlock-hardwood to hemlock is feasible through natural processes or through vegetation management.

Oak
Stands with a strong oak component with regeneration present opportunities for management to retain oak as a landscape component.

Aspen/Birch
Use regeneration harvesting to create aspen-birch and other early successional habitat to enhance this habitat type and diversify the forest landscape.

Upland Openings
Upland openings are created and maintained to provide this habitat type for several wildlife species and to diversify the forest habitat. Restore upland openings targeted for this condition and develop a maintenance schedule and funding and implementation strategy to ensure their perpetuation.

Other management opportunities include the following:

- Management of mature and old (silvicultural age) stands keeps these stands in silvicultural rotation and increases management options in the future.
- Evaluation of potential old forest areas for old growth characteristics and consideration of alternative designations if appropriate.
- Manage for composition and diversity with climate change adaptation in mind.
- Improve habitat for beavers and/or implement beaver-based restoration techniques (such as artificial dams) on appropriate sites to develop and maintain wetland, wet meadow, and complex waterway habitat for numerous wildlife and plant species and to increase water storage and flood attenuation as restoration and as climate change mitigation.

Initial Possible Activity List

- Enhance and maintain oak where it exists with potential for a regenerating age class via mid-story removal, cut-stump herbicide, and multiple prescribed fire entries. Potential stands preliminarily identified within Compartment (C) 146, C137, and C134.
- Conduct Beaver Restoration Assessment Tool (BRAT) modeling to evaluate the capacity of the landscape for beaver activities and beaver-based restoration. Implement beaver habitat improvement or construct beaver dam analogs or other structures which mimic beaver activity.
- Enhance aspen/birch or hardwood regeneration areas as potential food and dam-building materials for beaver; evaluate potential for beaver-based restoration (including building structures that mimic beaver dams) if appropriate sites can be determined.
- Quantify and document old growth characteristics of areas flagged as potential old forest during 2020 field inventory.
- Complete inventory and documentation (Establishment Record) and administrative reviews/approvals to finalize RNA status for Blue Ridge Fen cRNA.
5. ISSUES AND CONCERNS

- Steep terrain and access issues make maintenance of permanent upland openings particularly challenging in the project area.
- Steepness may be a limiting factor on opportunities for beaver-based restoration in the project area.
- Emerging forest pests and changing climate complicate management of forests for overall resilience as well as long term composition and age class objectives.
- A better understanding is needed of locations and relative contributions of connectivity corridors for a diversity of wildlife species on the GMNF, along with quantifying the role of forest management in potentially enhancing or disrupting habitat connectivity at the forest stand scale.
- To address ecological diversity within the Telephone Gap IRP area, we have identified several questions to highlight potential issues, concerns, and opportunities.

> Composition
  - How does the current composition compare to Forest Plan objectives and desired conditions as well as with climate change projections?
  - Are there habitats that are under-represented that we could create or enhance through management, like aspen-birch or upland openings?
  - How are aspen and upland openings distributed across the landscape, and are there barriers to successful maintenance of or conversion to these types? What silvicultural treatments can be applied to maintain or increase the abundance of these habitats?
  - Are hardwood stands occupying sites that are ecologically more supportive of softwoods with adequate softwood reproduction to consider conversion?
  - Are there plantation forests of non-native species that should be converted to native species?

> Age Class and Structure
  - How does the current age class distribution compare to Forest Plan objectives and desired conditions?
  - Are the regenerating, young, or old age classes under-represented on suitable lands within any or all habitat types? How are these age classes represented within the non-federal land base in the project area?
  - How many acres of land are being managed using uneven-aged management, or are in an uneven-aged condition? Does it constitute at least 20 percent of the suitable landbase? If not, how can we reach this objective while also working towards objectives that require even-aged management?
  - In the Diverse Backcountry and Remote Wildlife Habitat MAs, are mature stands healthy enough to be managed for extended rotations? If not, how should stands in these MAs be managed so that the old age class objectives can still be met?

> Process and Function
  - What are the landscape-scale ecological characteristics of the IRP area, including historical and current disturbance and connectivity?
• Are there any known or potential rare, uncommon, or exemplary natural communities in the area? What is their condition and should they be reserved in another MA designation?
• How can we make sure that sensitive natural communities, wetlands in particular, and the important roles they play are protected from project activities (e.g. timber harvest)?
• Are there young and early mature stands within the Diverse Backcountry and Remote Wildlife Habitat MAs to which a thinning prescription could be applied for extended rotation?
• Are there barriers to connectivity within the IRP and between the IRP and important state linkages? Are there actions that could be taken in collaboration with other landowners and managers to reduce these barriers?
• Are any old stands showing old growth characteristics (e.g. development of uneven-aged structure, average age >150 years)?

6. REFERENCES


Timber Resources

1. INTRODUCTION AND BACKGROUND

General Description
Forest as a landcover currently comprises nearly 96 percent of the 32,252 acres of National Forest System (NFS) lands within the Telephone Gap IRP project area. These ecosystems provide innumerable benefits to humans, wildlife, and plants that reside within and downstream of the project area. One of those benefits derives from woody material - sawlogs, pulpwood, and biomass - that could be harvested in a way consistent with the GMNF Land and Resource Management Plan (Forest Plan, USDA Forest Service 2006).

The Forest Plan established a maximum Allowable Sale Quantity (ASQ) of 197 million board feet, of timber which could be harvested from the GMNF over a decade (USDA Forest Service 2006). Harvesting and processing the timber resource within the project area has the potential to contribute to the economy of Vermont and provide raw materials that could be processed into products used around the globe. The residual stand structures and processes created from these harvests have the potential to create and maintain important habitat types such as aspen, birch, and oak, provide scenic vistas, and improve the landscape’s resilience to disturbances like non-native insects and diseases as well as climate change.

2. EXISTING CONDITION

Inventory Methodology/Process

Inventoring the forest and timber resources in the project area has been a multi-year effort consisting of collecting direct measurements, walk-through observations, and reviewing remote sensing data. Stands, a contiguous group of trees sufficiently uniform in age class distribution, composition, and structure, and growing on a site of sufficiently uniform quality to be a distinguishable unit have been interpreted and delineated across the landscape. Within the project area 799 forested stands have been delineated on NFS lands comprising 31,064 acres. Of those, 488 forested stands comprising 21,030 acres are considered suitable forest lands1 for timber production. An additional 9 stands and 779 acres are likely to become suitable forest lands in the South Pond acquisition.

Plots were established within 386 stands covering 18,811 acres (57 percent of the project area) following USDA Forest Service Common Stand Exam (CSE) protocols at the “Quick Plot” level (USDA Forest Service 2014). These plots measure the density of stems, their diameter, height, crown ratio, species, age, growth rate, and note visual observations on damage and growth potential. For the purposes of this analysis, plots sampled in 2020, 2019, 2018, and 2002 were selected, although older data does exist.

The Forest Vegetation Simulator (Dixon 2002) (Release 9/30/2020) was used to grow these stand measurements to a common year, 2021. FSVeg Spatial Data Analyzer (Release 10/18/2020 Version 3.14.1) was then used to impute the CSE data across the Telephone Gap IRP project area, creating a wall-to-wall database comprising current and modeled forest vegetation data. The Data Analyzer imputation process compared the spectral signature of each delineated stand as measured from LANDSAT 8 (Image 014030 dated 07/06/2020), topographical influences as measured from a Digital Elevation Model (LiDAR-derived and flown

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1 Suitable forest land – forest land that constitutes the land base for determining the allowable sale quantity (ASQ) and is managed for timber production on a regulated basis (USDA Forest Service 2006).
in 2016). Direct measurements of stand attributes grown forward in time from sampled stands were then imputed to unsampled stands that represented the most similar best fit regarding spectral signature and slope position and aspect.

Field surveys by foresters resulted in notes on stand quality, harvest access and other observations on stand development. In some cases, the notes from past walk-throughs are recorded in historic stand records or in the FSVeG database. Many of these surveys occurred in areas that lacked current stand measurements and assisted in verifying the imputation process.

Inventory Findings

Forests can be characterized in many ways, but the primary findings of this inventory describe the age, productivity, composition, density, and structure of the forests within the Telephone Gap IRP project area.

Age Class

As of 2021, the weighted average age of all forested stands on NFS lands in the project area is 105 years. The average age for suitable forested stands is 100 years. Recent harvests in the project area occurred on the South Pond acquisition in the late 2000’s. The most recent timber sale on NFS lands was the Baker Brook Sale between 1996 and 2000. Nearly 85 percent of the suitable lands within the project area regenerated before or approximately during the time that the GMNF was established in 1932 (see Table 4).

Table 4. Age classes of forested suitable timber lands.

<table>
<thead>
<tr>
<th>Age Class</th>
<th>0-9 (Regenerating)</th>
<th>10-39 (Young)</th>
<th>40-59 (Young/ Maturity)</th>
<th>60-79 (Maturity/ Old)</th>
<th>80-99 (Maturity/ Old)</th>
<th>100-119 (Old)</th>
<th>120+ (Old)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres</td>
<td>0</td>
<td>948</td>
<td>1,369</td>
<td>864</td>
<td>6,209</td>
<td>7,597</td>
<td>4,041</td>
</tr>
<tr>
<td>% of Suitable Lands*</td>
<td>0</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>30</td>
<td>36</td>
<td>19</td>
</tr>
</tbody>
</table>

*Due to rounding does not add up to 100 percent

Table 3 (see Ecological Diversity Section) provides a comparison of desired and existing conditions for the GMNF habitat types on suitable forest lands within the Telephone Gap IRP project area (northern hardwoods, mixedwoods, softwoods, aspen, birch, and oaks). However, most of the suitable timber lands are comprised of northern hardwoods, mixedwoods, and softwoods. The Forest Plan establishes desired ranges by age class within each habitat type. Old forests of each type currently are largely overrepresented while regeneration and young forests are largely underrepresented on suitable timber lands within the project area.

Composition

The assemblage of tree species across the landscape and the dominance of particular species can inform us of the value of the standing timber and the potential risk of the landscape to invasive insects and diseases such as beech bark disease, hemlock woolly adelgid, or the emerald ash borer. Additionally, species which may have an important management emphasis or objective as described in the Forest Plan such as aspen/birch, red oak, or softwoods can be determined from the inventory data.

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2 Table 2.2-2 in the GMNF Forest Plan defines desired ranges of age classes for different habitat types. This table combines those age classes because several habitat types (Aspen/Birch/Oak) are less abundant in the Telephone Gap IRP landscape, however a young, mature, or old forest varies by the habitat type.
From a timber perspective, species could be considered “high risk” if there is an increased chance that those trees may die or their value or volume will meaningfully decline between now and the next probable time that the landscape is evaluated for management. It is important to note that a species’ risk may vary substantially by age and site, and that predicted changes to the climate are likely to increase the risk to certain species in the future, (see discussion on climate change impacts to forests on page 31). At present, for the purposes of this assessment, high risk species include American beech, balsam fir, big-toothed aspen, black cherry, quaking aspen, red maple, white ash, and paper birch. These are species with current or imminent insect/disease threats that may not compartmentalize injury well and could rapidly lose value. Additionally, species such as big-tooth and quaking aspen and paper birch are early-successional colonizers with short lives that may likely be at biological maturity. Species considered high risk comprise at least 10 percent of the basal area of suitable timber lands across 98 percent of the project area and at least 30 percent of the basal area of suitable timber lands across 68 percent of the project area, these species are shown relative to the next most abundant species on suitable timberlands in the landscape (see Figure 1).

Within stands that may not have sufficient abundance to be considered a distinct habitat type, species presence may indicate suitability for opportunities to increase abundance through management. For example, the red oak habitat type occupies 76 acres, but red oak comprises 10 percent of the basal area in 123 acres. Aspen presents a similar pattern, occupying 11 acres as a habitat type but comprising 10 percent of the basal area in 81 acres (Figure 1).

**Figure 1.** Acres of suitable timber lands within the project area with greater than 10 percent and greater than 30 percent basal area comprising species groups.

There are many ways to measure and describe the density of stands. Common measurements in forestry include those that quantify the number of trees on a piece of land (such as trees per acre) and are accompanied by a measurement of the size of those trees (such as Quadratic...
Mean Diameter\(^3\) or basal area\(^4\). This is most useful when describing those two features in relation to a maximum density, which is defined as relative density. Stocking\(^5\) places a timber management bias on the relative density of a stand as it is comparing the size and density relationship of the stems in a stand to an objective for size and density to achieve optimum timber production. Stocking can be grouped into stocking classes, representing proportions of relative density. Stands which are overstocked are generally experiencing increased competition for resources which can increase stress on individual trees, predispose them to attack by insects or disease, and reduce volume growth on individual trees. The distribution of stocking classes across suitable timber lands within the Telephone Gap IRP project area is detailed in Table 5.

**Table 5. Stocking classes as computed from the Forest Vegetation Simulator (FVS) (Dixon 2002) for suitable timber lands within the project area.**

<table>
<thead>
<tr>
<th>Stocking Class</th>
<th>Class Boundary</th>
<th>Acres of Suitable Timber Lands</th>
<th>Percent of Suitable Timber Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overstocked</td>
<td>Total stocking &gt; 100%</td>
<td>4,945</td>
<td>23</td>
</tr>
<tr>
<td>Fully Stocked</td>
<td>60-100% Total Stocking</td>
<td>16,787</td>
<td>77</td>
</tr>
<tr>
<td>Moderately Stocked</td>
<td>35-60% Total Stocking</td>
<td>24</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Poorly Stocked</td>
<td>10-35% Total Stocking</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-stock ed</td>
<td>0-10% Total Stocking</td>
<td>24</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>

Stand densities for the project area are indicated in Figure 2. Each dot represents a stand within suitable timber lands. The fully stocked lines for two common stand types, northern hardwoods and mixed woods, are displayed indicating the number of stands generally considered fully stocked or over stocked. This is simply another way to look at the data presented in Table 5.

Structure is more difficult to interpret from the stand data and FVS simulations. Common definitions of stand structure include some description of age distribution or canopy layering. Often these are equated to successional stages (Oliver 1981). Nearly 90 percent (about 19,678 acres) of the suitable timber stands within the project area have been categorized as single-storied, even-age stands, in the stem exclusion (2=SE) phase of development (Figure 3). Stands in the stem exclusion phase of development are dominated by trees that established following the initial disturbance event and are in a phase of intense competition for light and other resources.

The next largest structural component within the project area is understory re-initiation (3=UR), comprising 10 percent (about 2,052 acres) of suitable timber stands. These stands are structurally more complex than stem exclusion stands. Overstory trees in the understory re-initiation phase are beginning to die from agents other than density. This mortality forms gaps in the canopy that allow for the establishment and release of trees within the understory. Understory re-initiation stands could be forming multi-storied canopy structures and be comprised of multiple ages of trees. They also are starting to accrue greater quantities and larger diameters of snags and down wood. It is possible that some of these stands are in locations where past management (such as shelterwood, group selection, or single-tree selection) has created multi-story stands. Very limited amounts of old or mature (6=OM) forests and stand initiation (1=SI) structural stages (about 25 and 27 acres, respectively) have been

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3 Quadratic Mean Diameter (QMD) – The square root of the arithmetic mean of squared diameters and is more commonly used in Forestry than a true average diameter, measured in inches.

4 Basal area – The cross-sectional area of a tree, typically used to measure the cross-sectional area of all stems on a given acre, measured in square feet per acre.

5 Stocking – The comparison of the size/density relationship of stems to the optimum size/density relationship for timber production.
categorized from the stand data. Old and mature forests and stand initiation are more abundant on unsuitable timberlands.

Factors that contribute to the uncertainty around these definitions include FVS being a distant-independent model that randomly assigns tree location. Additionally, tree heights were limited in collection and have been imputed by the FSV model. These two factors make it difficult for the model to determine the vertical structure of the stand, and impossible to determine how those stems are spaced within the stand. Additionally, limited plots were collected in stands with a recent history of management which makes the imputation process less reliable in other stands that have been managed.

Figure 2. Telephone Gap IRP stand densities plotted by basal area and trees per acre (for stands which are classified as suitable timber lands). Lines representing the approximate fully stocked level are displayed for both the mixedwood and hardwood stands (Leak, Solomon and DeBald, Silvicultural Guide for Northern Hardwood Types in the Northeast (revised) 1987).

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B basal area per acre for trees greater than 5 inches DBH\(^6\).

\( ^{\dagger} \) trees per acre for trees greater than 4 inches DBH.

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\(^6\) Diameter at Breast Height (DBH) – diameter of a tree measured at 4.5\(^\circ\) above ground level.
**Volume and Value**

There is currently an estimated 629,650 CCF\(^7\) of merchantable volume or 247,357 MBF\(^8\) of standing merchantable sawlog volume on suitable timber lands within the Telephone Gap IRP project area. On a per acre basis, suitable timber lands contain approximately 29 CCF of merchantable volume or 11.3 MBF of standing merchantable sawlog volume.

The merchantable volume distribution (including pulp and sawlogs) by species on suitable timber lands is heavily weighted to sugar maple, yellow birch, and American beech (see Figure 4). Large volumes of red maple and red spruce are also found within the suitable timber lands of the project area. Lesser, but still substantial quantities of paper birch, black cherry, and white pine are also present (see Figure 5).

---

\(^{7}\) Hundred Cubic Feet (CCF) – measurement of a volume of wood, unit is cubic feet and includes both pulp wood and sawlog volumes.

\(^{8}\) Thousand Board Feet (MBF) – measurement of a volume of wood, unit is board feet and includes only sawlog volumes.
Figure 4. Merchantable volume distribution on suitable timber lands within the project area (top five species shown).

Figure 5. Merchantable volume distribution on suitable timber lands within the project area. (Species ranking 6-10 shown).
Determining the amount of suitable timber lands that have reached an optimum point to regenerate involves multiple considerations. The National Forest Management Act of 1976 (16 U.S.C. 1600) establishes the optimum target for regenerating stands when timber production is the objective. That target is the culmination of mean annual increment or CMAI, and the unit of measurement for the CMAI prescribed by Forest Service Manual (FSM) 2470.5 is merchantable cubic volume of wood. Mean annual increment is defined as the average growth of wood in a stand and is calculated by dividing the amount of merchantable volume by the age of the stand.

Mean annual increment culminates between 50 and 70 years of age (approximately 30 cubic feet/acre/year) in unmanaged northern hardwood stands and about 95 years of age at (approximately 50 ft³/acre/year) in managed northern hardwood stands (Solomon and Leak 1986). Inventory data indicates the area weighted mean-annual increment on suitable timber lands in the project area is approximately 29 cubic feet/acre/year. By the measure of age, 75 to 95 percent of the suitable timber lands within the project area have the potential to have exceeded the CMAI, and this appears to be confirmed by inventory estimates.

Mean annual increment is simply a measure of optimum volume production, not value. Including value is more complicated and varies significantly by stand as it is dependent upon wood quality, species, location in relation to milling infrastructure, and global markets. Peak possible log grade is one indicator of maximizing value of harvested material. Some species may achieve maximum log grade value at a diameter as small as 12 inches DBH (such as paper birch and red spruce), while other species may not reach a peak possible log grade until they reach 18 inches DBH or larger (such as sugar maple, yellow birch, red oak, white ash, red maple, American beech, and eastern hemlock (Leak, Yamasaki and Holleran, Silvicultural Guide for Northern Hardwoods in the Northeast 2014).

Considering a high-end measure of peak possible log grade, 20 inches DBH, there are currently 834 acres (4 percent of suitable lands) where a third of the stand’s basal area exceeds 20 inches DBH, 3,085 acres (14 percent of suitable lands) where a quarter of the stand’s basal area exceeds 20 inches DBH, and 9,343 acres (43 percent of suitable lands) with greater than 20 square feet per acre of basal areas exceeds 20 inches DBH. These measurements suggest that across the Telephone Gap IRP project area a large portion of the stands have reached or exceeded their peak log values.

Insect and Disease and Other Damage

The Forest Health Protection division of the USDA Forest Service conducts annual surveys of forest insects, diseases, and disturbance agents across much of the nation (USDA Forest Service n.d.). These surveys are conducted aerially and verified by ground surveys. In some cases, a causal agent is unable to be determined. Since 2016, an average of 726 acres of defoliation or mortality has occurred each year within the project area. The most widespread insects and disease and other disturbance agents by area have been anthracnose, affecting approximately 1,000 acres in 2019, maple leaf cutter defoliating approximately 850 acres in 2019, forest tent caterpillar defoliating nearly 400 acres in 2017, and white pine needle damage defoliating approximately 200 acres in both 2016 and 2018.

Looking further back in time to 1997, the greatest disturbance event was a snow and ice storm documented in 1998, affecting more than 37,000 acres, a forest tent caterpillar outbreak in 2006 defoliating over 16,000 acres, and a frost event in 2010 affecting 16,000 acres of the project area. Beech bark disease has been the most chronic mortality agent over time, visibly causing mortality on an average of 500 acres each year, however this disease complex likely impacts all stands where beech is present.
3. DESIRED FUTURE CONDITION

Forest Plan Goals and Objectives

Forest-wide goals and objectives relating to forest/timber management are located in Section 2.2.2 of the Forest Plan (USDA Forest Service 2006). Specific, relevant, goals and objectives for the timber resource include:

- Goal 1: Provide for a wide range of uses and activities in an ecologically, socially, and economically sustainable way.
- Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.

  - Forest-wide Habitat Composition and Structure Objectives
    - Maintain northern hardwood forests on sites that ecologically support these habitats.
    - Support, and where desirable enhance, the natural conversion of northern hardwood forests to mixedwood and softwood forests on sites that ecologically support a higher proportion of softwoods.
    - Increase acres of oak-dominated and oak-pine forest habitat on sites that ecologically support these habitats. Maintain, and where ecologically feasible increase the oak component in oak-northern hardwood forests.
    - Increase acres of aspen-birch forest and regeneration forest in order to support species that prefer these habitats.
    - Maintain, and where desirable increase, the acres of upland open habitats at slightly higher than ecological tendencies to support species that prefer these habitats.
    - Increase acres of late-successional and old forest habitats through natural successional processes within lands not suitable for timber management, and through use of extended rotations within lands suitable for timber management.
    - Maintain a full range of age classes from young to old, including late successional and multi-age conditions, within management areas where age class can be actively manipulated towards goals, objectives, and desired future conditions.
    - Manage a minimum of 20 percent of lands suitable for timber management using uneven-age silvicultural systems to create multi-age conditions.
    - Achieve the desired amounts and distributions of various age classes for different forest types using standard and extended rotation ages whereby: Lands emphasizing quality timber products are managed to Standard Rotation Ages. Lands emphasizing recreation, enhancement of ecological communities, wildlife habitat, or other resource values may be managed to longer rotations, up to the Extended Rotation Ages.
Rotation Ages (Forest Plan, Table 2.2-3)

<table>
<thead>
<tr>
<th>Forest type</th>
<th>Standard rotation age (years)</th>
<th>Extended rotation age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern hardwoods</td>
<td>100</td>
<td>150-250</td>
</tr>
<tr>
<td>Oak</td>
<td>100</td>
<td>150-250</td>
</tr>
<tr>
<td>White and red pine</td>
<td>100</td>
<td>150-200</td>
</tr>
<tr>
<td>Hemlock</td>
<td>100</td>
<td>150-300</td>
</tr>
<tr>
<td>Aspen</td>
<td>50</td>
<td>n/a¹</td>
</tr>
<tr>
<td>Paper birch</td>
<td>60</td>
<td>n/a¹</td>
</tr>
<tr>
<td>Spruce and larch</td>
<td>80</td>
<td>150-200</td>
</tr>
<tr>
<td>Balsam fir</td>
<td>60</td>
<td>n/a¹</td>
</tr>
<tr>
<td>Jack and Scotch pine</td>
<td>50</td>
<td>n/a¹</td>
</tr>
</tbody>
</table>

¹ Extended rotation ages not appropriate for these species.

- **Goal 8**: Provide for a sustainable supply of forest products.
  - Objective:
    - Provide high-quality sawtimber and other wood products for local economies.

- **Goal 9**: Demonstrate innovative, scientifically, and ecologically sound management practices that can be applied to other lands.
  - Objectives
    - Develop demonstration forestry project areas and areas where state-of-the-art silvicultural practices are applied.
    - Provide opportunities for public education on Forest Service management practices.

- **Goal 10**: Provide other resource benefits through coordinated timber harvesting.
  - Objective
    - Use vegetation management as a tool to create the habitats or settings desired by each program area, including fisheries, wildlife, recreation, fire and fuels, silviculture and other managed resources.

**Forest Plan Desired Future Conditions**

Standards and guidelines for timber management across the GMNF are found in sections 2.3.4 and 2.3.5 of the Forest Plan. The GMNF is divided into management areas that provide more specific direction that influences how timber management will be practiced. Within the Telephone Gap IRP project area, management areas where timber harvest is generally permitted include Diverse Forest Use, Diverse Backcountry, and Remote Wildlife Habitat. Management areas where timber harvest is prohibited include the Appalachian/Long Trail Corridors, Existing and Candidate Research Natural Areas, and Wilderness.

Desired future conditions for the timber resource vary by management area. The Forest Plan desired future conditions have been summarized below, but are described in more detail in Chapter 3 of the Forest Plan:

**Diverse Forest Use**

Vegetation management emphasis is placed on production of high quality sawtimber and other timber products on a sustained yield basis. The landscape character will be a mix of deciduous
and coniferous forest stands of various types. The stands will vary in size, shape, height, and tree species. Along road and trail corridors, large diameter trees of diverse species will predominate. Vistas of landscapes with a mosaic of vegetative patterns will be provided along roads and trails. Forest communities that would naturally be present, such as northern hardwoods, aspen, and oak, will be retained and enhanced where feasible.

There are no standards and guidelines specific to timber management for this management area beyond Forest-wide standards and guidelines.

Diverse Backcountry

Lands in this management area will have a mixture of tree species, sizes, ages and appearances. Activities such as timber harvesting may be evident but will be scattered over time and space. Temporary openings will occur through natural disturbance and timber harvesting. Some stands will consist of trees of about the same age and size while other stands will have a mix of tree sizes and ages. Some areas of undisturbed forest will have many large, old trees with a few scattered temporary openings created by wind, ice, old age, or other natural forces. The primary silvicultural system will be even-aged.

- Timber Management Guidelines:
  - G-1: Where even-aged management is appropriate, rotation ages should fall within the range of extended rotation ages provided in the Forest-wide goals and objectives for each forest type.
  - G-2: Primary silvicultural system should be even-aged in order to reduce the number of entries.
  - G-3: Uneven-aged management should be used where even-aged management is incompatible with other resources and values such as along certain roads and trails that have high visual sensitivity.

- Openings Standard:
  - S-1: Temporary openings resulting from even-aged management shall be less than 20 acres and in accordance with the Forest-wide standards and guidelines for Recreation and Visuals.

- Openings Guideline:
  - G-1: Permanent upland openings should be less than 20 acres in size. Larger openings may occur naturally.

- Transportation Analysis Standard:
  - S-1: New permanent roads shall be prohibited unless required for administrative or designated special uses, or required by law to provide access to private land.

- Transportation Analysis Guidelines:
  - G-1: Segments of old roads or skid trails, not on the Forest Service Transportation System, and that are not necessary for managed recreation, vegetation, or timber purposes, should be closed and restored.
G-2: Temporary roads may be permitted to achieve MA Desired Future Conditions. Temporary roads will be rehabilitated after management objectives are complete.

**Remote Wildlife Habitat**

The Remote Wildlife Habitat management area will create a mix of deciduous and coniferous forest stands of various types. Stands will vary in size, shape, age, height, and tree species composition. Both even-aged and uneven-aged silviculture practices will be used to meet wildlife habitat objectives. As a result, two different conditions will occur among the stands: some stands will consist of trees of similar age and size; the remaining stands will consist of a mix of tree sizes and ages ranging from seedlings to very large, old trees. Forest communities that would naturally be present, including those important to wildlife such as aspen and oak, as well as rare or important communities will be retained and enhanced where feasible.

- **Timber Management Guidelines:**
  - G-1: Timber and vegetation management should be the primary tools for habitat manipulation, including even- and uneven-aged silviculture, commercial timber sales, service contracts, volunteer activities, and partnerships.
  - G-2: Where even-aged management is appropriate, rotation ages should fall within the range of extended rotation ages provided in the Forest-wide goals and objectives for each forest type.
  - G-3: Patches of early-successional habitat should be at least 2 acres in size. Patches larger than 5 acres will be emphasized, however.
  - G-4: Patches of early-successional habitat smaller than 5 acres should be created only in close proximity to other patches of regeneration habitat.

- **Openings Standard:**
  - S-1: Temporary openings resulting from even-aged management shall be less than 20 acres and in accordance with the Forest-wide standards and guidelines for Recreation and Visuals.

- **Openings Guideline:**
  - G-1: Permanent upland openings should be less than 20 acres in size. Larger openings may occur naturally.

- **Transportation Analysis Standards:**
  - S-1: Construction of new permanent roads shall be prohibited unless required for administrative purposes including timber harvest and designated special uses, or required by law to provide access to private land.
  - S-2: New roads shall be closed to motorized access by the public.
  - S-3: Temporary roads and skid trails shall be permitted.
  - S-4: Temporary roads and skid trails shall be closed at the completion of their intended uses.
Forest-Wide Desired Future Conditions

- A sustainable quantity of timber is harvested on a regular basis from compatible management areas producing a diversity of forest products to support local and regional markets.
- Diverse Forest Use stands emphasizing quality timber products are managed to standard rotation ages while stands in Diverse Backcountry and Remote Wildlife Habitat are managed for extended rotation ages.
- Forest Plan objectives for regeneration/young/mature/old age class are within or closer to established ranges
- A minimum of 20 percent of suitable timber lands are managed for uneven-aged conditions
- Long-term composition objectives are moved closer to desired objectives on sites that are suitable for these species and communities. This is achieved by appropriate regeneration methods unique to the target species. These include:
  - Mixedwood, softwood, oak, aspen
  - Non-native forest insect and disease pathogens are managed using appropriate methods within management areas where management is allowed. These include but are not limited to:
    - Beech bark disease, emerald ash borer (Agrilus planipennis), gypsy moth (Lymantria dispar), and hemlock woolly adelgid (Adelges tsugae)

Other Sources for Desired Future Conditions

Climate Change Considerations:

In order to produce a sustainable quantity of timber through time, it is desirable to affect the forest composition and structure to increase the proportion of suitable timberlands occupied by trees that are likely to be alive and sound at the time of re-entry. To achieve this desired future condition an additional objective would be needed:

- High risk species, including diseased beech, are reduced in abundance across suitable timber lands.

Our understanding of the potential impacts of climate change on forest ecosystems have become more developed since the completion of the Forest Plan in 2006. While the desired future conditions described above are still appropriate, there is now a consensus in the scientific community that on lands where vegetation management is allowed, forest structures and compositions may need to be altered to increase the adaptive capacity of these systems to the alterations in temperature, precipitation, natural disturbances and native and non-native forest diseases and insects (Swanston, et al. 2017, Janowiak, D'Amato, et al. 2018).

The following desired condition across the Telephone Gap IRP project area should be considered based on the need to address environmental stressors associated with climate change:

- Stands located in management areas where vegetation management is allowed are in a more resilient, resistant, or adaptive condition to stressors including climate change.

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9 Depending on the harvest prescription, reentry can vary to as soon as 5-10 years in a 2 or 3 stage shelterwood harvest, to as long 40-60 years in an irregular shelterwood. However, for most intermediate harvest treatments such as a commercial thinning or an uneven-age harvest, time to reentry is likely to be approximately 30 years.
4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

**Sustainable Supply of Forest Products:**

In 2020 roughly 5,800 CCF or 3.5 MMBF of sawlog timber and 10,655 CCF of pulpwood was sold on the GMNF. This is substantially less than the Forest Plan maximum allowable sale quantity of 19.7 MMBF per year.

Except for private lands within the Telephone Gap IRP project area, timber harvest has not occurred within the previous two decades. Private lands that may be acquired in the South Pond acquisition have been recently harvested. If successfully acquired, these lands are likely to be unavailable for harvest in the next 20-30 years.

Reducing volume and value losses from suitable timber lands would help achieve the objective of maintaining a sustainable supply of forest products. As indicated by Figure 1, there are more than 13,700 acres where more than 30 percent of the stand is comprised of species which have a high probability of dying or losing value between now and the next entry. Additionally, as indicated by Table 5 there are nearly 5,000 acres of stands which are overstocked, and are likely experiencing reduced growth and increased density-caused mortality.

Markets for forest products are constantly in flux, and stumpage rates vary significantly by location in proximity to mill. Most recent stumpage surveys for Vermont indicate that sugar maple, red oak, white ash, yellow birch, and black cherry currently generate higher stumpage fees (Vermont Department of Forests, Parks, and Recreation 2020, USDA Forest Service 2020).

**Desired Amount and Distribution of Various Age Classes and Compositions:**

As illustrated in Table 3 there is a gap between the desired distribution of age classes by habitat type and the existing distribution. Additionally, while aspen, oak, mixedwood, and softwood forest types are present, there are more acres where these species are present that suggests there may be opportunities to enhance or meet composition objectives on sites where they are suited.

**Uneven-age Stand Structures:**

Based on the current stand data there is also a deficit of stands which have uneven-age stand structures (Figure 3). Uneven-age management treatments would need to be applied to approximately 2,310 acres to meet the Forest Plan goal of a minimum of 20 percent of suitable timber lands in an uneven-age condition. That goal is merely a minimum and could be exceeded.

**Non-Native Forest Insects and Diseases:**

While surveys indicate that non-native diseases such as beech bark disease are present in the project area, with the exception of 36 acres of recent stand improvement work there have been no recent attempts to mitigate the effects of this disease or other insects and diseases. Forest-wide efforts to locate new infestations of emerald ash borer, monitoring of existing populations of gypsy moth, and locating potentially resistant beech trees are occurring. New and emerging non-native insects and diseases are discussed in the Issues and Concerns section below.
Opportunities

Harvesting trees on suitable timber lands would be an opportunity to supply forest products to local and regional markets. Cutting an amount less than or equal to the mean annual increment, would likely be a sustainable harvest level and would equal approximately 6,400 CCF per year from suitable timber lands within the Telephone Gap IRP project area.

Priority stands for even-age regeneration harvest could include stands that have reached or exceeded their desired rotation length. By regenerating mature and old age classes in these forest types, this would have the additional benefit of moving the age class distribution closer to the Forest Plan desired range. Additionally, even-age regeneration treatments could be used to create aspen and birch forest types on sites which presently have these species in the overstory but are succeeding to other more shade-tolerant forest types.

Uneven-age regeneration harvest could be applied across 2,310 acres of suitable timber lands in the project area to meet the minimum goal of 20 percent uneven-age stand conditions provided by the Forest Plan.

Silvicultural treatments could be done strategically within lands suitable for specific habitat types to increase the overall abundance of habitat types that are currently under-represented, establish vegetation best adapted to that site, and maintain high value species.

Additionally, harvests and other silvicultural treatments could target for removal trees which are considered high risk. The result would shift stand composition towards species which are more adapted to anticipated regional environmental climate change stressors, more commercially desired, or simply individual trees that are more likely to accrue volume and value.

Commercial thinning or improvement cuts could be applied in mid-rotation overstocked stands to reduce mortality losses and increase volume accrual on desired tree species.

Non-commercial silvicultural treatments known as stand improvement or crop tree release could be applied to recently harvested stands on the South Pond acquisition lands as well as the stands harvested in the 1990’s within the Telephone Gap IRP project area to ensure adequate stocking of desired species is achieved. Additionally, site preparation could be applied to stands regenerated by even-age or uneven-age means to liberate growing space from damaged and diseased trees and ensure stocking of desired species is achieved.

Initial Possible Activity List

Definitions of silvicultural systems and methods along with descriptions of where they are appropriate are described in detail in section 2.3.4 of the Forest Plan. Based on reviews of stand data, past stand-diagnosis and walk-throughs, and remotely sensed information including aerial photography and LIDAR-derived slope and vegetation height, preliminary estimates of the capacity of the project area to support timber management can be made.

This preliminary review indicates that the project area has a total of approximately 17,000 acres of potential candidate stands that could support between 4,700 to 11,000 acres of harvest treatments (see Table 6). Based on average past timber sale sizes on the GMNF, these treatments could be implemented through 15 to 30 potential timber sales. The result would be a combined potential yield of 58,300 CCF to 99,800 CCF\(^{10}\) (14.1 to 24.0 MMBF\(^{11}\)). Additionally,

\(^{10}\) Includes both sawlog and pulpwood volume
\(^{11}\) Includes only sawlog volume
this would cause increases in the regenerating age class across the landscape to approximately 18 percent on suitable timber lands and 12 percent of the Telephone Gap IRP project area.

Table 6. Potential harvest treatment acres and volume by harvest type within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Harvest Treatment</th>
<th>Candidate Stands (Acres)</th>
<th>Likely Treatments (Acres)</th>
<th>Potential Volume Yield (CCF) [10]</th>
<th>Potential Volume Yield (MMBF) [11]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Thinning/ Improvement Cut</td>
<td>1,750</td>
<td>1,050 - 1,400</td>
<td>5,300 - 7,000</td>
<td>1.3 - 1.6</td>
</tr>
<tr>
<td>Even-Age/Two-Age Regeneration</td>
<td>1,520</td>
<td>910 - 1,220</td>
<td>11,600 - 15,500</td>
<td>2.8 - 3.7</td>
</tr>
<tr>
<td>Uneven-Age Regeneration</td>
<td>13,800</td>
<td>2,760 - 8,280</td>
<td>41,400 - 77,300</td>
<td>10.0 – 18.7</td>
</tr>
<tr>
<td>Total</td>
<td>17,070</td>
<td>4,720 - 10,900</td>
<td>58,300 - 99,800</td>
<td>14.1 - 24.0</td>
</tr>
</tbody>
</table>

Using averages from all timber sales that occurred on the GMNF over the past 25 years, approximately 1.8 to 3.1 miles of temporary roads and 1.4 to 2.4 miles of newly constructed Operative Maintenance Level 1 roads could be needed to harvest the potential treatments described above (USDA Forest Service, 2021).

Following even-age, two-age and uneven-age regeneration harvests, non-commercial site preparation treatments could be used to improve the establishment and growth of desired species. These treatments could include the felling of broken, damaged, and diseased submerchantable trees that remain following harvest, but could also include the selective use of stump applied herbicide to control sprouting species where restoration objectives warrant and allow. In certain cases, reforestation with seedlings could be used to augment species composition, increase climate adaptation, and facilitate recolonization of harvested sites with rare or desired species.

There are approximately 300 acres of National Forest System lands within the Telephone Gap project area that were harvested between 1983 and 2001. Depending on their productivity, stands in this stage of development are likely overstocked and could benefit from non-commercial treatments that reduce stem density or release crop trees from competing vegetation. These treatments are known as pre-commercial thinning or crop tree release. The benefit of either of these treatments would be increased growth of residual trees, and potential increases in future stand timber quality or wildlife value. Additionally, these treatments could be done to improve the health of residual trees to prevent attack from insects like the sugar maple borer (Glycobius speciosus).

Northern red oak is found as a component in approximately 360 acres of stands in the project area of which 76 acres are classified as the oak-hardwood vegetation type (see Table 4). In both stand types, where it is found and where it currently dominates, maintaining or enhancing northern red oak as a stand component has benefits that include increased timber value, providing important plant and wildlife habitat for oak-obligate species, and increased stand-level resilience to climate change. In stands presently dominated by northern red oak, potential treatments that enhance this species could be implemented to prevent the transition to northern hardwood forest types. The first stage of this treatment is a non-commercial treatment commonly called a mid-story removal. This treatment, if timed following a bumper acorn crop, creates a suitable light environment to favor northern red oak regeneration over competing tree species. Following establishment of northern red oak seedlings, additional treatments could be performed like prescribed fire to further favor northern red oak advanced regeneration. Once a threshold for oak regeneration has been achieved, commercial treatments that create canopy gaps would be needed to recruit northern red oak regeneration into the overstory. Additionally,
northern red oak and associated species like bitternut hickory could be planted in lower elevation regeneration harvests where they might be more suited to a warmer, more droughty climate, increasing their distribution on the landscape.

Aspen, including both big-tooth aspen and quaking aspen is found as a component on approximately 370 acres including 13 acres classified as the aspen habitat type. Aspen species are highly adapted to recolonize disturbed sites. The aspen found in the project area has largely reached and exceeded its biological maturity and is declining in vigor. Maintaining aspen could be achieved by regeneration harvest treatments, primarily even and two-aged methods but also large group selection openings that create a high light environment. To maintain aspen, these regeneration harvests could be applied on suitable timberlands with at least 20 square feet of basal area of aspen.

Experimental silviculture treatments are being implemented and studied on the Second College Grant and Hubbard Brook Experimental Forest in New Hampshire. The objectives of these treatments are to maintain the resistance or resilience of northern hardwood forests or facilitate the transition to novel climate-adapted communities (Northern Institute of Applied Climate Science 2018). Implementing similar approaches within the project area could help mitigate the effects of climate change and maintain forest cover across the landscape. Resistance treatments could include those that reduce stand densities and improve the growth and health of residual trees. Resistance treatments overlap with existing practices like single tree selection, commercial thinning, or intermediate treatments described above. Resilience treatments help improve the ability of the forest to respond following disturbance and could include group selection treatments that regenerate species like yellow birch, red spruce, and red maple. Transition treatments help create novel plant communities better adapted to future climates and could include regenerating larger amounts of the project area through group selection or two-age silvicultural systems and planting of tree species and genotypes that are expected to be adapted to future climate conditions.

5. ISSUES AND CONCERNS

Non-Native Forest Insects and Disease

American beech is the third most abundant species by volume within suitable timber lands in the project area. Beech bark disease is widespread across the landscape. The Forest Service is actively locating and challenging potentially-resistant trees to determine resistance level and develop a restoration strategy, however the existing diseased beech and associated root suckers (Houston 1975) are currently competing with more desired species (Hane 2003) and likely reducing the volume and value of stands within the project area.

Emerald ash borer was located outside of Rutland in 2020. The western portion of the Telephone Gap IRP project area is now designated by the Vermont Agency of Natural Resources as a high-risk area (Vermont Agency of Natural Resources 2021) which assumes that emerald ash borer has likely expanded into these areas. White ash is the sixth most abundant species by volume on suitable timber lands in the project area (Figures 4 and 5). In Ohio, emerald ash borer caused 25 percent mortality the year after infestation, and 99 percent mortality after year six (Knight, Brown and Long 2013). It is expected that emerald ash borer mortality is likely to be observed within the Telephone Gap IRP project area over the coming decade.

Eastern hemlock is presently the seventh most abundant species by volume on suitable timber lands in the project area (Figures 4 and 5). Hemlock woolly adelgid is not presently found within the project area, however climate change is likely to decrease overwintering mortality and
therefore increase potential range of the adelgid into the Telephone Gap IRP area by mid-century (Paradis, et al. 2008). Hemlock woolly adelgid mortality in southern New England has exceeded 20 percent following infestation (Orwig, Foster and Mausel 2002).

**Climate Change**

The 2018 regional ecosystem vulnerability assessment summarizes the important climate change factors to New England’s forest systems as well as performs modeling to predict species-specific responses to climate change (Janowiak, D’Amato, et al. 2018). These anticipated impacts and ecosystem-level adaptive capacities have been summarized in Table 7. While the adaptive capacity of the forested ecosystems that comprise the project area is Moderate or Moderate-High, threats and adaptive capacities are likely to vary by stand. Many of the species which comprise the Telephone Gap IRP project area are likely to have decreases in future suitable habitat in the region (red spruce, eastern hemlock, American beach, balsam fir, eastern white pine, quaking aspen, sugar maple, white ash, and yellow birch). Stands that are largely comprised of tree species which are less competitive in future climate conditions or suffer from pests, pathogens or other stressors which are anticipated to increase with climate change are at greater risk of decline or mortality in the future (Janowiak, Iverson, et al. 2017).

Beyond the direct effects to the ecosystem, milder winters with more variable snow and soil conditions could reduce harvest windows that are established to protect soil productivity (Rittenhouse and Rissman 2015). For harvest operations to continue in the future, either alternative harvest equipment will need to be adopted by local purchasers that reduce soil disturbance, or more operations will need to move to periods of the year where soil moisture is low enough to prevent detrimental soil impacts.

**Table 7. Impacts from and adaptive capacity to climate change, summarized from Janowiak et al. 2018.**

<table>
<thead>
<tr>
<th>Forest Ecosystem</th>
<th>Neutral Impact</th>
<th>Negative Impact</th>
<th>Positive Impact</th>
<th>Adaptive Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montane Spruce-Fir</td>
<td>Herbivore populations both positive and negative</td>
<td>Reductions in snowpack may increase probability of root damage, Increase in extreme storm events may lead to greater tree mortality, Red spruce and balsam fir projected to decline in suitable habitat, Balsam woolly adelgid likely to increase</td>
<td>Eastern spruce budworm likely to decrease</td>
<td>Moderate – relatively low species and genetic diversity. High elevations present little opportunity for upward movement</td>
</tr>
<tr>
<td>Northern Hardwood</td>
<td>Increases in extreme weather events could lead to more frequent windthrow favoring shade-tolerant species</td>
<td>Drought and alterations in nutrient availability likely to decrease suitability for sugar maple, Eastern hemlock, yellow birch, quaking aspen, and sugar maple, likely to decline in habitat suitability and biomass, American beech, American Elm, and white ash likely to be impacted from insects and diseases</td>
<td>Species currently present in more southern habitats may become more suited to these sites</td>
<td>Moderate/High – diverse species composition, broad mix of shade tolerances and reproductive strategies allows for more adaptive capacity</td>
</tr>
<tr>
<td>Forest Ecosystem</td>
<td>Neutral Impact</td>
<td>Negative Impact</td>
<td>Positive Impact</td>
<td>Adaptive Capacity</td>
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<td>------------------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>invasive plant species, herbivory, forest pests likely to be amplified by climate change</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Carbon Sequestration and Storage**

There is growing interest in the ability of the GMNF to sequester and store carbon. Net primary productivity in New England’s forests is likely to increase as the climate warms and growing season lengths through the end of the century (Duveneck and Thomas 2017). However, the ability of New England’s forests to sequester carbon is largely based on their ability to resist or rapidly recover from the threats and disturbances identified in previous sections. Drought, insects, diseases, and windthrow are all likely to increase in the future and could decrease carbon sequestration rates (Williams, et al. 2016). While harvesting also reduces the carbon stocks above and below ground, it also allows for the implementation of important strategies to increase the resiliency of forests and increase the rate of recovery of carbon stocks following disturbances brought on by climate change (Ontl, et al. 2020). Additionally, harvest practices that include higher levels of retention, allocate more growing space to larger diameter trees, retain standing dead and down trees, and reduce soil carbon loss can retain greater carbon storage following harvests (Ford and Keeton 2017). Intermediate harvests and non-commercial treatments that increase the quality and value of retained trees can also lead to future harvests of higher-grade products that are more durable and potentially have a longer storage life in a wood product.

6. REFERENCES


Houston, David. 1975. "Beech Bark Disease - the aftermath forests are structured for a new outbreak." Journal of Forestry 660-663.


Wildlife and Wildlife Habitat

1. INTRODUCTION AND BACKGROUND

General Description

Management of wildlife habitat on the GMNF seeks to sustain the viability of wildlife populations on NFS lands and in the surrounding region while meeting other resource objectives. These management efforts are based on conservation and enhancement of wildlife habitat. By providing suitable habitat conditions across the landscape, the GMNF will continue to sustain diverse assemblages of wildlife species and provide refuge in the face of climate change.

2. EXISTING CONDITION

Inventory Methodology/Process

The Ecological Diversity section in this Landscape Assessment addresses habitat at a general landscape level through the desired species composition, age structure, and other characteristics of vegetation in forest communities, as well as the distribution of these communities across the project area. These vegetation characteristics define the composition and structure of habitat conditions on the GMNF, which in turn affect the wildlife species that occur in those habitats. Analysis included GIS-based data on forest type, stand age, ecological land type, topography, and aerial imagery. Existing compartment and stand records provide history of previous forest management actions. Initial inventory of wildlife habitat in the Telephone Gap IRP project area began with collaborative examination of existing data by a forester, an ecologist, and a wildlife habitat biologist. The condition of wildlife habitat is determined largely by species composition, age structure, and distribution of forest communities, therefore, the assessment of wildlife habitat within the project area began with a review of the Ecological Diversity assessment. Specific features of interest for wildlife included wetlands, fens, beaver meadows, state-mapped deer wintering areas, stands that include oak and other mast trees, and areas important to threatened, endangered and sensitive (TES) species. This initial assessment identified areas that merited site visits to examine wildlife features or field inventory to provide updated timber stand data. Site visits began in the summer of 2018, a bio-blitz was initiated in 2020 (ongoing), acoustic monitoring sites were established for bats in 2020, and comprehensive stand examinations are continuing.

Bioblitz

Forest Service - GMNF natural resources staff developed a BioBlitz project, which covers the entire project area. A BioBlitz is a detailed study of biodiversity in a specific location over a specified period and brings experts and amateurs together to collect data. The primary goal of the BioBlitz is to get a comprehensive list of the plants, animals, fungi, and other organisms that live in the project area. The BioBlitz timeframe covers 16 months instead of a traditional 24-hour “blitz” period due to the COVID-19 pandemic. The BioBlitz started in April 2020 and will continue through September 2021. All observations are hosted in the Forest’s project in the iNaturalist application (https://www.inaturalist.org/projects/gmnf-telephone-gap-BioBlitz). The BioBlitz involves a variety of participants: community members; natural history professionals; non-governmental organizations; citizen scientists; local schools; Forest Service partners; and the Vermont Fish and Wildlife Department (VFWD).
Herpetological Surveys
Beginning in April 2020, 14 cover “boards” were set up in 7 different locations within the project area. Cover boards are a standard technique for herpetological inventories; the cover material used is primarily wood and simulates natural cover such as fallen trees. The boards were placed in various habitats (such as wetlands, riparian areas, uplands, and mixed woods). Each board site was checked every 7 to 10 days in early spring to the end of May. Once inspections were finished for the 2020 season, the cover boards were left in place. The first cover board check for 2021 was on April 13. Also, four more cover boards were added to the project in a different location within the project area and are focused on wetland edges. Cover board checks will continue through May 2021.

Mammal Surveys
In 2021, from late winter to early spring, covering ground conditions from full snowpack to just after snow melt, two potential deeryards were informally inventoried by Forest Service staff during changing snow cover conditions from full snowpack to melt out. These deeryards were mapped by the VFWD as “potential” in 2008, based on land imagery.

For two years, Forest Service staff monitored a trail camera set up near potential American marten habitat in the Telephone Gap IRP project area. No martens were detected during the period of study.

Inventory Findings
The project area includes about 32,252 acres of NFS lands, which are dominated by northern hardwood forest types and mixed wood, with small amounts of softwood, and aspen birch. The remaining lands are in upland openings, wetlands, and or open water. On suitable lands, those available for commercial timber harvest, 85 percent of the forest is over 80 years old. There is a dearth of young forest on NFS lands within the project area; regenerating forest is almost nonexistent and young forest makes up only 5 percent. Non-forested lands, which account for about 6 percent of NFS lands in the project area are made up of openings and wetlands. There are few managed openings in the project area, most of these are associated with recreation and not wildlife focused. Botanical inventories also revealed that there are many stands of old forest (to be distinguished from old growth, which is more rigorously defined) within the project area.

Oak, beech, and other mast-bearing trees occur within the project area. Beech is the dominant species but faces an uncertain future with Beech Bark Disease (BBD). Beech bark disease has affected the health of the beech component and the hard mast availability normally provided by this species. Oak stands are present, predominantly red oak, and provide an opportunity for habitat enhancement. These stands are along the western escarpment of the Green Mountains.

Bio-Blitz
As of May 2021, over 2,400 observations have been recorded. Records include species of amphibians, reptiles, birds, fish, mammals, fungi, plants, mollusks, insects, and arachnids

Deer Wintering Areas
Thirty-five historic state-mapped deer wintering areas (DWA) are located within the Telephone Gap IRP project area, with a total of about 6,008 acres. Of these, eleven DWA’s are partially on NFS land (1,597 acres). The acres on NFS land can be classified as average to low quality for cover and food. However, these historic data are not reliable due to the age and potential changes in habitat.

Two DWA’s were chosen for review given that most of their acreage is mapped on NFS land:
• DWA1957 is 151.3 acres, anticipating the addition of the South Pond Parcel, and primarily consists of steep slopes between 2,100 and 2,500 feet in elevation. No sign of deer use was found in this DWA. The lower slopes of the area are composed of hardwoods with widely scattered conifers in the understory and in the canopy. The upper slopes have a thick understory spruce and fir in patches; however, the slope is steep (37 percent) and hardwoods were equal to conifers in density in the overstory.

• DWA2061 is 286.3 acres, including 120.5 acres on private land, and is mostly flat with elevation ranging from 1,600 to 1,700 feet. The overstory consists mostly of spruce and fir, and the understory is open with patches of regenerating conifers. Hardwood browse is found within the mapped area. Deer sign were seen along trails, including numerous droppings and some browse, all in the central section of the mapped area. The northern section of this area (west of Forest Road 99) has some potential deeryard habitat by Hewitt Brook, however the area east of Hewitt Brook does not contain the stands of conifer needed for deer winter habitat. Also, the southern mapped section (west of Forest Road 99) is comprised predominately of mixed hardwoods and is presently not suitable for deer wintering.

_Marten Camera Trapping_

Although no American martens were detected in or near the Telephone Gap IRP project area in the two years of study, a wide variety of wildlife was documented including fisher, red fox, coyote, white-tailed deer, black bear, and snowshoe hare.

3. **DESIRED FUTURE CONDITION**

_Forest Plan Goals and Objectives_

Forest Plan goals and objectives related to wildlife and wildlife habitat are contained primarily in (USDA Forest Service 2006):

• Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.
  o Objectives:
    ➢ Maintain northern hardwood forest
    ➢ Increase acres of oak-dominated and oak-pine forest on sites that ecologically support these habitats.
    ➢ Increase acres of regenerating forest.
    ➢ Increase acres of late successional and old forest habitat.

• Goal 6: Maintain or restore ecological processes and systems on the GMNF within desired ranges of variability, including a variety of native vegetation and stream channel types, and their patterns and structural components.
  o Objectives:
    ➢ Manage at least five percent of each ecological type present on the GMNF for old-growth characteristics.
    ➢ Manage oak-pine natural communities on the GMNF to maintain their presence and continuity. On the forest using natural as well as human-caused disturbance processes including fire use when necessary.
Forest Plan Desired Future Conditions

The Desired Future Condition (DFC) for wildlife habitat on the GMNF is a mix of deciduous and coniferous forest stands that vary in size, shape, age, height, and species composition, including both even-aged and uneven-aged stands. This diversity of forest conditions provides structural diversity, both horizontally (across the ground) and vertically (from the forest floor into the canopy), which, in turn, supports diverse flora and fauna. Upland openings and regenerating forest stands provide early successional habitat that is critically important to many species of wildlife. Old forest habitats provide suitable conditions for entirely different suites of species and yet many of these species are also dependent on open and young habitats during parts of their life cycle. The DFC also includes enhancement of naturally occurring forest communities that include tree species important to wildlife, such as aspen and oak. At a finer, site-specific scale, the DFC includes suitable quality and distribution of specific habitat features, such as deer wintering areas, wetlands/wet areas, wildlife trees, trees and snags used for dens, nests, cover and roosts, and hibernacula.

Management direction intended to steer wildlife habitat conditions on the GMNF toward the DFC is found under Goal 2 in the Forest Plan. The foundation for the DFC is contained in general, landscape-level objectives that address relative composition of major forest types, age-class distribution within each forest type, and several more-specific important habitat conditions, such as wetlands, early-successional habitats and upland openings, and late-successional or old forest habitats. Objectives, standards, and guidelines for wildlife reserve trees, deer wintering areas, and habitat management for individual species define the DFC at a finer, site-specific scale.

Management, maintenance, creation, or enhancement of wildlife habitats on NFS lands depends largely on timber and vegetation management activities that alter the existing structure and condition of vegetation communities. The kinds of vegetation management tools available and the authorized degree of habitat manipulation vary for each management Area as follows:

Diverse Forest Use and Remote Wildlife Habitat

Provide the greatest latitude for application of timber and vegetation management activities that alter the existing structure and condition of vegetation communities. The kinds of vegetation management tools available and the authorized degree of habitat manipulation vary for each management Area as follows:

Remote Backcountry Forest

Infrequent vegetation management may be prescribed on behalf of threatened and endangered species and Regional Forester Sensitive Species (collectively TES), or for maintaining existing unique or important wildlife features.

Diverse Backcountry Forest

Provide longer rotations for timber harvesting of 150 years or more. The longer harvesting rotations, temporary and permanent opening size of less than 20 acres, and limits on new permanent road construction within this MA means it will provide the opportunities to achieve “old forest” wildlife habitat objectives.

Appalachian National Scenic Trail

Low intensity vegetation management is appropriate to maintain the long term desired future condition on the Appalachian Trail management area including areas of high ecological value.
Long National Recreation Trail

Vegetation management activities authorized only to protect TES species, provide for public safety, or maintain existing fields and vistas.

Existing and Candidate Research Natural Areas

Vegetation management and animal habitat management should be permitted only when needed to maintain or restore the unique feature(s) or vegetation type for which the Research Natural Area was established.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

The existing distribution of major habitat types within the Telephone Gap IRP project area is not substantially divergent from the Forest Plan DFC. The Ecological Diversity section of this Landscape Assessment addresses the gap between DFC and existing condition in detail. Several aspects of this gap are relevant to wildlife resources. Age-class distribution of forested lands is skewed heavily to mature/old age classes at the expense of young and regenerating forest stands. Regeneration (0 to 9-year age class) is essentially absent from the project area.

Opportunities

Increasing or enhancing oak stands in the project area could benefit wildlife habitat by providing a food source (acorns).

The age-class distribution of forested lands is skewed heavily to mature age classes. This includes newly identified sections of “old forest”.

Increasing regenerating and young forest component adjacent to DWA’s and Old Forest type would improve deer wintering habitat and moves the project area towards the DFC. Increasing the abundance and distribution of these age classes would also benefit other species.

There is a lack of permanent upland openings, a low percentage of young forest, as well as limited early successional habitat in the project area. The lack of permanent upland openings is not problematic for wildlife habitat as temporary upland openings created by harvesting timber can provide this component. The conspicuous lack or early successional habitat can also be addressed through the same mechanisms that create temporary openings; the natural progression would move from opening to early successional then young forest. Additionally, utilizing timber harvest adjacent to old forest and/or softwood dominated deer wintering areas would further enhance wildlife habitat.

Initial Possible Activity List

- Propose timber management activities adjacent to old forest and/or softwood stands to provide enhanced deer habitat.
- Enhance or increase oak stands.
- Create temporary upland openings.
- Create temporary openings adjacent to aquatic resources or potential beaver habitat.
5. ISSUES AND CONCERNS

Protection of old forest and wildlife habitat corridors and blocks. The Blue Ridge mountain area within the project area is a large unfragmented section of the Green Mountains. Large unfragmented areas provide important wildlife corridors through the adjacent fragmented landscape. Preserving as much of the old forest and limiting permanent changes to the landscape would maintain wildlife habitat values for this section.
Threatened, Endangered, and Sensitive Species – Animals

1. INTRODUCTION AND BACKGROUND

General Description

Management of wildlife and wildlife habitat on the GMNF strives to ensure sustained viability of populations through conservation and enhancement of diverse habitat conditions. As part of this management, the Forest Service affords special attention to federally-listed threatened and endangered species and to Regional Forester Sensitive Species (collectively Threatened, Endangered, and Sensitive, or TES species) to avoid or mitigate potential adverse impacts of management actions on habitats that are important for these species.

Threatened and endangered species are identified by the Secretaries of the Interior and Commerce in accordance with the Endangered Species Act (ESA) of 1973. An endangered species is one in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. The ESA also includes provisions for protection of critical habitat for threatened and endangered species. Regional Forester Sensitive Species (RFSS) are those species for which population viability is a concern, based on significant downward trends in population numbers, density, or availability of suitable habitat that would reduce a species’ existing distribution.

2. EXISTING CONDITION

The endangered Indiana bat (Myotis sodalis) and threatened northern long-eared bat (Myotis septentrionalis) are the only federally listed species known to occur on or near the GMNF at this time (Table 8). Both species historically used Brandon Silver Mine as a hibernaculum (which is outside the project area, but the five-mile protection zone overlaps the IRP boundary) and have been observed or detected within the project area. Indiana bats are only found west of the Green Mountains and below 1,100 feet in the Champlain Valley. Northern long-eared bats may be using habitat throughout the project area. On January 28, 2020 in Center for Biological Diversity v. Everson, No. 1:15-cv-00477 (D.D.C. 2020), the U.S. District Court for the District of Columbia remanded, but did not vacate, the United States Fish and Wildlife Services’ 2015 decision to list the northern long-eared bat as threatened under the Endangered Species Act. This decision may lead to the species being listed as “endangered”. This potential change in status could have ramifications on the type and timing of activities that occur where northern long-eared bats and their habitat are present.

Eighteen of the species on the RFSS list could occur on or near the GMNF (Table 8) and several are known to occur or may occur within the Telephone Gap IRP project area, with the exception of both freshwater mussel species; creek heel splitter and brook floater.

Table 8. Federally-listed Threatened and Endangered Species and Regional Forester Sensitive Species for the Green Mountain National Forest.

<table>
<thead>
<tr>
<th>Species Common Name</th>
<th>Species Scientific Name</th>
<th>Status¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indiana bat</td>
<td>Myotis sodalis</td>
<td>E</td>
</tr>
<tr>
<td>Northern long-eared bat</td>
<td>Myotis septentrionalis</td>
<td>T</td>
</tr>
<tr>
<td>Eastern small-footed bat</td>
<td>Myotis leibii</td>
<td>RFSS</td>
</tr>
</tbody>
</table>

Telephone Gap Integrated Resource Project, Landscape Assessment
Little brown bat  
*Myotis lucifugus*  
RFSS  
Tri-colored Bat  
*Perimyotis subflavus*  
RFSS  

**Birds**  
Common loon  
*Gavia immer*  
RFSS  
American peregrine falcon  
*Falco peregrinus anatum*  
RFSS  
Bicknell’s thrush  
*Catharus bicknelli*  
RFSS  
Rusty blackbird  
*Euphagus carolinus*  
RFSS  

**Reptiles**  
Spotted turtle  
*Clemmys guttata*  
RFSS  
Wood turtle  
*Clemmys insculpta*  
RFSS  

**Amphibians**  
Jefferson salamander  
*Ambystoma jeffersonianum*  
RFSS  
Blue-spotted salamander  
*Ambystoma laterale*  
RFSS  
Four-toed salamander  
*Hemidactylium scutatum*  
RFSS  

**Insects (non-odonate)**  
Monarch butterfly  
*Danaus plexippus*  
RFSS  
Yellow-banded bumblebee  
*Bombus terricola*  
RFSS  
Appalachian tiger beetle  
*Cicindela ancisconensis*  
RFSS  
West Virginia white  
*Pieris virginiensis*  
RFSS  

**Odonates**  
Southern pygmy clubtail  
*Lanthus vernalis*  
RFSS  
Harpoon Clubtail  
*Gomphus descriptus*  
RFSS  

**Mollusks**  
Brook floater  
*Alasmidonta varicosa*  
RFSS  
Creek heelsplitter  
*Lasmigona compressa*  
RFSS  

1E=Endangered; T=Threatened; RFSS=Regional Forest Sensitive Species

**Inventory Methodology/Process**

All available data, including published and gray literature and survey records from a variety of agencies and organizations, were compiled and analyzed.

For several years, surveying the bat communities across the GMNF has been emphasized. During the fall of 2020, Forest Service - GMNF staff deployed acoustic detectors at Blue Ridge Cave in the project area. These detectors were placed near the mouth of the cave to capture fall swarm behavior. *Myotis* species were detected and additional surveys will be conducted at this location in 2021.

Since January 2020 the Forest Service - GMNF staff has hosted a Bio-Blitz within the project area boundary (see the Wildlife and Wildlife Habitat section for details). While not specifically focused on TES species there is an opportunity for their detection.

Additional surveys are planned for the rusty blackbird in potential breeding sites around Chittenden Reservoir during spring 2021.

A resurvey of the Blue Ridge Fen is also planned in spring or summer 2021 for birds, invertebrates, and amphibians. This may help identify additional TES species within the project boundary.
Inventory Findings

According to data provided by the Vermont Fish and Wildlife Department (VFWD), Vermont Center for Ecostudies, and New Hampshire Audubon Society, past survey efforts have documented the following TES species within the project area:

- Northern long-eared bat (*Myotis septentrionalis*), little brown bat (*Myotis lucifugus*), tricolored bat (*Perimyotis subflavus*), and eastern small-footed bat (*Myotis lebéei*) species were documented in the Brandon Mine as recently as 2005. In the fall of 2020, only little brown bats were detected during acoustic surveys at Blue Ridge Cave though other myotis species are suspected. All myotis species have declined since the introduction of white nose syndrome (WNS).

- Rusty blackbird (*Euphagus carolinus*) was documented at several locations in the project area. Chittenden Reservoir and Leffert’s Pond have observations and contain appropriate habitat (VHNI 2020).

- Bicknell’s thrush (*Catharus bicknelli*) has been recorded at multiple locations north and south of the project area along the spine of the Green Mountains. Within the project area boundary, the species has been observed on Mt. Carmel and at Bloodroot Mountain. The sub-alpine habitats preferred by this species are limited within the project area.

- Common loon (*Gavia immer*) has been observed during the breeding season in the project area (VNHI 2020). Chittenden Reservoir, Leffert’s Pond, South Pond, and Kent’s Pond are all bodies of water large enough to support breeding loons.

- Monarch butterfly (*Danaus plexippus*) has been documented at a few locations within the project area. The monarch butterfly is widespread in Vermont and can be found in any field, meadow, wetland, or disturbed area that supports wildflowers. Milkweeds (*Asclepias sp.*) serve as host plants for caterpillars and are therefore of particular importance to monarchs.

- Yellow-banded bumble bee (*Bombus terricola*) has been documented at multiple locations within the project area (VNHI 2020).

3. DESIRED FUTURE CONDITION

Forest Plan Goals and Objectives

Forest Plan goals and objectives related to TES species, like those for wildlife and wildlife habitat in general, stem from Goals 2 and 7, which address the maintenance and restoration of quality, abundance, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals, and protect rare or outstanding biological, ecological, or geographical areas on the GMNF. Objectives under these goals require that the Forest Service protect key habitat and habitat features for TES species, work toward recovery of federally-listed threatened and endangered species, implement established recovery or conservation strategies for TES species, and maintain or enhance habitats for RFSS through conservation and habitat management (USDA Forest Service 2006).

Forest Plan Desired Future Condition

There is no Desired Future Condition (DFC) specific to TES species in the Forest Plan, beyond that for wildlife and wildlife habitat in general. However, habitat management techniques that are employed to benefit other wildlife species frequently are not compatible with TES management. For example, tree removal for openings may reduce roosting areas for TES bats. Care must be taken to ensure that efforts to meet the general wildlife habitat DFC do not jeopardize TES species.
Optimal Condition

TES species benefit from the conservation and enhancement of specific habitat features, such as wetlands or roost trees, as well as the preservation and restoration of natural processes. The goal of TES species management is to sufficiently recover the species so that management is no longer needed for the species to remain viable.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

As previously mentioned, the Forest Plan does not outline a DFC that is specific to TES species. Moving toward the general wildlife habitat DFC may benefit some TES species at the expense of others, while many would remain largely unaffected. Therefore, TES species management does not fit under the umbrella of the general wildlife and wildlife habitat DFC.

The goal of TES management is to allow the species to recover so that focused management is no longer needed for the species to persist on the landscape; this outcome can be described as the optimal condition. A gap between the existing and optimal conditions will remain as long as species are listed and require management to persist. While recovery of TES species requires a range-wide effort, the Forest Service must do its part to protect and, when practicable, enhance or restore the habitats these species depend on.

Opportunities

Protection of the hibernaculum located on Blue Ridge Mountain is of the highest priority. There is no discussion of identifying or locating new hibernacula in the Forest Plan, however once identified these areas warrant special protection in relation to threatened and endangered species as well as RFSS listed bat species.

The use of timber or vegetation management is specifically authorized for managing habitats on behalf of TES species in all management areas that occur within the project area except the Blue Ridge Fen Candidate Research Natural Area.

Forest Service staff should continue to work in collaboration with agencies and other groups conducting research on WNS and bats and should act on recommendations that arise from ongoing research and monitoring.

Wood turtle nesting sites may be created as service work in areas that are within 300 feet of potential wood turtle stream or river habitat. The headwaters of East Creek above Chittenden Reservoir and Leffert's Pond contain extensive wetland habitats and riparian forest that could provide habitat for the wood turtle. There is the potential to create turtle nesting sites in this area.

There may also be opportunities for more proactive management for the rusty blackbird and West Virginia white butterfly. These opportunities are outlined in the following section.

Initial Possible Activity List

If timber harvests or other vegetation management activities were to take place within 800 feet of wetlands that may provide good foraging habitat for rusty blackbirds, the goal should be to regenerate spruce-fir. This would provide or enhance nesting habitat.
Support activities designed to move Blue Ridge Fen towards designation as a Research Natural Area.

Conduct activities to benefit the West Virginia white butterfly by removing garlic mustard in the project area, especially where it occurs near toothwort.

Designate and protect Blue Ridge Cave as a hibernaculum and establish a hibernaculum management plan to protect bat species.

5. ISSUES AND CONCERNS

The threatened northern long-eared bat and three RFSS bat species (little brown bat, eastern small-footed bat, and tri-colored bat) all could occur within or near the project area. All four of these species are known to be susceptible to WNS. Prior to the advent of WNS, these species wintered in three hibernacula on privately-owned land adjacent to GMNF lands. Blue Ridge Cave, which is located within the project area, still contains little brown bats.

Darling and Smith (2011) estimated that because of WNS, little brown bats in Vermont had declined by 75 to 99 percent, and northern long-eared bats had declined by 93 to 99 percent state-wide. Indiana bats, eastern small-footed bats, and tri-colored bats have never been abundant or wide-spread in Vermont, however, and documenting declines in abundance for these species is difficult (Darling and Smith 2011). The State of Vermont has listed the eastern small-footed bat as threatened for many years. In response to population declines from WNS, the State has since listed the little brown bat, tri-colored bat, and northern long-eared bat as endangered in August 2011 and listed tri-colored bats as endangered in 2012. Opportunities exist for Forest Service - GMNF personnel to collaborate with state and federal agencies, academic researchers, and others who continue investigations into the causes, containment, and potential management responses to WNS.

Projects that involve tree removal may negatively impact any or all bat species. Indirect impacts include the alteration of foraging and roosting habitat. Direct impacts include mortality and injury if roosting habitat is altered while occupied by bats during the active season (generally April through October), or activities that disturb hibernating bats in winter.

In addition to the bat species listed as RFSS, there are specific issues and concerns related to the following RFSS in the Telephone Gap IRP area:

- **Rusty blackbird** breeds in thick, young or stunted stands of spruce-fir within 800 feet, but usually immediately adjacent to, open wetlands. Vegetation management could negatively impact the species by eliminating breeding habitat or impacting individual birds during the breeding season. Alternatively, breeding habitat could be enhanced by regenerating spruce-fir stands near wetlands.

- **Bicknell’s thrush** breeds in high-elevation (generally over 3,000 feet in Vermont) stunted spruce-fir forests. Vegetation management, such as the maintenance or creation of trails, within this habitat type may impact breeding habitat or individuals during the breeding season. This type of habitat is limited within the project area boundary.

- **Wood turtles** are active during the summer months and may use an area of up to 1,000 feet from moderately sloped streams and rivers. Any vegetation management activities that occur within 1,000 feet of potential habitat should occur during the winter months when wood turtles are hibernating. Wood turtles hibernate in streams and slack waters. Activities that alter flows should be avoided to protect the species.
• **West Virginia white butterfly** requires a closed forest canopy and will not cross areas where the canopy is broken (e.g. waterbodies, unshaded roads, powerline corridors). Therefore, any activity that creates gaps in the canopy can restrict the movements of individuals. Forestry practices may as also result in direct mortality at all life stages. A far more serious threat is the invasion of garlic mustard (*Alliaria petiolata*) into the range of the West Virginia white butterfly. Females often lay their eggs on garlic mustard, mistaking it for toothwort (*Cardamine sp.*), the species’ host plant. Caterpillars cannot feed on garlic mustard and will therefore die. Opportunities exist to conserve the West Virginia white by eradicating garlic mustard and/or protecting patches of toothwort. Given the amount of potential old forest detected within the project area boundary, efforts should be made to limit impacts to toothwort in these areas.

• **Monarch butterfly** and yellow-banded bumblebee require floral resources throughout the growing season. Good habitats generally include open areas with a high diversity of native wildflowers. Although both species are sharply declining, they are wide-ranging and occur within the project area. As such, any activities that impact these types of open areas, including mowing, prescribed fire, and timber operations, may have short-term negative impacts on these species.

• **Appalachian tiger beetle** (*Cicindela ancocisconensis*), **southern pygmy clubtail**, and **harpoon clubtail** occur in various riparian and wetland habitats. Activities that alter these habitat types could be detrimental to these insect species. Opportunities exist for enhancing conditions in riparian and aquatic habitats, as well as for improving soil stability and minimizing water runoff and erosion, thus providing overall improvement and enhancement to open water, riparian, and wetland habitats.

These species may require mitigation measures in addition to Forest Plan Standards and Guidelines to ensure that project activities do not cause undue harm to individuals or their habitats.

6. REFERENCES


Vermont Natural Heritage Inventory (VNHI). 2020. Unpublished spatial data provided to the GMNF.
Botanical Resources

1. INTRODUCTION AND BACKGROUND

General Description
Regional Forester Sensitive Species (RFSS) are rare plants which the Forest Service works to protect and enhance habitat to maintain viable reproducing populations. Forest Service Manual 2670 directs us to:

- Develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions.
- Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.
- Develop and implement management objectives for populations and/or habitat of sensitive species.

Non-native invasive plants (NNIP) are species that require management actions to prevent, contain, or eradicate their spread to avert detrimental impacts to other forest resources.

2. EXISTING CONDITION

Inventory Methodology/Process
Any rare plants within the Telephone Gap IRP project area (primarily at the Cape Research Natural Area) that had not been monitored in the previous five or more years, plus rare plants historically known from the region, were prioritized for monitoring. Subsequently, we focused on potential rare plant habitat, based on known information about habitat preferences for RFSS:

- Habitat for boreal bedstraw (*Galium kamtschaticum*), which is known to occur at forested sites above about 1,800 feet, often next to small streams.
- Significant Ecological Features that might have rare plants that weren’t reported during mapping of the features.
- Ponds, wetlands, and their edges, especially on the South Pond parcel (in the process of being acquired).
- Areas with mapped calcareous bedrock.
- Distinctive areas or features noted in aerial imagery.
- Forested stands likely to be considered for management, prioritized by:
  - Forest types (existing vegetation), combined with site indices (indicative of growing conditions) and remarks about the stand; northern hardwood stands with high site indices and oak stands were highest priority.
  - Stand age, with oldest stands being of most interest (with the understanding that year of origin in the database is not always accurate).
  - Topographic features prioritized for inventory include:
    - Small rounded hills, which may be limy and provide habitat for calciphiles.
    - Convex slopes, especially south-facing, can concentrate heat and be good potential habitat for rare plants preferring warmer microclimates.
    - Concave slopes concentrate nutrients, which can be good for rare plants that require richer sites.
Some rare plants are associated with seeps, which can be indicated by wavy contour lines.

- Ravines, which can concentrate nutrients and moisture.
- Whalebacks, which can have narrow ridges with exposed slopes.
- Saddles, which can have unique wetlands.

Field surveys were conducted by Forest Service staff in 2019 and 2020 and will continue into the summer of 2021. In general, intuitively controlled survey methods were used and included stands that looked the most ecologically or botanically interesting on the ground (such as sites where potential habitat for rare plants was evident) received the most in-depth surveys.

Roads or trails used to access other sites for inventory were high priority locations to record infestations of NNIP. Subsequently, NNIP locations were documented whenever they were found during botanical surveys.

**Inventory Findings**

The Telephone Gap IRP project area is a botanical hotspot, and very few concerns were reported in Element Occurrence Records. No Threatened or Endangered plant species occur on the GMNF.

**Sensitive Species**

Forty-five plant species that are rare or uncommon in Vermont are documented to occur in the Telephone Gap IRP project area. Of these, 27 are on the RFSS list, and 18 are tracked by the State of Vermont (or were until recently) (see Appendix A). These 45 rare plant species are represented by 73 populations, of which 57 populations are on NFS land. More than half of the 45 species are either aquatic or wetland species, and many of the remaining species are associated with either rich northern hardwood forests or a woodland seep.

During botanical inventory, it was discovered that there are many stands of old forest (to be distinguished from old growth, which is more rigorously defined). In addition, the quality of the habitats throughout the project area was recognized, and 35 state significant communities representing 17 different community types were mapped as a result. State-significant communities are recognized as the best examples of these communities in the state, and their designation is based on their condition, size or abundance, and the landscape surrounding them. Twenty-six of the 35 significant communities are home to rare plants. Of the 73 rare plant populations, 16 are either within or partially within potential old forest.

**Non-native Invasive Plants**

Twenty NNIP species, or species groups, represented by a total of 151 infestations are documented to occur in the Telephone Gap IRP project area. The most common are non-native honeysuckles, common reed, Japanese knotweed, and wild chervil. Least common are oriental bittersweet, burning bush, and glossy buckthorn. There were also three species reported that are usually not tracked on the GMNF (bull thistle, Canada thistle, and creeping jenny). Most infestations are along road or trail edges, and wetland edges. Very few are in habitat interiors, although infestations do occur in the general vicinity of 18 rare plant populations.

The tentatively mapped areas of old forest are largely uninfested, except for the one that overlaps with Gifford Woods State Park. Two other areas that are likely old forest have common buckthorn nearby, but not within them.
Six of the 35 state-significant natural communities have NNIP infestations within them. Those infestations are tiny except for infestations within two communities on the southeast shore of Lefferts Pond; it is not clear, however, whether the large purple loosestrife infestation documented there is accurately mapped.

3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to botanical resources (USDA Forest Service 2006):

Forest Plan Goals and Objectives

- Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.
  - Threatened, Endangered, Proposed, and Sensitive Species; Species of Local Interest; Rare and Exemplary Natural Communities Objectives:
    - Protect critical habitat and key habitat features upon which federally listed endangered, threatened, proposed species, and Regional Forester’s Sensitive Species depend.
    - Coordinate with the Vermont Fish and Wildlife Department to maintain and enhance habitat conditions for the State’s rare species and natural communities.
    - Maintain viable reproducing populations for all native plant and animal species. For species where the Forest alone cannot support a viable population, species persistence will be maintained, and the Forest will contribute to maintaining or improving viability where possible.
  - Non-native Invasive Species Objective:
    - Minimize adverse effects of non-native invasive species on National Forest resources. Program efforts include introduction prevention, inventory, containment, and abatement.

Forest Plan Desired Future Conditions

The Forest Plan does not list a desired future condition for rare plants other than what is described in the goal and objectives listed above. The implication of the goal and objectives for rare plants is that all rare species (on the RFSS list or rare in the state) that are known to occur on the GMNF would have viable and sustainable populations.

The Forest Plan does not list desired future condition for NNIP, other than what is described in the goal and objective listed above. The implication for NNIP is that existing infestations would be eradicated, or at least contained, and new infestations would be prevented.

Other Sources for Desired Future Conditions

The Vermont Fish and Wildlife Department describes the importance of protecting plant diversity: “…plants provide crucial habitat for most other organisms, are a food source for most animals, especially pollinators, and make our landscapes more resilient to climate change and other disturbances. Plants, in fact, are responsible for the existence of most life on earth” (Vermont Fish and Wildlife Department, date unknown). The implication is that all native plant species, including rare species, should have viable populations that contribute to the overall biodiversity of the planet and help support all life on earth.
According to the Native Plant Trust, “research indicates that each plant in a community plays a unique role, and only together can they efficiently capture light and the nutrients from soil and water necessary to sustain them. Declining plant diversity also reduces the ability of plants to adapt to changing local conditions and of ecosystems to produce oxygen and remove carbon dioxide from the atmosphere” (Farnsworth, 2015). The implied desired future condition is one in which all native plants, including rare plants, have viable populations.

The vision of the North American Invasive Species Management Association is that North America’s lands and waters are protected from invasive species. The Nature Conservancy states that the best way to fight invasive species is prevention, implying a desired future condition in which natural communities are free from invasive species. Executive Order 13112, signed in 1999 and updated in 2016, states that, “it is the policy of the United States to prevent the introduction, establishment, and spread of invasive species, as well as to eradicate and control populations of invasive species that are established. Invasive species pose threats to prosperity, security, and quality of life”. The desired future condition is implied to be one in which NNIP are prevented from establishing and are controlled or eradicated where they already exist.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description
For the 73 total rare plant populations, there were concerns about NNIP near 18 of them. In most cases these infestations were not immediately adjacent to the population but within 200 feet to one mile away. An additional five rare plant populations are represented by historical records of plants that have not been located in 20 or more years, and another two populations need their identity confirmed. Element Occurrence Records for several populations indicate tiny populations of one to a few plants, but management concerns were not indicated for many of these, and it is uncertain why those populations are so small or whether there are any management activities that could facilitate greater viability. Currently, we are unaware of a link between past management activities and the small size of these populations. Not all potential rare plant habitat has had botanical inventory, and there may be more rare plant species and/or populations that are not in optimal condition.

The presence of 20 NNIP species, or species groups, represented by a total of 151 infestations are documented to occur in the Telephone Gap IRP project area indicates a gap between the existing and desired future condition. Further evidence of this gap is that NNIP infestations occur near 18 rare plant populations, within eight state-significant natural communities and near (within 1,000 feet) 22 of the communities, are within one preliminarily mapped old forest area, and near two others (see Appendix A).

Opportunities
An overarching priority is to conserve the habitats where rare species occur. In some cases that would mean not managing the vegetation in old forests or significant natural communities. In other cases, it would mean only planning vegetation management activities that would not alter the basic habitat type and would not disturb the ground or canopy where the rare species occur. Out of 73 rare plant populations, only ten occur in places where this opportunity could potentially conflict with places where vegetation management might be proposed; others are either not on NFS land, are aquatic, or occur in wetlands or on land that is unsuitable for harvest (see Appendix A).

Within the above context, the highest priority would be to control NNIP wherever they occur near rare plants, or within the old forests or significant natural communities that support them. It is also a high priority to develop mitigation measures that will effectively prevent the spread of
NNIP into the area from elsewhere, or from where they currently occur in the project area to elsewhere in the project area, where they could potentially have an impact on rare plants.

Of medium priority is to continue surveying for documented rare plants in the project area that have not been found in recent years, to confirm the identity of the two populations of orchids that were unable to be confirmed previously, and to assess whether any of their habitats would benefit from management. Additionally, it is a priority to ensure some of the smallest populations of rare plants are monitored often enough (at least every five years) to detect downward trends and do whatever is possible to maintain their viability.

The highest priority for NNIP would be preventing the introduction of new infestations and spread of existing infestations by following the Eastern Region’s Best Management Practices (USDA Forest Service 2012) in the development of project design criteria or mitigation measures.

Also, a high priority is to treat NNIP infestations where they occur in or near state-significant natural communities, preliminarily mapped old forest, and rare plant populations. These are all resources we want to protect.

Treating the remaining NNIP infestations would be a medium priority.

**Initial Possible Activity List**

Identify state significant natural communities that are of high quality and review for the need of additional protection from management activities.

Control NNIP located near the rare plant populations as indicated in Appendix A. Control treatments could include any invasive plant control method authorized through the 2010 forest-wide Invasive Plant Control Decision Notice (USDA Forest Service 2010).

Continue monitoring rare plant populations in the project area.

Using methods in keeping with the forest-wide Invasive Plant Control Decision Notice (USDA Forest Service 2010), plan and implement treatment for infestations:

- Within or near state-significant natural communities and preliminarily mapped old forests.
- Near 18 rare plant populations.
- Within stands slated for vegetation management, along any roads or trails used for access, including any log landings.
- Elsewhere in the project area if there is any overlap between proposed activities and NNIP infestations.

Because NNIP control is covered by the existing Invasive Plant Control Decision Notice, none of the above activities would be listed as proposed actions in the Telephone Gap IRP project proposal. Likewise, NNIP mitigations are not listed as a possible activity because they are anticipated to be included as mitigation measures in the Telephone Gap IRP environmental assessment. Another important activity that would not be listed in the proposed action is ongoing surveying for new infestations, including NNIP species that are new to the area.
5. ISSUES AND CONCERNS

Some plant species are intrinsically rare because they require a unique habitat, lack genetic self-compatibility, have isolated populations, depend on specialized mutualistic relationships with other species, or have limited dispersal mechanisms. Others are rare because of human activities that have resulted in loss of habitat, such as: loss of pollinators, dispersal agents, or other associations; collection for horticulture, medicine, or science; competition with non-native invasive species; and introduction of pathogens or pests (USDA FS, date unknown).

Climate change has the potential to alter habitat suitability for rare plants, especially those that are already at the edge of their range. This could result either in loss of populations for some species, or population expansion for others (Farnworth 2015). Research in the northeastern United States and Canada shows that the climate has become warmer and wetter, with more extreme precipitation events, over the past 100 years (Rudstad et al. 2012). Rare plant response to climate change is categorized as resistance, resilience, or transition, and the response of any particular rare species in the Telephone Gap IRP project area is uncertain.

Land use history affects habitat suitability for many native plants. In a study in central New York state, secondary forests 70-100 years old contained an average of 65 percent of the number of forest herb species found in primary forests (Flinn and Marks, date unknown). The Telephone Gap IRP project area may be unusual on the GMNF in having multiple stands of old forest, in addition to 35 state-significant natural communities which collectively support a high diversity of plant life.

All native plants, including rare plants are subject to browse pressure from deer to varying degrees in different parts of Vermont (Shortsleeve, date unknown).

American ginseng and at least four species of orchid occur in the project area. Although there has not been substantial evidence of illegal collection in the area, these species may be subject to poaching (Davies 2011; Shea 2019; Vermont Fish and Wildlife Department, date unknown). Orchids and moonworts may be declining in the northeast due to loss of mycorrhizae associations (USDA Forest Service, date unknown).

Non-Native Invasive Plants

Non-native invasive plants are documented to occur in many locations in the project area. Some of these infestations are beginning to encroach on rare plants.

With the lack of top predators such as wolves, herbivores such as deer have increased in recent decades. Since deer feed preferentially on native rather than non-native vegetation, NNIP have an increased opportunity to expand in many forested ecosystems. This browse pressure negatively affects native plant regeneration (Rawinski, 2014).

Climate change has resulted in earlier spring conditions in North America, and this expanded season is thought to preferentially benefit NNIP over native flora (Wolkovich, E.M. et. al., 2013), and longer growing seasons facilitate migration of new invasive species into an area.

Outdoor recreation is thought to be a major pathway of dispersal for NNIP species (Anderson et al., 2015). Anecdotally, outdoor recreation has increased greatly during the COVID-19 pandemic as people search for safe activities to pursue.

This combination of issues adds to the concern that NNIP species need focused attention as part of the Telephone Gap IRP.
6. REFERENCES


Aquatic Organisms and their Habitat, and Water Quality

1. INTRODUCTION AND BACKGROUND

General Description

The Telephone Gap IRP project area drains both east to the Connecticut River and west to Lake Champlain and the Hudson River Valley. The area contains portions of four Hydrologic Unit Code (HUC) 12 watersheds; East Creek and Furnace Brook draining to Lake Champlain via Otter Creek; and the Headwaters of the Ottauquechee and Tweed Rivers draining to the Connecticut River.

Headwater streams are the most abundant aquatic habitat in the project area. Fish communities in headwater streams are dominated by brook trout and slimy sculpin. Additional non-game stream and river species include creek chub, common shiner, and tessellated darter. Sections of the Tweed and Ottauquechee Rivers likely support sea lamprey and were historically spawning grounds for Atlantic salmon before the species was extirpated. Portions of these river systems are stocked with brook, rainbow, and brown trout to support a recreational fishery by the State of Vermont.

Most of Vermont’s streams and rivers, including those within the project area, were heavily impacted by past land use. Agricultural practices removed forest and manipulated rivers to move timber and expand farming. This left streams and rivers in unstable configurations leading to incision and erosion, degrading aquatic habitats and water quality. The project area contains predominantly headwater reaches on NFS lands. These reaches are benefitting from the age of the forests that surround them. Eighty-five percent of the forest located on NFS lands is 80 years or older. Mature forests provide channel stability, shade, and large wood material. Although mature, these forests are not yet old enough to provide adequate recruitment of large wood material in headwater streams and efforts to maintain adequate buffers are essential to protecting the resource. The protections currently provided under the Forest Plan (USDA Forest Service 2006) will protect headwater streams so they can continue to provide abundant habitat and refugia for aquatic organisms. However, access to these reaches may be hindered by barriers to upstream movement off NFS lands.

2. EXISTING CONDITION

Inventory Methodology/Process

Aquatic resources were inventoried and characterized by a number of information sources including: State of Vermont Tactical Basin Plans for Otter Creek and the White River, Geomorphic assessments of the Otter, Ottauquechee, Tweed Rivers, in-house survey data on temperature and fish populations, the Vermont Agency of Natural Resources Atlas, and the Watershed Classification Assessment Tracking Tool. Additional comparisons were drawn from prior GMNF IRP’s as conditions impacting water resources are similar across the region.

Inventory Findings

East Creek (HUC 041504020107) has a total area of 39,271 acres, 30 percent of which is NFS lands. The East Creek HUC contains most of the Telephone Gap IRP project area. Under the Watershed Condition Framework (WCF 2011), East Creek is listed as functioning Properly. Aquatic Biota, Water Quality Condition, and Riparian/Wetland Vegetation Condition are
considered good. Water quality is considered fair as is Aquatic Habitat. The fair ratings are due to the flow alteration in Chittenden Reservoir, and mercury and phosphorous pollution. Headwater streams in the East Creek HUC are relatively intact and meet most of the Forest Plan desired conditions apart from the amount of large wood material.

Furnace Brook (HUC 041504020301) has total area of 28,422 acres (4,479 NFS acres). Under the Watershed Condition Framework, Furnace Brook is listed as functioning Properly. Aquatic Biota, Water Quantity Condition, and Riparian/Wetland Vegetation Condition are considered good. Water quality is considered fair as is Aquatic Habitat.

Tweed River (HUC 041504020301) has a total area of 32,480 acres (17,670 NFS acres). Under the Watershed Condition Framework, the Tweed River is listed as functioning Properly. Aquatic Biota, Water Quantity Condition, and Riparian/Wetland Vegetation Condition are considered good. Water quality is considered fair, Aquatic Habitat is rated as poor. The poor rating for habitat is largely due to fragmentation caused by barriers to aquatic organisms on Michigan and Guernsey Brooks.

Headwater of the Ottauquechee (HUC 041504020301) has a total area of 28,389 acres (1,533 NFS acres). Under the Watershed Condition Framework, the Ottauquechee is listed as functioning Properly. Aquatic Biota, Water Quantity Condition, and Riparian/Wetland Vegetation Condition are considered good. Water quality and Aquatic Habitat are considered fair. The headwaters of the Ottauquechee has the smallest amount of Forest Service ownership and few streams on system lands.

The Telephone Gap IRP project area contains three reservoirs abutting NFS lands. Chittenden Reservoir, at 724, acres is the largest body of water in the project area. The reservoir impounds East Creek as it flows west to Otter Creek. Chittenden Reservoir’s water levels fluctuate depending on power generation needs. This fluctuation in water levels impacts aquatic biota and wetlands around the reservoir and is listed on Vermont’s List of Priority Surface Waters, Part F. Surface Waters Altered by Flow Regulations. The reservoir is also listed under the state’s impaired water list for elevated mercury levels in Walleye. Leffert’s Pond is 55 acres and joined to Chittenden Reservoir via a fish way but is not listed as impaired. Leffert’s Pond is surrounded by a large wetland complex to the north and east. Kent Pond is located on the east side of the Green Mountains in the Headwaters of the Ottauquechee River. Kent Pond is a 101-acre reservoir managed for recreation. All three of these reservoirs provide lacustrine habitats and contain smallmouth bass, largemouth bass, yellow perch, pumpkin seed, and walleye (Chittenden Reservoir), not found elsewhere in the project area.

Ponds are also an important aquatic resource in the project area and several occur on NFS lands, or lands soon to be acquired. North Pond, in the Town of Chittenden, is approximately 4.85 acres and at an elevation of 2,415 feet. North Pond appears to have good water quality and not suffer from acidification like other high elevation ponds in the region. It also contains a population of native brook trout. South Pond, also in Chittenden is at 2,270 feet and 8.4 acres. South Pound is also unimpaired by acidification, and contains native brook trout, blunt nose minnow, common shiner, and black nose dace.

Aquatic Organism Passage (AOP) in the project area is a minor issue on NFS lands but does pose a substantial risk to aquatic organisms throughout the area on non-NFS lands. The majority of roads in the project area are town roads or state highways. There is a total of 12.3 miles of Forest Service system roads within the project area and many of the concerns regarding AOP have already been addressed. The Vermont Fish & Wildlife Department - Aquatic Organism Passage Coarse Screening Tool ratings are summarized in Table 9. It is
important to point out that the data used to assess passage may be outdated. For example, the barriers to movement in the Michigan Brook Drainage have already been addressed and all crossing on Forest Road 35 are passable to aquatic organisms, however, these show in the database as not passable.

Table 9. Coarse Passage Rating for Aquatic Organism Passage in the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Coarse Passage Rating¹</th>
<th>Number of AOP in this Category</th>
<th>Percent in this Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Passable</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Reduced Passage</td>
<td>53</td>
<td>41</td>
</tr>
<tr>
<td>Passage for Adult Salmonids</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>No Passage</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td>Missing Data</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td><strong>Total number of structures identified</strong></td>
<td><strong>129</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

¹ Coarse Passage Rating as defined by the State of Vermont’s screening tool: http://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_VTAOPScreeningTool.

Large woody debris (LWD), an important component to headwater streams, is limited within the project area. The lack of LWD has been demonstrated across the GMNF. Survey data from reaches on the GMNF suggest current wood loading is about half the desired amount of 175 to 230 pieces per mile. The Telephone Gap IRP project area is heavily skewed towards old or mature forest. As forests mature and senesce, the amount of natural wood loading increases. Due to the steep nature of headwater streams in the project area there is limited opportunity to utilize “chop and drop” techniques to increase LWD. One notable exception that is suitable for this activity is Townsend Brook, a tributary to the Tweed River in Chittenden and Pittsfield.

Vernal pools are present throughout the project area in low numbers. These pools are important to aquatic life at various life stages. In the Telephone Gap IRP project area, there are 15 known or potential vernal pools on NFS lands. Efforts to verify pools are ongoing. Forest Service staff will continue this effort into 2021. At this time, 5 of the 10 vernal pools have been confirmed.

3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to aquatic resources (USDA Forest Service 2006):

**Forest Plan Goals and Objectives**

- Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.
  - Objectives: Maintain or enhance fish populations through habitat protection, enhancement, restoration, and stocking programs.
- Goal 4: Maintain or restore aquatic, fisheries, riparian, and wetland habitats.
  - Objectives: Restore and enhance fisheries habitat using principles of stream geomorphology and habitat management to provide:
    - Less than 50 percent substrate embeddedness in spawning and rearing areas.
    - Less than 20 percent fine sediment, sand, and silt in spawning areas.
At least 30 percent pool habitat.

No more than 15 percent of stream bank area eroded on the entire length of stream.

Goal 6: Maintain or restore ecological processes and systems on the GMNF within desired ranges of variability, including a variety of native vegetation and stream channel types, and their patterns and structural components.

Objectives: Restore and enhance stream ecosystem processes using knowledge of riparian/floodplain functions and large woody debris (LWD) dynamics for the purpose of improving and connecting aquatic habitats, such as those for wild trout and Atlantic salmon, promoting stream stability and sediment and organic matter storage, or to increase stream productivity. Stream habitat should be managed to provide:

- LWD quantities between 75 and 130 pieces greater than 12 inches diameter per mile of stream.
- Approximately 100 pieces between 8 to 12 inches diameter per mile of stream.

**Forest Plan Desired Future Condition**

Maintain or enhance streamside riparian area forest composition towards an increase in mature and over-mature species where ecologically appropriate.

Restore and enhance fisheries habitat using principles of stream geomorphology and habitat management to provide:

- Less than 50 percent substrate embeddedness in spawning and rearing areas, primarily riffle and run habitats
- Less than 20 percent fine sediment, sand, and silt in spawning areas
- At least 30 percent pool habitat, of which at least one third should be Class 1 and 2 holding and resting pools
- No more than 15 percent of stream bank area eroded on the entire length of stream.

Restore and enhance stream ecosystem processes using knowledge of riparian/floodplain functions and large woody debris dynamics for the purpose of improving and connecting aquatic habitats, such as those for wild trout and Atlantic salmon, promoting stream stability and sediment and organic matter storage, or to increase stream productivity. Stream habitat should be managed to provide:

- LWD quantities between 75 and 130 pieces greater than 12 inches diameter per mile of stream
- Approximately 100 pieces between 8 to 12 inches diameter per mile of stream

**4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION**

**Gap Description**

Most deficiencies occur lower in the watershed and actions conducted on headwater streams on NFS lands alone will not resolve them. The primary gap between desired future conditions in the Forest Plan and existing conditions are large wood loading levels and off forest stream crossings that limit access to headwater streams.
Opportunities

There is an opportunity to assess fish passage between Leffert’s Pond and Chittenden Reservoir.

There is an opportunity to support partners to address downstream aquatic organism passage (AOP).

Townsend Brook is one of the few drainages in the project area that could benefit from LWD placement.

Initial Possible Activity List

Install a fish passage structure at Leffert’s Pond.

Restore hydrologic connectivity to the wetlands along Wildcat Road to allow passage for aquatic wildlife such as amphibians and turtles.

Replace AOPs on Forest Road 57 as outlined in the Transportation section.

Identify areas along Townsend Brook where LWD placement would benefit the watershed.

5. ISSUES AND CONCERNS

Water Quality Concerns

Stream Water Temperature Increase

Water temperatures are currently suitable for cold water adapted species within the project area and only occasionally exceed 70°F. Over the next century, ambient air temperatures are expected to increase because of climate change (Stager & Thill, 2010). An increase in the ambient air temperature would result in an increase to stream water temperatures. If stream water temperatures exceed 70°F for prolonged periods of time there would be impacts to cold water species such as brook trout (Eaton et al., 1995).

Aquatic Habitat Concerns

Large Woody Debris (LWD): Large woody debris across the GMNF is below the desired amount outlined in the Forest Plan. Large woody debris serves multiple roles in benefitting stream habitat including sediment storage, channel stability, retention of organic material, and habitat structure for fish and aquatic insects (Fausch et al., 2002). Low amounts of LWD will remain an issue until there is enough timber along stream channels at an age where senescence leads to recruitment into the channel.

Connectivity (AOP): Stream connectivity on NFS lands within the project area has not been identified as a large concern, however, areas downstream of NFS lands do present barriers to movement for aquatic organisms.

6. REFERENCES

managers can expect and do. The Nature Conservancy, Adirondack Chapter, Keene Valley,
NY.


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Waterbury, VT.
Soils

1. INTRODUCTION AND BACKGROUND

General Description

Soil in the project area provides many environmental services including regulating nutrient and water cycles, regulating water flow, energy transfer, nutrient uptake and release, carbon transfer, and chemical processing. As more precipitation infiltrates into soils, less can rapidly flow into streams and rivers as damaging floods. Acting as sponges that collect and release precipitation, soils support plant growth, soil biodiversity, and groundwater recharge. Soils also physically screen out pollutants and other toxins including pathogens and viruses in wastewater, and retain pollutants like sulfates from acid precipitation, thereby reducing the amounts deposited in streams and rivers. In forests, most plant productivity (trunks, branches, and leaves) is returned to the soil surface as it falls. These materials are broken down and recycled by soil to be re-used by plants or soil organisms.

Soils play an important role in regulating greenhouse gases, typically having a neutral import and export of gases in undegraded lands. Carbon builds up at the soil surface in a stable structure, and when left intact, increases infiltration and lowers runoff, keeping the soil surface from being washed away. The level of organic matter in a soil can greatly influence the soil's capacity to produce trees and plants. Soils maintained with high organic carbon levels can enhance production in other ways as well such as improved aggregation, water retention, diverse microbial communities, and micronutrient regulation. Carbon accumulation in the soil helps protect off-site water quality, reducing runoff, erosion, and nutrient loss. Additional services include degrading wastes and detoxifying materials and supporting recreational activities. Soil is also an important part of our cultural heritage (Comerford et al. 2013).

2. EXISTING CONDITION

Inventory Methodology/Process

The dominant soil series in the project area are Berkshire, Marlow, Peru, and Tunbridge (Soil Types Map located in the project record). Soils were inventoried and characterized by the Natural Resources Conservation Service (NRCS). This information is available online at the NRCS Web Soil Survey (Soil Survey Staff 2020). The Soil Data Mart extension in ArcMap, which accesses the same information used in the Web Soil Survey database, was used for accessing soil maps. To supplement this information, specific areas of interest were visited to determine areas of erosion, compaction, or shallow or poorly drained soils.

Existing non-system roads and trails (sometimes referred to as legacy woods roads) were mapped using a LiDAR hillshade derivative. To supplement this information, some existing legacy woods roads were visited, focusing on areas where potential vegetation management was likely. Areas with steep ground, shallow soils, soils with poor drainage, signs of erosion, sedimentation, or poor drainage were documented.

Acidic atmospheric deposition maps developed by the National Atmospheric Deposition Program’s (NADP) Total Deposition Science Committee (TDEP) were used to assess effects of acid deposition in the project area. The NADP’s Critical Loads of Atmospheric Deposition Science Committee (CLAD) Critical Loads maps were used to assess effects of nitrogen and sulfur deposition for various forest ecosystem components in the project area (NADP 2015).
The GMNF initiated a 50-year study on GMNF lands in 2008 to provide insight into how the long-term effects of environmental factors such as acid deposition, toxins, and climate change impact soil quality and productivity. The first round of sampling concluded when soil, forest health, and vegetation community data were collected on 20 plots in 2008-2011. Although none of the pits are located within the Telephone Gap IRP project area, four of the 20 plots are located close enough for the data to be representative of the project area.

Inventory Findings

- In general, soils on forested lands are productive within the project area, with fertile organic and topsoil layers. Soils show little to no evidence of erosion or compaction. The soils store carbon and support a variety of forest ecosystems.
- Erosion and sedimentation are ongoing on some legacy woods roads. On some roads, use by four-wheel-drive vehicles, snowmobiles and all-terrain vehicles (ATVs) are making the erosion worse.
- Forest soils, especially in higher elevations, have been negatively impacted by decades of acidic deposition.
- Some forest soils have had their organic horizons reduced by non-native earthworms.
- The following soil resource maps will be made available to the public on the project website:
  - Soil Types
  - Sensitive Soils
  - Soil Concerns

Sensitive soils within the project area include soils more sensitive to erosion, rutting, nutrient losses, and other reductions in long-term soil productivity resulting from proposed management actions. These areas include steep ground, soils with poor drainage, shallow soils, high-elevation soils (which tend to have higher acid deposition and lower resiliency), or soils with severe or very severe erosion hazard. Sensitive soils generally require additional management considerations to ensure long-term soil productivity. Common examples of management for sensitive soils include restrictions on road building and equipment access, harvesting in general, not harvesting outside of protective snow or frozen ground conditions, or bole-only harvesting.

The amount of sensitive soils mapped on NFS land within the project area is listed in Table 10. The majority of these sensitive soil parameters overlap in the same areas (Sensitive Soils Map located in the project record). Altogether, approximately 47 percent of NFS land within the project area has one or more sensitive soil features.

Lengths of existing non-forest-system roads and trails identified using hillshades derived from LiDAR bare-earth digital elevation models on sensitive soil types are also listed in Table 1. Roads constructed with bare earth materials on sensitive soils, as these are, tend to be less stable and more susceptible to erosion, sedimentation, slumps, and slides. Altogether, approximately 12 percent of identified non-system roads and trails are on sensitive soils. Approximately 187 miles of non-system roads and trails were identified from LiDAR hillshades.

<table>
<thead>
<tr>
<th>Sensitive Soil Category</th>
<th>Area on NFS lands (acres)</th>
<th>Percent of NFS lands</th>
<th>Length of non-system roads and trails on NFS lands (miles)</th>
<th>Percent of NFS non-system roads and trails on sensitive soil types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation over 2,500 feet</td>
<td>6,480</td>
<td>19.6</td>
<td>4.35</td>
<td>2.3</td>
</tr>
<tr>
<td>Poorly drained</td>
<td>385</td>
<td>1.2</td>
<td>0.05</td>
<td>0.03</td>
</tr>
</tbody>
</table>
### Sensitive Soil Category Area on NFS lands (acres) Percent of NFS lands Length of non-system roads and trails on NFS lands (miles) Percent of NFS non-system roads and trails on sensitive soil types

<table>
<thead>
<tr>
<th>Sensitive Soil Category</th>
<th>Area on NFS lands (acres)</th>
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<th>Length of non-system roads and trails on NFS lands (miles)</th>
<th>Percent of NFS non-system roads and trails on sensitive soil types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poorly Drained</td>
<td>125</td>
<td>0.4</td>
<td>0.42</td>
<td>0.2</td>
</tr>
<tr>
<td>Slopes over 25% (over 0.25 acres or 300 feet)*</td>
<td>9,700</td>
<td>29.3</td>
<td>10.84</td>
<td>5.8</td>
</tr>
<tr>
<td>Slopes over 35% (over 0.25 acres or 300 feet)*</td>
<td>3,296</td>
<td>10.0</td>
<td>1.49</td>
<td>8.0</td>
</tr>
<tr>
<td>Shallow</td>
<td>6,797</td>
<td>20.5</td>
<td>4.59</td>
<td>2.5</td>
</tr>
<tr>
<td>Very shallow</td>
<td>1,062</td>
<td>3.2</td>
<td>1.44</td>
<td>0.8</td>
</tr>
<tr>
<td>Severe off-road erosion hazard</td>
<td>7,232</td>
<td>21.8</td>
<td>7.20</td>
<td>3.9</td>
</tr>
<tr>
<td>Very severe off-road erosion hazard</td>
<td>1,443</td>
<td>4.4</td>
<td>1.11</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total without overlap</strong></td>
<td><strong>15,622</strong></td>
<td><strong>47.2</strong></td>
<td><strong>19.72</strong></td>
<td><strong>10.6</strong></td>
</tr>
</tbody>
</table>

*Only road sections longer than 300 feet were included.

Additional NRCS soil interpretations, including poor harvest equipment operability, poor suitability for log landings, poor soil trafficability, and poor suitability for natural roads are important management considerations. Although not shown on the Sensitive Soils Map, these interpretations will be considered to inform proposed project design and mitigations.

### 3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to the soil resource (USDA Forest Service 2006):

**Forest Plan Goals and Objectives**

- Goal 3: Maintain or restore the natural, ecological functions of the soil.
  - Objectives:
    - Minimize the adverse impacts on soils from management activities.
    - Restore soil processes and functions on degraded soils.

**Forest Plan Desired Future Condition**

The soil resource desired future condition is similar to the goal and objectives stated above. However, these goals and objectives cannot be achieved on 100 percent of the project area 100 percent of the time. Existing roads, trails, homes, agricultural practices, and other land uses all have some detrimental effects on soils. Atmospheric deposition has also had broad-scale effects on soils in the project area.

Given the existing soil conditions, the desired future condition is to minimize the extent and magnitude of detrimental soil effects while maintaining the economic, recreational, plant and animal habitat, and other forest ecosystem benefits of sustainable land management.

### 4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

**Gap Description**

Gaps between the desired future condition and existing condition exist due to acid deposition, the presence of invasive earthworms, and erosion of some roads, skid roads, and trails.
• Approximately 187 miles of non-system roads and trails are located on NFS land within the project area, having an average width of 14 feet, including ditches (see Table 11). These road or trail corridors have reduced soil productivity mainly due to compaction from past use. There is also ongoing erosion and sedimentation on some non-system roads and trails throughout the project area, including areas where they have turned into streams.

• Forest Service system roads and snowmobile trails and non-system roads in or near areas of potential vegetation management occupy approximately 422 acres, or 2.4 percent of the area considered for harvest. This area has reduced long-term soil productivity.

### Table 11. Existing system and non-system roads on NFS lands within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th></th>
<th>Total length (miles)</th>
<th>Acres of disturbance</th>
<th>Percent of NFS lands covered by roads</th>
<th>Length in or near inventoried timber stands (miles)</th>
<th>Acres of disturbance</th>
<th>Percent of inventoried area covered by roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>System roads</td>
<td>36.0</td>
<td>96.0</td>
<td>0.30</td>
<td>34.9</td>
<td>93.1</td>
<td>0.54</td>
</tr>
<tr>
<td>System trails</td>
<td>130.9</td>
<td>222.1</td>
<td>0.69</td>
<td>54.9</td>
<td>93.2</td>
<td>0.54</td>
</tr>
<tr>
<td>Non-system roads</td>
<td>186.9</td>
<td>317.2</td>
<td>0.53</td>
<td>138.9</td>
<td>235.7</td>
<td>1.36</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>353.8</strong></td>
<td><strong>635.3</strong></td>
<td><strong>2.0</strong></td>
<td><strong>228.7</strong></td>
<td><strong>422.0</strong></td>
<td><strong>2.43</strong></td>
</tr>
</tbody>
</table>

1 Based on 22-foot-wide system roads and 14-foot-wide non-system roads and snowmobile trails.
2 NFS lands in the project area total approximately 32,252 acres.
3 Inventoried timber stand area totals approximately 17,379 acres as of April 2021.
4 Segments of system trails on system roads were not included in the system trail counts.

Approximately 29 miles of non-system roads and trails were assessed for existing soil conditions (Soil Concerns Map located in the project record). Assessment of roads was focused in areas with a higher risk for resource concerns due to steep slopes or poorly drained or shallow soils. Table 12 lists the lengths of roads and trails where resource concerns were observed. All assessed roads have varying levels of soil compaction, but most do not have ongoing erosion and appear to be naturally stabilizing. None of the non-system roads inventoried have gravel surfaces. These segments have increased risks for rutting, puddling, compaction, and erosion, and may adversely affect soil hydrology. All these areas may benefit from stabilization work and/or rerouting to lessen ongoing negative impacts to soil resources.

### Table 12. Summary of observed resource concerns on surveyed non-system roads.

<table>
<thead>
<tr>
<th>Resource Concern</th>
<th>Length of Road with Concern (miles)</th>
<th>Percent of Assessed Roads with Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut/fill</td>
<td>0.54</td>
<td>1.9</td>
</tr>
<tr>
<td>Dugway</td>
<td>0.33</td>
<td>1.1</td>
</tr>
<tr>
<td>Slopes over 20% over 300 feet long</td>
<td>1.35</td>
<td>4.7</td>
</tr>
<tr>
<td>Ongoing erosion</td>
<td>0.89</td>
<td>3.1</td>
</tr>
<tr>
<td>Stream diverted down road</td>
<td>1.42</td>
<td>4.9</td>
</tr>
<tr>
<td>Other standing or flowing water in road</td>
<td>1.16</td>
<td>4.0</td>
</tr>
<tr>
<td>In stream protective strip</td>
<td>1.69</td>
<td>5.8</td>
</tr>
<tr>
<td>Very poorly drained</td>
<td>1.11</td>
<td>3.8</td>
</tr>
<tr>
<td>Potential wetland crossings</td>
<td>0.65</td>
<td>2.2</td>
</tr>
<tr>
<td>Any of the soil concerns above</td>
<td>7.53</td>
<td>26.0</td>
</tr>
</tbody>
</table>
Opportunities

- Partner with collaborators on monitoring efforts to better quantify the effects of atmospheric deposition and climate change on soils in the project area, including collecting data for the Long-Term Ecosystem Monitoring Project.
- Maintain or enhance carbon sequestration and counteract negative effects of earthworms in the project area by increasing the amount of organic matter on the forest floor. Examples include leaving branches on the forest floor after harvest and minimizing soil compaction and erosion.
- Protect and enhance soils during project implementation through application of soil conservation measures reflected in Forest Plan standards and guidelines, and environmental analysis mitigation measures.

Initial Possible Activity List

- Collect soil data to validate the effects of atmospheric deposition on soils through the Long-term Ecosystem Monitoring Project already established on the GMNF.
- Stabilize or restore non-system legacy roads and trails with ongoing erosion, sedimentation or other soil and hydrology concerns. See Soils Concerns Map for locations of identified and assessed road segments. Road segments with resource concerns identified or unassessed segments in sensitive soil areas are more likely to need stabilization work to improve soil resources.
- Reroute existing roads, non-system legacy roads, and trails away from unsustainable locations.

5. ISSUES AND CONCERNS

Effects of Atmospheric Deposition on Soils

Incoming atmospheric sulfur and nitrogen deposition is acidic. In 2014, the pH of atmospheric deposition in Vermont averaged around 5.0 (NADP 2015). Total mercury deposition was approximately 6.4 to 7.6 micrograms per square meter on NFS lands within the project area in 2014 (NADP 2015). These are relatively high levels which have likely caused soils in the higher elevations of the project area to have become more acidic. In addition, important nutrients like calcium and magnesium are likely being leached from the soils. This could impair long-term soil and ecosystem productivity. This is a concern to the Forest Service and several other public sectors.

The critical load for a forest ecosystem is the level of sulfur plus nitrogen deposition, above which significant harmful ecological effects is estimated to occur including to soil fertility, forest health, and forest productivity. Empirical Critical Loads were developed for forests from measured observations. Nearly the entire project area, including all NFS lands, have deposition above critical loads. Table 1 provides the following exceedances for NFS lands within the project area:

Table 13. Critical load exceedance on NFS lands with the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Ecosystem component</th>
<th>Exceedance Proportion of the Critical Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycorrhizal Fungi</td>
<td>3 to 4 times</td>
</tr>
<tr>
<td>Herbaceous Plants and Shrubs</td>
<td>2 to 4 times</td>
</tr>
<tr>
<td>Forests</td>
<td>3 to 4 times</td>
</tr>
<tr>
<td>Nitrate Leaching</td>
<td>2 to 3 times</td>
</tr>
<tr>
<td>Lichens</td>
<td>2 to 3 times</td>
</tr>
</tbody>
</table>
Soil Carbon Sequestration

Maintaining the ability of soils to retain forest ecosystem carbon is a concern for the Forest Service. Carbon sequestration was also identified by the public as a concern during the 2006 Forest Plan revision and previous site-specific project environmental analyses. Forest soils are a major carbon reservoir in forests. Based on the current scientific literature, over 50 percent of the ecosystem carbon is stored in the soils of forests in the Northeastern U.S. (Petrenko 2014). It will be important to maintain or enhance this reservoir over the long-term.

Earthworms

All earthworms in Vermont are non-native, introduced from Europe and Asia. Earthworms consume organic matter in the soil, particularly in the very top organic layer of forest soils. They can completely remove this organic layer and alter soil chemistry, and the physical and microbial environment of soils. Higher elevation forests without historical use for crops developed without earthworms, putting them at greater risk for drastic changes with invasion. High earthworm diversity is linked to reduced forest floor depth (Knowles, et al. 2016). Earthworms create less favorable conditions for plant regeneration and growth by creating drier, warmer soils that are more susceptible to erosion. They also reduce the herbaceous layer of forests and may reduce salamander populations, which thrive in thick forest floor conditions. Earthworms reduce mycorrhizal fungi populations, which help plants absorb nutrients and water from soils (Knowles et al. 2016)

Soil Stabilization and Restoration Needs

There is ongoing erosion on some roads and trails throughout the project area, some of which are being used illegally by ATV riders. The soil is degrading due to loss of additional topsoil and compaction. Impacts are likely to increase in magnitude and extent if illegal ATV use continues.

6. REFERENCES


National Atmospheric Deposition Program. 2015. 2015 Summary of critical loads maps. Champlain, IL.


Wetlands

1. INTRODUCTION AND BACKGROUND

General Description
Wetlands are portions of the landscape where water is present at or near (just above or just below) the ground surface long enough or frequently enough to result in soil functions and plant communities that are specific to or adapted to wet conditions. This happens when water draining from a site through subsurface pathways though the soil is slow enough to retain water supplied by direct precipitation, surface flow (streams), adjacent standing water (lakes), or other subsurface contributions (springs). Wetlands are part of a gradient of habitat types based on water availability that, from wettest to driest, includes aquatic, wetland, riparian, and upland habitats. When functioning properly, wetlands can be particularly resistant and resilient to a number of natural and anthropogenic stressors (such as drought, fire, or herbivory), but they can also be particularly sensitive to other stressors (such as invasive plants, tire rutting, or pollutants).

Wetlands serve a wide range of ecological functions for natural plant and animal communities and they also provide several ecosystem services that benefit human communities. Due to their unique soil and hydrologic characteristics, wetlands can represent diversity hotspots for plants and animals. When surface water is present, they provide drinking water for wildlife. The timing and duration of surface water can also allow certain wetlands to serve as critical breeding locations for some species. The sponge-like characteristics of wetlands result in these sites being effective at slowing down runoff which can decrease peak flood flows downstream and help filter out a wide range of suspended and dissolved materials from the water.

Wetlands within the Telephone Gap IRP project area are generally associated with large natural depressions, beaver activity (where ponds may or may not exist without the presence of beaver), hydrologic control structures such as dams, vernal pools, fens, springs, and possibly some riverine features (such as broad floodplains with oxbow ponds).

2. EXISTING CONDITION

Inventory Methodology/ Process
Presence and location of wetland features within the project area were determined using the following spatial data:

- USDI Geological Survey (USGS) (National Hydrography Dataset, waterbodies)
- State of Vermont (Class 1 and 2 Jurisdictional Wetlands, Advisory Wetlands)
- USDA Natural Resources Conservation Service (NRCS) (Soil Survey, hydric soils)
- USDI Fish and Wildlife Service (National Wetland Inventory)
- USDA Forest Service (FNVeg Spatial, wetland stands).

These data sources have limitations on their accuracy in representing wetland features that may exist on the ground. In some locations, multiple data sets might represent particularly large or evident water bodies. In other cases, one data set may have a wetland feature mapped while the others do not. As a result, particularly small wetlands are often underrepresented by these data sets.
Regarding the current condition of wetlands in the project area, a general description is provided based on personal knowledge and anecdotal evidence.

**Inventory Findings**

Table 14 provides statistics from the individual data sets as well as a merged version (a combination of the individual data sets overlaid to create a single data set) are included. Seven open water bodies (totaling 987 acres) were not included in the summary of wetland acres.

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Number of wetland polygons mapped</th>
<th>Smallest wetland polygon mapped (acres)</th>
<th>Largest wetland polygon mapped (acres)</th>
<th>Average wetland polygon size (acres)</th>
<th>Total wetland area (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydric Soils</td>
<td>248</td>
<td>0.01</td>
<td>218</td>
<td>9.93</td>
<td>2,463</td>
</tr>
<tr>
<td>Wetland Stands</td>
<td>53</td>
<td>0.57</td>
<td>68.6</td>
<td>10.6</td>
<td>560</td>
</tr>
<tr>
<td>NHD Waterbody</td>
<td>142</td>
<td>0.02</td>
<td>5.57</td>
<td>0.66</td>
<td>94.0</td>
</tr>
<tr>
<td>National Wetland Inventory</td>
<td>514</td>
<td>&lt;0.01</td>
<td>91.2</td>
<td>3.25</td>
<td>1,671</td>
</tr>
<tr>
<td>VT Advisory Wetlands</td>
<td>174</td>
<td>0.12</td>
<td>293</td>
<td>7.00</td>
<td>1,218</td>
</tr>
<tr>
<td>VT Regulatory Wetlands</td>
<td>350</td>
<td>0.01</td>
<td>310</td>
<td>6.11</td>
<td>2,140</td>
</tr>
<tr>
<td>Merged Data</td>
<td>333</td>
<td>0.01</td>
<td>385</td>
<td>10.6</td>
<td>3,537</td>
</tr>
</tbody>
</table>

This review of the available spatial data indicates that about 4.9 percent of the project area including all ownership is likely to be wetland habitat, and 11 percent of the project area when only NFS lands are considered. Without a comprehensive, on the ground inventory of all wetland resources, the accuracy of this estimate can’t be determined. However, this estimate and the mapped locations of known wetlands along with general provisions in the Forest Plan that protect wetland resources allow for informed decisions to be made about how best to manage activities in and around these resources. The merged spatial data are shown on the Wetlands Map, which is available on the project planning record and website.

A long history of land use has resulted in a variety of direct impacts to wetlands within the project area. These impacts include alterations to surface and subsurface patterns of water movement, alteration of plant communities (including species composition and age class), alteration of soil structure and composition, removal of beavers, and creation of artificial wetlands. Less direct anthropogenic impacts to wetlands include those related to acid rain, dry deposition of pollutants such as metals and particulates, introduction of pollutants by runoff, and the alteration of temperature and precipitation regimes. Many of these direct and indirect impacts have been diminished or reversed by changing land uses and environmental protection policies, but some impacts still exist.

### 3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to the wetland resource (USDA Forest Service 2006):

**Forest Plan Goals and Objectives**

- Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.
  - Forest-wide Habitat Composition and Structure Objectives:
Maintain acres of forested and non-forested wetlands, predominantly through natural processes.

Table 2.2-1 indicates a long-term composition objective for wetlands of 1-2% (shown as being met at the time of the EIS).

Goal 4: Maintain or restore aquatic, fisheries, riparian, and wetland habitats.

Objectives:

- Minimize the adverse impacts on aquatic, fisheries, riparian, vernal pool, and wetland resources from management activities.
- Meet or exceed all State Water Quality Standards, including biotic standards.
- Restore and improve aquatic, riparian, fisheries, and wetland resources.

Forest Plan Desired Future Conditions

Desired future conditions are described in the Forest Plan based on management area direction and therefore there is no specific desired future condition defined for wetlands. Of the management areas within the Telephone Gap IRP project area, most do not include reference to wetland-specific desired future conditions, although most include qualitative descriptions of desired conditions related to natural conditions or processes that would apply to wetlands. The project area, however, does include the Blue Ridge Fen Candidate Research Natural Area. Fens are a type of wetland and the desired future conditions for this management area are specifically applicable to this wetland feature. Wetland-applicable desired future conditions for this site include, “…will be generally well buffered from incompatible activities on nearby lands in order to preserve the integrity of the area for monitoring of baseline ecological conditions. … Forest composition and structure will primarily be the result of natural ecological processes rather than human-caused activities. These areas will provide excellent opportunities for many kinds of long-term monitoring and non-manipulative research. …”

Other Sources for Desired Future Conditions

To meet the objectives described for wetlands in the Forest Plan, a desired condition of minimal functionality for riparian areas and wetlands would need to be achieved. As described in the third edition of Technical Reference 1737-16 (U.S. Department of the Interior 2020), this minimum degree of functionality represents a “state of resiliency that will allow it [a wetland] to resist impairment from energy stressors, including overland flow events and wind and wave action, as well as direct physical stressors from human activities and wild and domestic ungulates.” This technical reference further defines proper functioning condition for lentic riparian and wetland areas as follows:

- A lentic riparian-wetland area is considered to be functioning properly when adequate vegetation, soil and landform, or woody material is present to:
  - Dissipate energies associated with overland flows (e.g., storm and snowmelt events) and wind and wave action, thereby reducing erosion.
  - Protect/ stabilize shorelines, islands, and soil surfaces from erosion and direct physical alteration from human and animal activities.
  - Improve floodwater retention as well as ponding, storage, and retention of surface water.
  - Saturate soil and retain soil moisture.
  - Maintain or improve groundwater recharge.
  - Capture sediment.
  - Maintain soil attributes (e.g., organic matter, pore space, structure, soil chemistry).
When any wetland can meet this definition, as appropriate to the potential of the site, then the wetland can provide ecological, recreational, and ecosystem services, in addition to other desired values.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

In some circumstances, roads and trails of various types continue to have an influence on the hydrology of wetlands or on the delivery of sediment or chemical pollutants. Beavers are likely less common throughout the project area than they were prior to extensive historic trapping. Wet and dry deposition of atmospheric pollutants still occurs, but at lower levels, while previously deposited contaminants persist in water and wetland soils to varying degrees. Slow changes to climate are expected to continue with difficult to predict impacts at the site-specific scale.

Opportunities

The opportunities related to wetlands in the project area fall into three broad categories:

- **Research**: Where larger scale human activities are impacting wetlands, such as changes in climate or atmospheric deposition of pollutants, wetlands within the project area can serve as living research sites that can continue to provide insight into the degree or rates of change related to these impacts.

- **Restoration**: Where past land use activity has altered the hydrology, vegetation, ecology, or other natural processes, it may be possible to actively or passively remove the artificial conditions and/or reintroduce missing ecological components to restore more natural functionality to wetlands.

- **Mitigation**: Where ongoing land use exists (such as roads and trails), actions can be taken to minimize the impacts of those land uses on existing wetlands.

Initial Possible Activity List

- Recontouring portions of historic or unused roads to restore natural surface and subsurface flow patterns.
- Relocation or improved design of roads and trails to restore or improve surface and subsurface flow patterns and to limit or prevent erosion and runoff of pollutants.
- Implementation of low technical, process-based restoration to preserve, expand, or restore wetlands.
  - Note that while this approach often applies to lotic systems, the approach could similarly be applied to shorelines and/or vegetated surfaces of lentic systems.
- Seeding, planting, or staking of desired wetland plant species where they are determined to be missing.
- Removal of undesirable wetland plant species, including non-native invasive species, where they are documented to occur.
- Confirmation of Blue Ridge Fen as a Research Natural Area.
- Activities to promote healthy populations of native wetland-dependent fauna.
- Continued or improved mapping of wetland features, including vernal pools.
5. ISSUES AND CONCERNS

Impacts on wetlands from climate change are expected, but the exact nature and scale of these impacts in the project area are unknown. Changes in temperature and precipitation type, amount, and timing would impact different wetlands in different ways and to different degrees. Regardless, the healthier a wetland is in general, the more resistant and resilient it would be to seasonal and annual changes that may occur. Ensuring that artificial conditions don’t limit water inputs or accelerate water loss from wetlands, supporting the maintenance or recovery of soil organic carbon, and maintaining natural vegetative shading conditions would help ensure that wetlands stay as resistant and resilient to climate change as possible.

Due to the propensity of wetlands to attract and support a wider diversity of wildlife, they can attract more recreational use than adjacent upland areas. Appropriate management of recreational use in and around wetland areas can help conserve these resources.

Common reed (Phragmites australis) is documented in the project area. Although it isn’t the only non-native invasive species to consider, it represents an ecological threat to wetlands. According to vtinvasives.org, “Common reed replaces native grasses, sedges, and herbaceous plants. It provides poor quality habitat for insects, birds, and amphibians. Fish populations that reproduce in wetlands and marshes inundated with phragmites suffer higher egg and juvenile mortality. The plant also exudes allelopathic compounds from its roots, causing root death of nearby native plants.” Wetlands in the project area that don’t already contain common reed may potentially develop an infestation through natural dispersal of seeds or by accidental introduction by recreational, commercial, or administrative activities.

6. REFERENCES


“Common Reed.” Vermont Invasives, University of Vermont Extension, vtinvasives.org/invasive/common-reed.

Fire, Fuels and Air Quality (Smoke)

1. INTRODUCTION AND BACKGROUND

General Description
Fire management is an important resource area to consider during integrated resource project planning. Although recent occurrences are limited, the historic role of fire had a significant role across the landscape. There are three main ways in which fire can be considered in the process:

1. Fuels management - are there hazardous fuels within the project area that may present an issue for wildfire suppression or management?
2. Fire as a tool - can fire be used to meet the objectives of other resource areas such as recreation vistas, wildlife openings, and timber hazardous fuels reduction along road corridors and on partner lands?
3. Fire ecology - does fire play a natural role in the ecosystems that are being analyzed, and if so, do we want to maintain this role?

2. EXISTING CONDITION

Inventory Methodology/Process
Minimal inventory has been reviewed for this assessment. Field trips have occurred to assess forest stand types and vegetation inventories were reviewed for Compartments using common stand exam (see Timber Resource section of this document).

Inventory Findings

Existing wildlife openings should be maintained as they have been with prescribed fire. Oak stands exist where prescribed fire could be considered as a tool to maintain and promote this species. Fire history in some of the stands and areas exists.

3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to fire, fuels and air quality (USDA Forest Service 2006):

Forest Plan Goals and Objectives

- Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.
  - Forest-wide Habitat Composition and Structure Objectives:
    - Maintain, and where desirable increase, the acres of upland open habitats. This may be accomplished through the use of prescribed fire and/or by managing fire for resource benefit.
  - Healthy forests with functional natural processes; fire may be able to assist with the following Forest Plan composition objectives:
    - 1-5 percent in oak habitat type
- 1-5 percent in permanent upland openings habitat type
- 45-55 percent in mixed woods habitat type
- 1-5 percent in aspen-birch habitat type

- Goal 5: Maintain or improve air quality on the GMNF.
- Goal 6: Maintain or restore ecological processes and systems on the GMNF within desired ranges of variability.
- Goal 7: Protect rare or outstanding biological, ecological, or geological areas on the GMNF.
- Goal 9: Demonstrate innovative, scientifically, and ecologically sound management practices that can be applied to other lands.
- Goal 13: Manage designated wilderness to preserve an enduring resource that represents ecosystems and natural processes unique to northeastern forests while providing opportunities for solitude and unconfined recreation consistent with the Wilderness Act of 1964 and subsequent legislation.
- Goal 15: Maintain or enhance visual resources such as view sheds, vistas, overlooks, and special features.
- Goal 16: Provide protection and stewardship for significant heritage resources on the GMNF.
- Goal 18: Maintain and enhance partnerships to achieve Forest goals.
- Goal 21: Protect human life, property, and facilities from wildland fire hazards.
  - Objective:
    - Reduce hazardous fuels through fire use, mechanical treatments, and harvest treatments (Forest Plan, pp. 1-18).

- GMNF Forest Plan Final Environmental Impact Statement, page 3-328:
  - The GMNF will use fire as a tool to meet management objectives, including but not limited to:
    - Reducing hazardous fuel loading
    - Creating, maintaining, or improving wildlife habitat
    - Preparing sites for restoration of species (e.g., oak, pine, birch and aspen)
    - Creating, maintaining, or improving plant community composition by influencing the scale and pattern of vegetation across the landscape, including changing successional patterns
    - Managing insect and disease
    - Enhancing blueberry and heath production
    - Creating or maintaining scenic vistas

- GMNF Forest Plan Final Environmental Impact Statement, page 3-330:
  - The Forests will maintain fuels in proportion to the levels of hazards, risks, and values to be protected, and to address resource management objectives both outside and within the Wildland Urban Interface.
  - Prescribed fire may be used in the management areas outlined in the Forest Plan.

**Forest Plan Desired Future Condition**

The following is management area direction where fire may be able to assist in achieving the desired future condition:
Diverse Forest Use

- Vistas of landscapes with a mosaic of vegetative patterns will be provided along roads and trails. Forest communities that would naturally be present, such as northern hardwoods, aspen, and oak, will be retained and enhanced where feasible.
- Silvicultural practices will be used to meet timber, wildlife, ecological, visual, and recreation objectives.
- Suitable habitat will be provided for a variety of wildlife and plant species. Deer wintering habitat will be emphasized within, or adjacent to, identified deer wintering areas. Habitat at the landscape level will include a sustainable mix of young and mature forests. Permanent upland and temporary openings will occur across the landscape in shapes and sizes that are consistent with visual objectives.
- Views, ecological processes, and management practices will be interpreted at some vista sites.

Diverse Backcountry

- Temporary openings will occur through natural disturbance and timber harvesting.
- Timber harvests will occur with constraints such as extended rotations, fewer intermediate treatments, and other modifications to benefit backcountry settings... with a few scattered temporary openings created by wind, ice, old age, or other natural forces.
- This management area will provide a wider diversity of wildlife habitats than what would be expected in areas that have no vegetation management. Timber and vegetation management will provide more clearings and early successional habitats in this management area than would occur from natural disturbances.
- Permanent upland openings and orchard maintenance for wildlife values will be maintained.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

The gap between existing condition and desired future condition exists due to our difficulty in locating stands and conditions suitable for the use of prescribed fire within the project area.

Opportunities

There are opportunities to work with the wildlife, timber, and recreation staff to use fire as a more effective resource management tool within the project area.

Initial Possible Activity List

- Although no obvious fuel issues have been identified, a Community Wildfire Protection Planning (CWPP) process has been initiated which would help recognize areas of concerns near communities. The towns of Pittsfield and Stockbridge have a current CWPP in place.
- Work with the towns of Pittsfield and Stockbridge to identify further needs on the landscape relating to hazardous fuels reduction and/or wildland fire suppression equipment needs based on the CWPP.
- Work with other towns within the project area (Chittenden and Mendon in particular) that do not have a current CWPP to develop one and then identify further needs on the landscape relating to hazardous fuels reduction and/or wildland fire suppression equipment needs based on the CWPP.
• Prescribed fire could be used to meet other resource area objectives such as wildlife opening creation and maintenance, silvicultural objectives such as promoting oak-pine ecosystems, and creation of scenic vistas.

5. ISSUES AND CONCERNS

Smoke impacts to nearby residents and roadways sometimes occur during prescribed fire activities and can be considerable but are short in duration (usually limited to the day of prescribed fire activities). Nationally recognized smoke management techniques would be employed if prescribed fire activities are planned and implemented in the project area.

Locating and maintaining fire-adapted or fire-tolerant habitats on NFS lands within the project area is a concern. These tend to be rare, small, and ecologically important. There are also concerns related to risk and fuel management within the wildland urban interface. Opportunities to use fire as a tool to meet multiple objectives are the most common for this resource.
Recreation Resources
(Trails, Developed Recreation, Recreation Special Uses, Recreation in the General Forest Area and Wild & Scenic Rivers)

1. INTRODUCTION AND BACKGROUND

General Description

As noted in Connecting People with America’s Great Outdoors - A Framework for Sustainable Recreation: “National Forests and Grasslands provide the greatest diversity of outdoor recreation opportunities in the world, connecting people with nature in an unmatched variety of settings” (USDA 2010). With an estimate of over two million visitors to the GMNF each year, recreation provides a conduit not just for connecting people to nature – but for enhancing their understanding of natural and cultural environments and catalyzing their participation in caring for public land. Recreation is the portal for understanding and caring for natural resources and public lands and contributes to the physical, mental, and spiritual health of individuals.

In addition, recreation provides economic benefits to communities, regions, and the nation. Recreation and tourism within Vermont are recognized as leading economic industries in the state. This is evident in the large resorts that provide year-round recreation activities as well as the smaller, independent businesses, considered a signature of Vermont, that rely on the tourism trade to generate income from more personalized services. The GMNF plays an important role in acting as an anchor to complement the private tourism sector by providing a backdrop of natural settings as well as nature-based recreation opportunities (USDA Forest Service 2006a).

Recreation resources are comprised of the following components: 1) the natural environment; 2) the physical or ‘built’ environment, such as facilities and trails; and 3) the social environment - including interactions with other users as well as rules and regulations. In combination, these three components make up a recreation experience. The recreation experience provided on the GMNF is reflected in the recreation niche statement for the Green Mountain and Finger Lakes National Forests (USDA Forest service 2006a). The niche statement highlights the unique regional role that the National Forest plays in providing public recreation opportunities by stating:

- The recreation niche of the Green Mountain and Finger Lakes National Forests is to provide the public with the following:
  - High quality scenery along with opportunities for viewing.
  - Diverse and high-quality trail-based recreation opportunities in undeveloped areas for all seasons.
  - Large contiguous public land areas for dispersed recreation opportunities.
  - Low level development water-based recreation.

The Forest Plan further defines the recreation niche by noting: “Our recreation niche will focus on the fact that the GMNF’s large, contiguous blocks of land are well suited to trail-based activities in backcountry settings. The remote nature of much of this land makes Wilderness a special role the GMNF will serve to play. Working in partnership with many organizations will continue to be a hallmark of how the Forest Service provides recreation opportunities to the public.”
Recreation assessments primarily address how forest visitors interact with the natural resources within and surrounding the GMNF. Natural resources in and of themselves do not guarantee that outdoor recreation will occur – it is the combination of natural resources with management and user inputs that determine the supply of outdoor recreation. Recreation opportunities vary from unconfined, primarily unmanaged recreation in which visitors experience a high degree of freedom over their actions, such as exploring a wilderness area, to activities with clear management, such as camping in a developed campground.

For this assessment, recreation resources will be organized using the following outline:

1. National Forest System (NFS) Trails
2. Developed Recreation
3. Recreation Special Uses
4. Recreation in the General Forest Area
   a. Backcountry Skiing/Boarding
   b. Unauthorized Trails
   c. Shooting Sites
   d. Dispersed Camp Sites
   e. Caving/Climbing
5. Wild & Scenic Rivers

2. EXISTING CONDITION

Inventory Methodology/Process

National Forest System Trails

An inventory of NFS Trails, including those within the Telephone Gap IRP project area, was completed as part of the Green Mountain National Forest Comprehensive Trail Strategy (USDA Forest Service 2015). This analysis incorporated data from TRACS trail surveys (TRACS surveys identify existing trail infrastructure as well as deferred maintenance needs associated with each trail) as well as an assessment of the following criteria for each trail:

- Designed and Managed Use
- Relative Use Level
- Safety, Resource and/or Maintenance Concerns
- Purpose
- Forest Plan Alignment
- Recent Maintenance and/or Financial Investments
- Duplicate Trail Opportunities

In addition to utilizing data compiled for the Comprehensive Trail Strategy, field surveys are ongoing to inventory the latest trail conditions in the project area – including bridge and culvert infrastructure assessments as well as opportunities for trail relocations to address long-term maintenance concerns. Finally, a review of the Trail Management Objectives (TMO) for each trail was completed.

Legal town trails (non-NFS Trails) within the project area were inventoried using Vermont Agency of Transportation data for the towns of Chittenden, Goshen, Killington, Mendon, Pittsfield, Pittsford, Rutland Town, and Stockbridge. Town clerks were contacted for Town
policies regarding trail managed uses. Field surveys will occur as needed and if prompted with/by towns, partner groups, or the public.

**Developed Recreation**

Recreation Site Condition Assessments have been completed within the past five years for developed recreation sites within the project area. These assessments were reviewed to identify maintenance concerns in addition to completing field reviews to identify needs and opportunities at each site. Information was compiled from the Recreation Facility Master Plan to identify long-term goals for each site.

An inventory of developed recreation sites off NFS land within the project area was completed by reviewing state, town and county parks and recreation websites and maps. Field surveys will occur as needed and if prompted by towns, partner groups, or the public.

**Recreation Special Uses**

Recreation staff reviewed previous and existing requests and authorizations within the project area.

**Recreation in the General Forest Area**

- **Backcountry Skiing/Boarding**: Recreation staff reviewed existing and potential backcountry recreation opportunities.
- **Unauthorized Trails**: Recreation staff surveyed the project area for unauthorized, user-maintained trails.
- **Shooting Sites**: Recreation staff surveyed the project area for sites with recurring shooting activity and potential resource impacts.
- **Dispersed Camp Sites**: Recreation staff surveyed the project area for recurring use and potential resource impacts at dispersed sites.
- **Caving/Climbing**: Forest Service staff surveyed the project area for recurring climbing and/or caving activity.

**Wild & Scenic Rivers**

The 2006 Forest Plan Final Environmental Impact Statement (Appendix D) determined the eligibility, potential classification (wild, scenic or recreational), and suitability for rivers within the GMNF.

**Inventory Findings**

**National Forest System Trails under Forest Service Jurisdiction**

Tables 15 and 16 provide NFS Trails by managed use and other information within the Telephone Gap IRP project area.

**Table 15. Trail miles within the Telephone Gap IRP Project area by managed use.**

<table>
<thead>
<tr>
<th>Managed Use¹</th>
<th>Forest Service Jurisdiction (miles)</th>
<th>Other Jurisdiction (miles)</th>
<th>Total by Use (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snowmobile</td>
<td>62.5</td>
<td>33.3</td>
<td>95.8</td>
</tr>
<tr>
<td>Bike</td>
<td>26.4</td>
<td>74.7</td>
<td>101.1</td>
</tr>
<tr>
<td>Hike</td>
<td>44.9</td>
<td>114.8</td>
<td>159.7</td>
</tr>
<tr>
<td>Horse</td>
<td>7.6</td>
<td>82.1</td>
<td>89.7</td>
</tr>
<tr>
<td>Cross-country Ski</td>
<td>38.4</td>
<td>105.5</td>
<td>143.9</td>
</tr>
<tr>
<td>Number</td>
<td>Name</td>
<td>Miles</td>
<td>Managed Uses¹</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>1</td>
<td>APPALACHIAN TRAIL/LONG TRAIL</td>
<td>1.0</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>APPALACHIAN</td>
<td>7.2</td>
<td>F</td>
</tr>
<tr>
<td>3</td>
<td>LONG</td>
<td>14.9</td>
<td>F</td>
</tr>
<tr>
<td>44</td>
<td>BLOODROOT GAP</td>
<td>6.8</td>
<td>S, FAT</td>
</tr>
<tr>
<td>71</td>
<td>NORTH POND</td>
<td>8.3</td>
<td>S</td>
</tr>
<tr>
<td>86</td>
<td>MT. CARMEL</td>
<td>2.3</td>
<td>S</td>
</tr>
<tr>
<td>117</td>
<td>CANTY</td>
<td>2.3</td>
<td>F</td>
</tr>
<tr>
<td>133/ SNO-133</td>
<td>LEFFERTS POND</td>
<td>2.3</td>
<td>F, H, S, SS, X, FAT</td>
</tr>
<tr>
<td>134/TER-134</td>
<td>ROUND ROBIN (C-7)</td>
<td>4.9</td>
<td>F, H, B, S, SS, X, FAT</td>
</tr>
<tr>
<td>136</td>
<td>BLUE RIDGE MOUNTAIN</td>
<td>4.9</td>
<td>S</td>
</tr>
<tr>
<td>138</td>
<td>DEER RUN</td>
<td>1.2</td>
<td>SS, X</td>
</tr>
<tr>
<td>138.01</td>
<td>LOST HORIZON</td>
<td>0.9</td>
<td>SS, X</td>
</tr>
<tr>
<td>138.03</td>
<td>HEWITT BROOK</td>
<td>1.2</td>
<td>S, SS, X</td>
</tr>
<tr>
<td>138.04</td>
<td>BOONDOCKS</td>
<td>2.5</td>
<td>SS, X</td>
</tr>
<tr>
<td>138.06/TER-138.06</td>
<td>SNOW GOOSE</td>
<td>0.4</td>
<td>SS, X, H</td>
</tr>
<tr>
<td>145</td>
<td>BOILING SPRING</td>
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<td>S, X</td>
</tr>
<tr>
<td>146</td>
<td>PUSS AND KILL</td>
<td>1.7</td>
<td>S, X</td>
</tr>
<tr>
<td>146.01</td>
<td>PUSS AND KILL ALTERNATE</td>
<td>2.2</td>
<td>S, X</td>
</tr>
<tr>
<td>166/SNO_166</td>
<td>NEW BOSTON</td>
<td>1.2 TER/ 0.8 SNO</td>
<td>F, S</td>
</tr>
<tr>
<td>193</td>
<td>CATAMOUNT - OLD TURNPIKE RD</td>
<td>1.2</td>
<td>SS, X</td>
</tr>
<tr>
<td>242</td>
<td>FURNACE BROOK</td>
<td>2.7</td>
<td>S, X</td>
</tr>
<tr>
<td>242.01</td>
<td>FURNACE BROOK ALTERNATE</td>
<td>1.9</td>
<td>S, X</td>
</tr>
<tr>
<td>261</td>
<td>NORTH POND CUTOFF</td>
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<td>S</td>
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<tr>
<td>706</td>
<td>DEER LEAP</td>
<td>1.3</td>
<td>F</td>
</tr>
<tr>
<td>706.01</td>
<td>DEER LEAP OVERLOOK</td>
<td>0.2</td>
<td>F</td>
</tr>
</tbody>
</table>

¹ Managed trail under other jurisdiction based on best available information.
² Total trail mileage is not a sum of all managed use miles as some trails offer multiple uses.
<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Miles</th>
<th>Managed Uses¹</th>
<th>Consistent with Desired Recreation Opportunity Spectrum</th>
</tr>
</thead>
<tbody>
<tr>
<td>715</td>
<td>PELKEY PATH</td>
<td>0.2</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td>790</td>
<td>THOUSAND ACRE</td>
<td>1.1</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td>789</td>
<td>CALIFORNIA LOT</td>
<td>2.3</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td>793</td>
<td>A AND D</td>
<td>2.1</td>
<td>S</td>
<td>Yes</td>
</tr>
<tr>
<td>797/797</td>
<td>CARYL BROOK</td>
<td>8.6</td>
<td>S, FAT, B</td>
<td>Yes</td>
</tr>
<tr>
<td>806</td>
<td>SHERBURNES PASS</td>
<td>0.5</td>
<td>F</td>
<td>Yes</td>
</tr>
<tr>
<td>810</td>
<td>MTN MEADOWS - LAKESIDE DRIVE</td>
<td>1.1</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>811</td>
<td>MTN MEADOWS - POND PLUNGE</td>
<td>0.7</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>812</td>
<td>MTN MEADOWS - SOUTH RIDGE</td>
<td>2.4</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>813</td>
<td>MTN MEADOWS - NORTH RIDGE</td>
<td>3.0</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>814</td>
<td>MTN MEADOWS - TELEMARK</td>
<td>0.9</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>815</td>
<td>MTN MEADOWS - ORCHARD</td>
<td>1.1</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>816</td>
<td>MTN MEADOWS - GREEN</td>
<td>0.2</td>
<td>X</td>
<td>Yes</td>
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<tr>
<td>817</td>
<td>MOUNTAIN MEADOWS</td>
<td>0.4</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>817.01</td>
<td>MTN MEADOWS - SNOWSHOE</td>
<td>1.0</td>
<td>SS</td>
<td>Yes</td>
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<tr>
<td>820</td>
<td>MORRILL BROOK</td>
<td>2.4</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>822</td>
<td>SLAB BRIDGE BROOK</td>
<td>1.3</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>823</td>
<td>HAYES BROOK</td>
<td>2.8</td>
<td>F, B</td>
<td>Yes</td>
</tr>
<tr>
<td>824</td>
<td>THE DARNING NEEDLE</td>
<td>3.7</td>
<td>S</td>
<td>Yes</td>
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<tr>
<td>828</td>
<td>THUNDERING FALLS</td>
<td>0.04</td>
<td>F</td>
<td>Yes</td>
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<tr>
<td>834/834</td>
<td>MIND ERASER</td>
<td>0.9</td>
<td>B, F, FAT</td>
<td>Yes</td>
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<tr>
<td>835/835</td>
<td>PACA'S PATH</td>
<td>0.7</td>
<td>B, F, FAT</td>
<td>Yes</td>
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<tr>
<td>836/836</td>
<td>OHLY ROLLER</td>
<td>1.4</td>
<td>B, F, FAT</td>
<td>Yes</td>
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<tr>
<td>837/837</td>
<td>POND VIEW</td>
<td>0.5</td>
<td>B, F, FAT</td>
<td>Yes</td>
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<tr>
<td>844</td>
<td>C-100 QUIMBY MOUNTAIN AT X-ING</td>
<td>0.2</td>
<td>S</td>
<td>No (but is an approved crossing of AT MA)</td>
</tr>
<tr>
<td>854</td>
<td>CATAMOUNT SOUTH POND CONNECTOR</td>
<td>1.5</td>
<td>SS, X</td>
<td>Yes</td>
</tr>
<tr>
<td>855</td>
<td>PESKY CAIRN</td>
<td>2.9</td>
<td>B, F</td>
<td>Yes</td>
</tr>
</tbody>
</table>

¹ Managed Uses Identification: A=ATV/UTV; B=Bike; F=Hike; H=Horseback Ride; S=Snowmobile; X=X/C Ski; SS=Snowshoe; and FAT=Fat Bike.

**Trails Intersecting Project area on Non-NFS Jurisdiction**

Table 17 provides trails under non-NFS jurisdiction within the project area.
Table 17. Trail data: trails under non-NFS jurisdiction within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Name</th>
<th>Miles</th>
<th>Known Uses¹</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gifford Woods pump track and Pesky Cairn Connector</td>
<td>0.2</td>
<td>B</td>
<td>State</td>
</tr>
<tr>
<td>Mt Meadows Bike Network</td>
<td>4.7</td>
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<td>Private</td>
</tr>
<tr>
<td>Green Mtn Trails</td>
<td>25</td>
<td>F, SS</td>
<td>Private</td>
</tr>
<tr>
<td>Gifford Woods State Park: Kent Brook Trail</td>
<td>1.1</td>
<td>F</td>
<td>State</td>
</tr>
<tr>
<td>Mt Carmel State Forest: David Logan Shelter Connector</td>
<td>2.2</td>
<td>F</td>
<td>State</td>
</tr>
<tr>
<td>Chaffee Falls Loop (Pittsford)</td>
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<td>F</td>
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<td>Legal Town Trail 2</td>
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<td>Legal Town Trail 3</td>
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<td>Legal Town Trail 4</td>
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<td>Legal Town Trail 6</td>
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<td>Legal Town Trail 9</td>
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<td>Legal Town Trail 10</td>
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<td>Legal Town Trail 12</td>
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<td>Legal Town Trail 13</td>
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<td>Legal Town Trail 14</td>
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<td>Legal Town Trail 18</td>
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<td>Legal Town Trail 19</td>
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<tr>
<td>Legal Town Trail 20</td>
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<tr>
<td>Legal Town Trail 21</td>
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<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 22</td>
<td>0.29</td>
<td>F, B, H, X, SS, FAT</td>
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<tr>
<td>Legal Town Trail 23</td>
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<tr>
<td>Legal Town Trail 24</td>
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<td>Legal Town Trail 25</td>
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<td>Legal Town Trail 26</td>
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<tr>
<td>Legal Town Trail 27</td>
<td>3.8</td>
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<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 28</td>
<td>1.44</td>
<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 29</td>
<td>1.63</td>
<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 30</td>
<td>0.26</td>
<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 31</td>
<td>0.34</td>
<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 32</td>
<td>0.66</td>
<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 33</td>
<td>0.28</td>
<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
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<tr>
<td>Legal Town Trail 34</td>
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<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 35</td>
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<td>F, B, H, X, SS, FAT</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Legal Town Trail 4</td>
<td>0.32</td>
<td>F, B, H, X, SS, FAT</td>
<td>Mendon</td>
</tr>
</tbody>
</table>
Table 18. National Forest System developed recreation sites within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Boston Turnout Trailhead</td>
<td>No infrastructure at this trailhead except for a gravel surface parking lot. Total capacity: 40 people/11 cars</td>
</tr>
<tr>
<td>Tucker-Johnson Shelter</td>
<td>New moldering privy built 2018; new shelter constructed 2019. Total capacity: 8 people</td>
</tr>
<tr>
<td>Michigan Brook Winter Trailhead</td>
<td>Parking lot maintained for winter use. Total capacity: 35 people/10 cars</td>
</tr>
<tr>
<td>Thundering Falls</td>
<td>Access to only universally accessible portion of the Appalachian Trail in Vermont. Total capacity: 11 people/3 cars</td>
</tr>
<tr>
<td>Sherburne Trailhead</td>
<td>Parking lot maintained by Town of Killington under Road Use Agreement. Expanded to allow for winter operations in 2020. Total capacity: 42 people/12 cars</td>
</tr>
<tr>
<td>Lefferts Pond</td>
<td>Design Narrative and National Environmental Policy Act (NEPA) decision completed to improve and expand parking, access, infrastructure, and universal accessibility; seeking funding. Total capacity: 53 people/15 cars</td>
</tr>
</tbody>
</table>

Table 19. Non-National Forest System developed recreation sites within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gifford Woods State Park</td>
<td>Maintained by State of Vermont Agency of Natural Resources: Forests, Parks and Recreation (VT FPR). Amenities include camping (21 RV/tent, 19 lean-to and 4 cabin), hiking, mountain biking, picnicking, and fishing. Camping amenities include restrooms with flush toilets; hot/cold water with showers, and a sanitary station for RVs.</td>
</tr>
<tr>
<td>Mt. Carmel State Forest</td>
<td>Maintained by VT FPR. Recreation dominated by the Long Trail which bisects the forest north to south and the New Boston Trail, a side trail that accesses the Long Trail from adjacent Forest Service land. A VAST corridor trail crosses the southern end of the forest.</td>
</tr>
<tr>
<td>Kent Pond Fishing Access Area</td>
<td>Maintained by VT FPR for fishing access, boat launch.</td>
</tr>
<tr>
<td>Colton Pond Fishing Access Area</td>
<td>Maintained by VT FPR for fishing access, boat launch.</td>
</tr>
</tbody>
</table>
### Site Notes

<table>
<thead>
<tr>
<th>Site</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chittenden Reservoir Fishing Access Area</td>
<td>Maintained by VT FPR for fishing access, boat launch.</td>
</tr>
<tr>
<td>Les Newell Wildlife Management Area (WMA)</td>
<td>Maintained by VT FPR. Within the project area, recreation amenities include only a small portion of the Appalachian National Scenic Trail that crosses the WMA. In close proximity, the WMA offers snowmobiling, off-road vehicle riding on select Town roads, horseback riding, hunting and general dispersed recreation activities such as bird watching.</td>
</tr>
<tr>
<td>Proctor Fish &amp; Game</td>
<td>Private shooting range requiring fee located in Pittsford, VT</td>
</tr>
</tbody>
</table>

### Recreation Special Uses

Ongoing requests and authorizations for recreation special use permits (SUPs) are completed annually. One pending request for the construction and management of a new hut, to be located on the South Pond acquisition parcel, has been reviewed for inclusion in the Telephone Gap IRP analysis. The proposed hut would be located in the vicinity of a previous cabin, destroyed by arson, and take advantage of existing infrastructure from that cabin (such as septic and power). Additionally, annual outfitting and guiding permits are requested for the Deer Leap area. Over the past 15 years, recreation special use permits have been issued for events (3), trail networks (3), and outfitting and guiding (7).

### Wild & Scenic Rivers

There are currently no Congressionally designated wild, scenic or recreational rivers within the GMNF; however, there are many river segments that are eligible to be further considered for addition to the National Wild and Scenic River System. The Forest Plan identified the White River as an eligible recreational river for fish, historic and scenic outstandingly remarkable values (ORVs) and identified the Ottauquechee River as an eligible recreational river for recreation ORVs. Portions of the eligible White River and Ottauquechee River travel through the project area.

### 3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to the recreation resource (USDA Forest Service 2006):

#### Forest Plan Goals and Objectives

- **Goal 10:** Provide other resource benefits through coordinated timber harvesting.
  - **Objective:**
    - Increase the coordination among wildlife and fish biologists, recreation planners, fire planners, silviculturists, and other specialists in order to utilize vegetation management to accomplish objectives of other program areas. The emphasis is using vegetation management as a tool to accomplish the habitat or setting desired by program areas.

- **Goal 12:** Provide a diverse range of high-quality, sustainable recreation opportunities that complement those provided off National Forest System lands.
  - **Objectives:**
    - Maintain or enhance high-quality opportunities for downhill skiing in partnership with private sector.
    - Continue to provide diverse, high-quality opportunities for recreation in partnership with private sector by authorizing appropriate activities through
special use authorization and by improving administration of special use authorizations.

- Complete comprehensive trail planning for 100 percent of the Forest.
- Increase the effective use of partnerships in the improvement, maintenance, and operation of the Forest trails system.
- Increase the number of miles of trails that are operated and maintained to full standard.
- Reduce the total deferred maintenance on the GMNF trail system.
- Increase the number of developed recreation sites that are operated and maintained to standard.
- Reduce total deferred maintenance on GMNF developed recreation facilities.
- Increase the number of inventoried Concentrated Use Areas managed to standard to reduce health, safety, and resource impacts caused by unmanaged recreation use in the general forest area.
- Complete a Forest-wide comprehensive interpretive plan for recreation and trails.
- Complete comprehensive management plans that address the enhancement of dispersed recreation activities, non-facility related, that occur in the general forest area.

- Goal 14: Provide a safe, efficient, and effective Forest transportation system that meets both the needs of the Forest Service and the public.
  
  o Objectives:
    
    - Use design elements and standards that permit maximum economy while meeting management direction for resource and environmental protection and user safety.
    - Complete comprehensive transportation system planning for 100 percent of the Forest.

**Forest Plan Desired Future Conditions**

The major emphasis and desired future conditions for the recreation resource varies by Forest Plan management area and are summarized as follows:

**Diverse Forest Use**

- **Major Emphasis:** Public use is managed to provide a full range of recreation opportunities, from motorized and non-motorized trails to dispersed campsites and developed campgrounds.
- **Desired Future Condition:** Recreation opportunities will be diverse. Desired ROS class of Roaded Natural. Trail opportunities will be diverse, ranging from hiking and bicycling to snowmobiling and potentially summer ORV riding. Interaction among visitors will be in moderate to high concentrations.

**Remote Backcountry Forest**

- **Major Emphasis:** Management actions are limited to those that help restore or maintain natural processes, natural communities, and associated species within their natural ranges of variation in the landscape. Public use is managed at a scale and intensity that either helps keep species or processes within their natural range of variation or has minimal effect on the area’s integrity. Non-motorized trail recreational opportunities will be available that provide a relative sense of isolation and remoteness in a predominantly natural or natural-appearing landscape.
• **Desired Future Condition:** Desired ROS class of Semi-primitive Non-motorized. Accessible by foot and other non-motorized means of transport, such as skis, snowshoes, horses, and bicycles. Motorized trails will not be present, unless required by law to provide access to private land. Recreational impacts will be managed to protect natural resources such as water quality and rare plants and animals, to minimize visual disturbance, and to preserve a sense of wildness.

**Diverse Backcountry**

- **Major Emphasis:** relatively large landscapes that provide a mix of backcountry recreational experiences from low use foot trails to motorized use trails.
- **Desired Future Condition:** Desired ROS class of Semi-primitive Motorized. Appropriate for a wide variety of recreational uses. Concentration of users will generally be low, but there will often be evidence of other users. Recreation facilities may be present and will complement the desired recreation opportunities. Trail systems will be present and new trails may be developed.

**Remote Wildlife Habitat**

- **Major Emphasis:** Recreation uses are de-emphasized to minimize continuing disturbance to wildlife.
- **Desired Future Condition:** Desired ROS class of Semi-primitive Non-motorized. Recreation-related disturbances to wildlife will be minimal. Forest Service system trails will be managed primarily for access on foot and by other non-motorized means of transport. Existing Forest Service System snowmobile trails will be allowed and may be relocated or closed to enhance the values of the area. Changes or additions in trail use designations may be considered where they do not compromise the values of the area.

**Appalachian National Scenic Trail**

- **Major Emphasis:** Provide for the conservation and enjoyment of the nationally significant scenic, historic, natural, and cultural qualities of the land through which the AT passes. Provide opportunities for high quality outdoor recreation experiences, including a sense of “wildness.” Recognize and strengthen the level of partnership, cooperation, and volunteer efforts integral to AT management.
- **Desired Future Condition:** Facilities will include the AT footpath itself, including trail bridges, and limited recreation facilities such as trail shelters, tent platforms, designated campsites, fire towers, privies, trailhead parking areas, and information boards. The AT and associated facilities will be designed, constructed, and maintained for foot travel only, and to wear lightly on the land. Associated structures will be in harmony with the surrounding environment. This management area will traverse a range of Recreation Opportunities Spectrum (ROS) classes. Recreation management of the AT setting will be towards the desired ROS class of Semi-primitive Non-motorized. Recreation management will be designed to provide a variety of opportunities in the most primitive and natural recreation setting possible.

**Long National Recreation Trail**

- **Major Emphasis:** Provide for the conservation and enjoyment of the significant scenic, historic, natural, and cultural qualities of the land through which the LT passes. Provide opportunities for high-quality outdoor recreation experiences, including a sense of “wildness.” Recognize and strengthen the level of partnership, cooperation, and volunteer efforts integral to LT management.
- **Desired Future Condition:** This management area will traverse a range of Recreation Opportunities Spectrum (ROS) classes. Recreation management of the LT setting will
be towards the desired ROS class of Semi-primitive Non-motorized. Facilities will include the LT itself, including trail bridges, and limited recreation facilities such as trail shelters, tent platforms, designated campsites, privies, trailhead parking areas, and information boards. Recreation management will be designed to provide a variety of opportunities in the most primitive and natural recreation setting possible.

Existing and Candidate Research Natural Areas

- **Major Emphasis**: Preservation and protection of ecologically significant natural features.
- ** Desired Future Condition**: Recreation management will be towards the desired ROS class of Primitive.

Eligible Wild, Scenic, and Recreational Rivers – Recreational Segment

- **Major Emphasis**: The emphasis of this management area is to protect and enhance the “outstandingly remarkable values” (ORVs) that led those rivers and streams within this management area to be determined as eligible Wild Scenic, and Recreational Rivers.
- **Desired Future Condition**: Desired ROS class of Roaded Natural. The sights and sounds of others will be evident, and opportunities to encounter other visitors will be moderate to high. Visitors seeking solitude may find that difficult to achieve, particularly in peak-use seasons. Trails may be highly developed, including hardened trail surfaces.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

*National Forest System (NFS) Trails*

- There is a high level of deferred maintenance on existing trails within the project area due to inadequate trail maintenance budgets and increased design specifications for trail bridges. Specific examples include:
  - Forest Trail 193, Catamount-Old Turnpike Road, follows steep grades in five locations and is exhibiting ongoing erosion concerns.
  - Forest Trail 824, The Darning Needle, has been administratively closed for over 15 years due to outstanding maintenance needs, including multiple bridge replacements, and insufficient funds to bring the trail to standard for snowmobile access. Shared maintenance of the trail is under easement to the Town of Chittenden.
  - Portions of Forest Trails 822 and 790, Slab Bridge Brook and Thousand Acre, respectively, have been washed out. Thousand Acre washouts are not passable, and the trail location is indiscernible. Shared maintenance of both trails is under easement to the Town of Chittenden.
  - Forest Trail 136, Blue Ridge Mountain, crosses multiple drainages where erosion is evident and trail users are bypassing the established trail tread. The secondary trail is being utilized for unauthorized ATV traffic causing concern for invasive plant introduction as well as concern for wildlife populations, particularly moose and bats. Blue Ridge Cave is a bat hibernaculum where monitoring shows visitation from motorized trail users. The area contains old forest with little evidence of NNIP; no invasive garlic mustard has been located. Toothwort, an important plant for the West Virginia White butterfly, is abundant in the area.
  - Concerns with wayfinding, private property rights, pre-historic resource protection, and outfitting/guiding capacity exists for Forest Trails 706 and 706.01, Deer Leap and Deer Leap Overlook, respectively.
The Vermont Association of Snow Travelers (VAST) snowmobile trail network includes trail segments co-located with Wildcat Road where the surface is plowed, and mixed motorized use increases safety concerns.

Unmanaged recreation in the form of ongoing all-terrain vehicle (ATV) use, both unauthorized and authorized on Vermont ATV Sportsman’s Association (VASA) trails, is occurring in the Quimby Mountain recent acquisition area and the pending Chateauguay/No-Town acquisition area.

The Comprehensive Trail Strategy (USDA Forest Service 2015) identified the need to assess the demand for potential new trails associated with new land acquisitions. The South Pond acquisition provides potential connectivity for the state-wide Velomont Trail.

There are limited trails that meet Forest Service Trail Accessibility Guidelines in the project area. This is likely due to a combination of older trail infrastructure, terrain, and lack of funds to improve accessibility.

To increase the effective use of partnerships, reduce deferred maintenance, and offer a diverse range of recreation opportunities, there is the option to expand managed uses on some trails and broaden the partner/volunteer network. Currently, the number of horse trails in the project area is less than other managed uses.

**Developed Recreation**

- Limited winter trailhead parking within the towns of Pittsfield and Chittenden do not provide an effective Forest transportation system that meets the needs of the public.

**Recreation Special Uses**

- Resource impacts are occurring in the Deer Leap area.
- An outstanding request for a special use permit needs addressed. Issuing the permit may require a site-specific Forest Plan amendment to align with management area direction.

**Recreation in the General Forest Area**

- **Backcountry Skiing/Boarding:** Additional terrain managed for backcountry skiing and riding would address the rapidly increasing demand for this activity combined with limited access for managed terrain.
- **Unauthorized Trails and Use:** Although recreating off a NFS trail is a permitted activity, developing or maintaining unauthorized trails is considered a violation of the Code of Federal Regulations. To prohibit resource damage, unauthorized trails and unmanaged trail uses need to be obliterated and/or blocked off.
- **Shooting Sites:** Shooting sports are long standing and appropriate uses of NFS lands; however, where frequent target practice occurs in unmanaged areas, shooting debris accumulates including target trash, ammunition shells and casings. There is a need to address ongoing waste disposal to prevent resource degradation in the Killington Pit.
- **Dispersed Camp Sites:**
  - Dispersed camping is an encouraged and appropriate recreational activity. However, when sites are repeatedly used and human waste and garbage are not disposed of properly, dispersed campsites have a negative impact on resources. There is a need to address waste disposal management in the dispersed camping sites located around Chittenden Reservoir and the Upper Michigan Road area to reduce fecal matter accumulation and potential for fecal runoff into nearby water resources.
Unauthorized off-road motor vehicle use is occurring within the “Picnic Table” and Morrill Brook dispersed sites located along Upper Michigan Road.

- **Caving/Climbing**: Concerns with wayfinding, private property rights, pre-historic resource protection, and outfitting/guiding capacity exists for climbing activity occurring in the Deer Leap area.

**Wild & Scenic Rivers**

Eligible segments are currently managed to protect off-road vehicles (ORVs). No current gap exists between existing and desired future conditions.

**Initial Possible Activity List**

Table 20 provides a list of possible recreation resource activities within the Telephone Gap IRP project area.

**Table 20. Possible recreation resources activities under federal and non-federal jurisdiction within the Telephone Gap IRP project area.**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Activity</th>
<th>Description</th>
<th>Options to Accomplish</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail</td>
<td>The Darning Needle Relocations and Managed Use Change</td>
<td>Relocate portions of The Darning Needle Trail to eliminate/reduce the need for costly bridge infrastructure. Change the managed use of The Darning Needle Trail from snowmobile to mountain bikes to provide Velomont connectivity.</td>
<td>Quantified Ventures is an impact investing intermediary whose mission is to fill capital needs for high-impact environmental, social, and health projects. Quantified Ventures is partnering to finance the full huts and trail system in partnership with Vermont Huts Association (VHA), the Velomont Trail Collective, and the Vermont Mountain Bike Association (VMBA).</td>
<td>High</td>
</tr>
<tr>
<td>Trail</td>
<td>Velomont and Catamount Trail Connectivity</td>
<td>Construct a new trail segment managed for mountain bike use to connect The Darning Needle Trail to the Pesky Cairn Trail. A portion of the trail, from the Catamount South Pond Connector Trail to the Catamount - Old Tumpike Road Trail, would be managed for cross-country ski use as well.</td>
<td>Quantified Ventures impact investing implemented in partnership with Vermont Huts Association, Catamount Trail Association (CTA), VMBA, and the Velomont Trail Collective.</td>
<td>High</td>
</tr>
<tr>
<td>Trail</td>
<td>VAST Trail Relocation</td>
<td>Construct a new trail segment of the VT Association of Snow Travelers (VAST) trail network to provide connectivity between the Round Robin Trail and Old Tumpike Road, via the South Pond parcel, to reduce road ride segments along Wildcat Road and to honor agreements made with the Town of Chittenden.</td>
<td>Work with VAST and the Chittenden Dammers Club to design, fund, construct, and maintain the new trail.</td>
<td>High</td>
</tr>
<tr>
<td>Trail</td>
<td>ATV Trails</td>
<td>Consider proposals for ATV trail designation in the Quimby Mountain and No Town acquisitions.</td>
<td>Work with Vermont ATV Sportsman’s Association (VASA) to identify potential system connectors crossing federal land and to design, fund, construct, and maintain any new trails.</td>
<td>High</td>
</tr>
<tr>
<td>Resource</td>
<td>Activity</td>
<td>Description</td>
<td>Options to Accomplish</td>
<td>Priority</td>
</tr>
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<td>-----------------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Trail</td>
<td>Catamount Trail – Old Turnpike Road Relocations</td>
<td>Improve the recreation experience by relocating five short segments of the Catamount Trail – Old Turnpike Road Trail, approximately one mile total, where the trail exceeds design parameters for grade. Approximate lengths: segment 1: 0.1 miles; segment 2: 0.3 miles; segment 3: 0.1 miles; segment 4: 0.1 miles; segment 5: 0.2</td>
<td>Collaborate with CTA to design fund relocations.</td>
<td>High</td>
</tr>
<tr>
<td>Trail</td>
<td>Bridge replacements</td>
<td>Replace trail bridges as necessary.</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Trail</td>
<td>Decommission Thousand Acre Trail</td>
<td>Decommission Thousand Acre Trail unless Town of Chittenden can fund improvements.</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Trail</td>
<td>Decommission Blue Ridge Mountain trail</td>
<td>Decommission secondary trail.</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Trail</td>
<td>Horse Managed Use</td>
<td>Seek interest in managing for equestrian use on trails</td>
<td>Collaborate with Vermont Horse Council.</td>
<td>Medium</td>
</tr>
<tr>
<td>Trail</td>
<td>SO Trail Connection</td>
<td>Construct a new trail to connect the Mendon Supervisor’s Office location to the National Forest Trail System. Connectivity between the future Mendon Supervisor’s Office location and existing NFS trails was removed from NEPA consideration (Supervisor’s Office Relocation Project - Supplemental Information Review, 2020) to narrow the analysis to the building construction only. Public desire to provide this connection remains and the Comprehensive Trail Strategy (2015) identified this as a potential trail need.</td>
<td>Explore partnership opportunities based on trail connections/managed uses.</td>
<td>Medium</td>
</tr>
<tr>
<td>Trail</td>
<td>Killington Resort</td>
<td>Explore potential connectivity requested between National Forest System Trails and Killington/Pico Resorts.</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Developed Recreation</td>
<td>Trailhead Improvements: Snowmobile Parking Expansion</td>
<td>Explore opportunities to expand/create additional parking opportunities for winter snowmobile trailheads.</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Recreation Special Uses</td>
<td>South Pond Hut</td>
<td>Explore request to construct and operate a four-season hut on the South Pond parcel. The hut would be part of the Velomont hut-to-hut system that connects to the Chittenden Brook hut.</td>
<td>The hut would be owned and operated by Vermont Huts Association.</td>
<td>Medium</td>
</tr>
<tr>
<td>Recreation Special Uses/ Dispersed Recreation</td>
<td>Deer Leap Area Management</td>
<td>Develop a site/resource protection plan for the Deer Leap area which adequately addresses wayfinding issues at the site, user-created trails and resource impacts, protects pre-historic resource and private property rights. A visitor (hiking) and SUP (climbing) capacity study</td>
<td>Develop in consultation with private landowners, tribes, CRAG-VT, Appalachian Trail Conservancy and Green Mountain Club.</td>
<td>High</td>
</tr>
<tr>
<td>Resource</td>
<td>Activity</td>
<td>Description</td>
<td>Options to Accomplish</td>
<td>Priority</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>-------------</td>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Federal Jurisdiction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>should be considered for Deer Leap.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispersed Recreation</td>
<td>CH Reservoir</td>
<td>Develop a Friends of Chittenden Reservoir group. Consider adding to reservations as a formal campground. Discuss opportunity to charge fee to improve the user experience. Explore options to address waste management.</td>
<td>Seek interested volunteers to develop a Friends group.</td>
<td>Medium</td>
</tr>
<tr>
<td>Dispersed Recreation</td>
<td>Killington pit</td>
<td>Monitor success and adaptively manage following recent Forest Service/Vermont Agency of Transportation installation of a guardrail along the highway that reduced access to the Killington Pit parking area. Make the site less desirable for leaving garbage/waste by moving in large boulders, dropping trees, and possibly planting some trees or shrubs.</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Dispersed Recreation</td>
<td>Dispersed Recreation Management</td>
<td>Upper Michigan Road: Place boulders at 3 of the 4 access points to &quot;Picnic Table&quot; dispersed site to address erosion and minimize off-road vehicle access. FR35: Place boulders to reduce access to Morrill Brook dispersed site to prevent erosion and stream sedimentation from vehicle access.</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Dispersed Recreation</td>
<td>Unauthorized Trails and Uses</td>
<td>Identify solutions to curb unauthorized trail construction, maintenance and/or use in the area between Stone Hollow and Sherwood Drive in Mendon (Compartment 146, Stands 57, 59, 60 and beyond) and in the vicinity of Forest Road 232/Casey Road/Blue Ridge Trail in Chittenden.</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Backcountry Skiing</td>
<td>Backcountry Skiing: South Pond</td>
<td>Explore new backcountry skiing and boarding opportunities on the South Pond acquisition.</td>
<td>Work with Rochester/ Randolph Area Sports Trail Alliance (RASTA) and CTA to design, fund, construct, and maintain.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Non-Federal Jurisdiction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VAST Trail Connectivity</td>
<td>Public feedback suggested the Puss N Kill Trail should be connected to Middle Road via a trail on private land.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. ISSUES AND CONCERNS

**Backcountry Skiing/Boarding:** Opportunities for managing backcountry skiing with partner engagement has the most potential in the vicinity of the South Pond parcel.

**Unauthorized Trails and Use:** Unauthorized, user-maintained ATV and bike trails were identified in the area between Stone Hollow and Sherwood Drive in Mendon (Compartment 146, Stands...
Unauthorized ATV use is also occurring in the vicinity of Forest Road 232/Casey Road/Blue Ridge Trail in the Town of Chittenden.

**Shooting Sites:** Recurring target practice/shooting is occurring at the closed gravel pit located along Vermont State Route 100 in the Town of Killington, just north of the Gifford Woods State Park entrance, known as the “Killington Pit.”

**Dispersed Camp Sites:** Repetitively used dispersed campsites are known or managed within the project area in the following areas:

- **Upper Michigan Road:** multiple sites (approximately 6) including one large area known locally as “The Picnic Table” as well as the “Morrill Brook” site located near the confluence of Michigan and Morrill Brooks.
- **Chittenden Reservoir:** multiple sites (19) receive varying levels of use surrounding the reservoir.
- FR57 dispersed site
- FR99 dispersed site

**Caving/Climbing:** Evidence of climbing and caving activity is ongoing in the Deer Leap area. Marked trails access the climbing terrain and several outfitting and guiding special use permits have been issued for the activity.

6. REFERENCES


Visual Resources

1. INTRODUCTION AND BACKGROUND

General Description

The role our nation’s public lands take in providing quality scenery is unquestionable. A call to manage the land for aesthetics is found in Forest Service handbooks, planning rules, and land and resource management plans – and it is expected by the public. Through thoughtful scenery management, land managers have the opportunity to provide positive, memorable experiences and showcase visible stewardship of the land. Alfred Runte notes in Public Lands, Public Heritage: The National Forest Idea: “national forests are major contributors to an American sense of place, to an identity with landscape that transcends economics for its own sake. …The forests not only should be functional, they should be beautiful as well” (Runte1991). The importance of visual resource management on the GMNF is reflected in the Forest’s recreation niche statement. The niche statement highlights the unique regional role that the National Forest plays by stating the GMNF will provide “high quality scenery along with opportunities for viewing.” (USDA Forest service 2006a).

Managing for scenery is challenging; it requires careful analysis over time and space. Agriculture Handbook 701, Landscape Aesthetics: A Handbook for Scenery Management (1995) and Agriculture Handbook 462, National Forest Landscape Management Vol. 2 Ch.1 The Visual Management System provides direction for scenery management in the Forest Service. In addition, the Forest Plan established visual condition guidelines that lead to Visual Quality Objectives (VQO) for NFS lands within the GMNF. These guidelines and objectives are based on criteria defined in the National Forest Visual Management System Handbook (USDA Forest Service 1974) and the Forest Plan, and vary depending on whether activities can be seen, viewer sensitivity, and the desired recreation opportunity spectrum (ROS). Visual Quality Objectives help provide a threshold of acceptable impacts that may result from management activities across the landscape. Table 21 displays the VQO thresholds that are applicable to the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Visual Quality Objective</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preservation</td>
<td>Alterations are caused by ecological changes only.</td>
</tr>
<tr>
<td>Retention</td>
<td>Alterations made by people are not visually evident to the casual forest visitor.</td>
</tr>
<tr>
<td>Partial Retention</td>
<td>Alterations made by people must appear subordinate within the surrounding natural appearing landscape.</td>
</tr>
<tr>
<td>Modification</td>
<td>Alterations may dominate the original surrounding landscape, but constructed facilities must be compatible with the landscape.</td>
</tr>
</tbody>
</table>

The Telephone Gap IRP project area includes travel corridors that are considered sensitive to scenic quality. Two Vermont State Routes that fall within the project area have scenic designations: 1) Route 100 Scenic Byway, and 2) Route 4 Crossroad of Vermont Byway. Congress created the National Scenic Byways Program to create a distinctive collection of American roads, their stories and their treasured places. The U.S. Secretary of Transportation recognizes those roads that are outstanding examples of scenic, historic, recreational, cultural, archaeological and/or natural qualities. These travel corridors are used frequently by local and out-of-state visitors to the GMNF and surrounding areas. The scenic elements to be viewed from these Scenic Byways include numerous rivers, streams and ponds; steep side slopes and
ridgelines of the Green Mountains, including Blueridge Mountain; alpine ski resorts; and characteristic Vermont villages and architecture.

Other notable vantage points and travel corridors providing views of the project area include locations along the Appalachian National Scenic Trail and Long National Recreation Trail, Chittenden Reservoir, Lefferts Pond, private alpine and Nordic ski resorts, and locations along additional roads, trails, and private parcels. These numerous vista points offer views of the surrounding mountains and valleys in addition to the transient vistas available throughout the project area.

2. EXISTING CONDITION

Inventory Methodology/Process

Key observation points within and of the project area were identified by assessing locations where the public is likely to have views of project activities. Field reviews and/or Google Earth reviews of each observation point considered vantage points along roads, trails, existing vistas, bodies of water, peaks, and visibly sensitive business locations (such as wedding venues). Geographic Information System (GIS) analysis helped to identify additional points where visibility extends due to elevation.

The assessment of scenic quality considered factors such as view quality, viewer duration, number of viewers, sensitivity levels, and landscape character and variety. Review of the key observation points considered three scenic quality variety classes as identified in Table 22. All landscapes have value but the more diverse and unique a landscape is, the more potential it has for high scenic value. Other considerations for analysis included assessing the capacity of the landscape to absorb alteration without losing visual character and the visual impact of management activities.

<table>
<thead>
<tr>
<th>Feature</th>
<th>CLASS A: DISTINCTIVE (Land, water, rock or vegetation forms are of unusual or outstanding visual quality)</th>
<th>CLASS B: COMMON (Features vary in form, line, color and texture but are common throughout the area)</th>
<th>CLASS C: MINIMAL (Features have little change in line, form, color or texture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landform</td>
<td>Steep slopes (&gt;60 percent) with dissected, uneven or sharp exposed ridges or dominant features.</td>
<td>Moderately steep slopes (30 to 60 percent) – rolling ridgeline.</td>
<td>0 to 30 percent slopes with no distinctive features or dissection.</td>
</tr>
<tr>
<td>Rock form</td>
<td>Features stand out on land form such as unusual outcrops.</td>
<td>Features that do not stand out or are common.</td>
<td>Small or nonexistent features.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Pattern diversity, large or old-growth timber, unusual plant species.</td>
<td>Continuous cover with interspersed patterns.</td>
<td>Continuous cover with little or no pattern.</td>
</tr>
<tr>
<td>Water form –</td>
<td>50 acres or larger or smaller water bodies with unusual shoreline or reflection of major landscape features.</td>
<td>5 to 50 acres with some shoreline irregularity and minor reflections only.</td>
<td>Less than 5 acres with little to no irregularity or reflections.</td>
</tr>
<tr>
<td>lakes/ponds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water form –</td>
<td>Drainage with unusual characteristics (falls, rapids) or large volume.</td>
<td>Drainage with common characteristics and meandering.</td>
<td>Drainage with little or no distinguishing features.</td>
</tr>
<tr>
<td>rivers/streams/brooks</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Inventory Findings

The Telephone Gap IRP project area lies within the Green Mountains and portions of the State Routes 4 and 100 highway corridors. The landscape has a mosaic of vegetation patterns with a great deal of topographic relief enabling new vantage points as a viewer moves across the complex landscape. There are rivers, streams, ponds, and wetlands within the project area that offer scenic value. Specially noted is Chittenden Reservoir, Lefferts Pond, North Pond, South Pond, Kent Pond, Colton Pond, Tweed River, Ottauquechee River, and multiple brooks which add scenic diversity to the landscape.

Evidence of recent timber harvest activity on NFS lands in the project area is not noticeable; the Forest Service has not conducted timber sales in the project area in the past 20 years. Some evidence of older timber harvests is apparent within the interior of the project area along roads, trails and old logging roads. Evidence of more recent timber harvest and site disturbance is evident on the South Pond parcel. When viewed from vantage points in the higher elevations such as the Long Trail, textural changes are not apparent in the tree canopy.

Multiple trails as well as the Tucker Johnson Shelter, New Boston Turnout Trailhead, Michigan Brook Winter Trailhead, and Sherburne Trailhead recreation sites are surrounded by forest with minimal views off-site. The Thundering Falls Trailhead offers foreground views facing west towards private land. The Lefferts Pond Fishing Site and Chittenden Reservoir offer sweeping foreground and middleground views. Key observation points in and of the project area, including openings along trails, that offer on-site and/or off-site views are identified in Table 23.

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Visual Quality Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appalachian Trail (2 vistas)</td>
<td>Vista located along National Scenic Trail</td>
<td>Retention</td>
</tr>
<tr>
<td>Long Trail (9 vistas)</td>
<td>Vista located along National Recreation Trail</td>
<td>Retention</td>
</tr>
<tr>
<td>A&amp;D Trail</td>
<td>Vista located along snowmobile trail</td>
<td>Partial Retention</td>
</tr>
<tr>
<td>Bloodroot Gap Trail</td>
<td>Vista located along snowmobile trail</td>
<td>Partial Retention</td>
</tr>
<tr>
<td>Puss N Kill Trail</td>
<td>Vista located along snowmobile trail</td>
<td>Partial Retention</td>
</tr>
<tr>
<td>Canty Trail</td>
<td>Vista located along hiking trail</td>
<td>Partial Retention</td>
</tr>
<tr>
<td>Chittenden Reservoir (5 water locations and 2 land locations)</td>
<td>Vistas visible from water and shoreline</td>
<td>Retention</td>
</tr>
<tr>
<td>Lefferts Beach</td>
<td>Vista facing north from beach located on Chittenden Reservoir</td>
<td>Retention</td>
</tr>
<tr>
<td>Lefferts Dam/Opening</td>
<td>Vista facing south/southeast from Lefferts Pond Dam</td>
<td>Retention</td>
</tr>
<tr>
<td>Lefferts Fish Ladder Opening</td>
<td>Vista facing south from Lefferts Pond fish ladder and opening</td>
<td>Retention</td>
</tr>
<tr>
<td>Mt Top Porch/Wedding Barn</td>
<td>Vista located on private land</td>
<td>Retention</td>
</tr>
<tr>
<td>Mt Top Beach</td>
<td>Vista located on private land</td>
<td>Retention</td>
</tr>
<tr>
<td>Mt Top Wedding Knoll</td>
<td>Vista located on private land</td>
<td>Retention</td>
</tr>
<tr>
<td>Pico</td>
<td>Vista from Pico Mountain ski resort north to project area</td>
<td>Retention of visible upper peaks, partial retention below peaks and ridgelines</td>
</tr>
<tr>
<td>South Pond</td>
<td>Expansive views west from ridgeline location</td>
<td>Retention</td>
</tr>
<tr>
<td>Route 4 at Sherburne Pass</td>
<td>Views from scenic byway towards Deer Leap/AT trail network</td>
<td>Retention</td>
</tr>
<tr>
<td>Route 4 traveling west from Sherburne Pass</td>
<td>View from scenic byway of Blue Ridge Mountain</td>
<td>Retention</td>
</tr>
</tbody>
</table>
Visual Quality Objectives are summarized by location in Table 24. Table 25 provides compartment/stand(s) within the Telephone Gap IRP project area with high visual sensitivity and the visual quality objective associated with each location. On-site views (less than one-half mile) from State Routes 4 and 100, Chittenden Reservoir, Lefferts Pond Day Use Area, Thundering Falls, Tucker Johnson Shelter and the Appalachian and Long Trails have high viewer sensitivity and should meet the Retention VQO. Timber stands identified as having potential for timber harvest along these areas were inventoried for visibility in the foreground distance zone using Google Earth Pro. A field survey was also conducted to identify areas visible from the sites and corridors identified as having high viewer sensitivity, validate the views shown in Google Earth Pro, and validate the existing visual condition of the area.

On-site views (less than one-half mile) from the remaining Forest Roads and NFS Trails have moderate viewer sensitivity and should meet the Partial Retention VQO.

On-site views (less than one-half mile) from travelways maintained primarily for non-recreation purposes such as timber access roads have lower visual sensitivity and should meet the Modification VQO.

Off-site views (more than one-half mile) from roads and NFS Trails within the Appalachian Trail, Long Trail, Remote Backcountry and the Remote Wildlife Habitat management areas with a desired ROS of semi-primitive non-motorized should meet the Retention VQO.

Off-site views (more than one-half mile) from roads and NFS Trails within the Diverse Backcountry management area with a desired ROS of semi-primitive motorized should meet the Retention VQO on the upper part of the more noticeable peaks and ridges, and meet the Partial Retention VQO on the remainder of the landscape.

Off-site views (more than one-half mile) from roads and NFS Trails within the Diverse Forest Use management area with a desired ROS of roaded natural should meet the Partial Retention VQO on the upper part of the more noticeable peaks and ridges, and meet the Modification VQO on the remainder of the landscape.

Current visual conditions within the project area meet VQOs from both on-site and off-site views with the exception of the pending South Pond parcel acquisition that will be located in the Diverse Backcountry management area.

Table 24. Visual Quality Objectives by location for the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Visual Quality Objectives</th>
<th>On-Site Views (&lt; ½ mile from observer)</th>
<th>Off-Site Views (&gt; ½ mile from observer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention</td>
<td>Views from:</td>
<td>Views from roads and National Forest trails within the following management areas:</td>
</tr>
<tr>
<td></td>
<td>• VT Route 4</td>
<td>• Appalachian Trail</td>
</tr>
<tr>
<td></td>
<td>• VT Route 100</td>
<td>• Long Trail</td>
</tr>
<tr>
<td></td>
<td>• Chittenden Reservoir</td>
<td>• Remote Backcountry</td>
</tr>
<tr>
<td></td>
<td>• Lefferts Pond Day Use Area</td>
<td>• Remote Wildlife</td>
</tr>
<tr>
<td></td>
<td>• Thundering Falls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tucker Johnson Shelter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Appalachian Trail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Long Trail</td>
<td></td>
</tr>
<tr>
<td>Partial Retention</td>
<td>Views from:</td>
<td>Views of upper peaks and ridgelines from roads and National Forest trails in the following management area:</td>
</tr>
<tr>
<td></td>
<td>• Non-ridgeline/peak views from roads and Forest Service trails in the following management area:</td>
<td>• Diverse Backcountry</td>
</tr>
</tbody>
</table>
Table 25 provides compartment/stand(s) within the Telephone Gap IRP project area with high visual sensitivity.

### Table 25. Initial inventory of Telephone Gap IRP project area stands with high visual sensitivity.

<table>
<thead>
<tr>
<th>Location or Viewpoint</th>
<th>VQO</th>
<th>MA¹</th>
<th>ROS²</th>
<th>Comp.</th>
<th>Stand(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;D Trail</td>
<td>Partial Retention</td>
<td>DFU</td>
<td>RN</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Bloodroot Gap Trail</td>
<td>Partial Retention</td>
<td>DB</td>
<td>SPM</td>
<td>130</td>
<td>4,5</td>
</tr>
<tr>
<td>Puss N Kill Trail</td>
<td>Partial Retention</td>
<td>DB</td>
<td>SPM</td>
<td>110</td>
<td>1,2,3,7,9,15,27</td>
</tr>
<tr>
<td>Long Trail south of Bloodroot Gap Vistas I and II</td>
<td>Retention</td>
<td>LT</td>
<td>SPNM</td>
<td>141</td>
<td>1,4,5,6</td>
</tr>
<tr>
<td>Long Trail south of Bloodroot Gap III</td>
<td>Retention</td>
<td>LT</td>
<td>SPNM</td>
<td>132</td>
<td>2,6,12,16</td>
</tr>
<tr>
<td>Canty Trail</td>
<td>Partial Retention</td>
<td>DB</td>
<td>SPM</td>
<td>147</td>
<td>102</td>
</tr>
<tr>
<td>Mt. Top (3) locations, Chittenden Reservoir, Lefferts Pond Beach, South Pond, and Long Trail vistas</td>
<td>Retention</td>
<td>DFU, DB, and LT</td>
<td>RN, SPM, SPNM</td>
<td>145</td>
<td>1,2,3,5,6,9,10,11, 12,13, 14,15,17, 18,19,20,21,22, 23,24,25,26,27,28, 30,31,32,33,36,41, 43,44,45,46,48, 58,59,62,63,64,110</td>
</tr>
<tr>
<td>Mt. Top (3) locations, Chittenden Reservoir, Lefferts Pond Beach, South Pond, and Long Trail vistas</td>
<td>Retention</td>
<td>DFU, DB, and LT</td>
<td>RN, SPM, SPNM</td>
<td>144</td>
<td>1,2,3,5,6,7,11,12, 13,14,15,16,18, 21,102,103,104, 108</td>
</tr>
<tr>
<td>Mt. Top (3) locations, Chittenden Reservoir, Lefferts Pond Beach, South Pond, and Long Trail vistas</td>
<td>Retention</td>
<td>DFU, DB, and LT</td>
<td>RN, SPM, SPNM</td>
<td>138</td>
<td>19</td>
</tr>
<tr>
<td>Mt. Top (3) locations, Chittenden Reservoir, Lefferts Pond Beach, South Pond, and Long Trail vistas</td>
<td>Retention</td>
<td>DFU, DB, and LT</td>
<td>RN, SPM, SPNM</td>
<td>143</td>
<td>4,6,9,10,14,17,20,25, 27,28,38,39,42</td>
</tr>
<tr>
<td>Long Trail (2 vistas)</td>
<td>Retention</td>
<td>LT</td>
<td>SPNM</td>
<td>152</td>
<td>2,3,4,12,14,17,101</td>
</tr>
<tr>
<td>AT Vistas</td>
<td>Retention</td>
<td>AT</td>
<td>SPNM</td>
<td>153</td>
<td>13,16,17,18</td>
</tr>
<tr>
<td>Long Trail Vista</td>
<td>Retention</td>
<td>LT</td>
<td>SPNM</td>
<td>138</td>
<td>4,14</td>
</tr>
<tr>
<td>Lefferts Pond Dam and Fish Ladder</td>
<td>Retention</td>
<td>DFU</td>
<td>RN</td>
<td>145</td>
<td>108</td>
</tr>
<tr>
<td>Wedding Knolls Off-Site (Background) Views of Blue Ridge</td>
<td>Modification</td>
<td>N/A</td>
<td>N/A</td>
<td>147</td>
<td>1,2,3,4,5,6,7,8, 10,11,16,17,30,33, 34,36,49,51,52,55, 59,63,64,65,68,69, 70,71,72,75,79,147, 205,206,209,213, 217</td>
</tr>
</tbody>
</table>
Example Viewpoints for the Telephone Gap IRP Project Area

<table>
<thead>
<tr>
<th>Viewpoint Description</th>
<th>Modification</th>
<th>ROS 1</th>
<th>ROS 2</th>
<th>ROS 3</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chittenden Reservoir looking east</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lefferts Pond (at fish ladder) looking south</td>
<td>Retention</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>29,37,41,42,43</td>
<td>29,37,41,42,43</td>
<td></td>
</tr>
<tr>
<td>Lefferts Pond (near dam) looking south</td>
<td>Retention</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>58,65</td>
<td>58,65</td>
<td></td>
</tr>
</tbody>
</table>
Mt Top wedding knoll looking towards Chittenden Reservoir

Mt Top wedding knoll looking towards Blue Ridge

Mt Top view from beach
3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals, objectives, and forest-wide standards and guidelines related to the visual resource (USDA Forest Service 2006):

Forest Plan Goals and Objectives

- Goal 15: Maintain or enhance visual resources such as viewsheds, vistas, overlooks, and special features.
  - Objectives:
    - Maintain or enhance visual quality of special areas that contain scenic features.
    - Maintain or enhance visual quality on the Forest.

- Mineral Standards and Guidelines:
  - S-2: Before development of a site, an operating plan shall be prepared. The plan will include at least the following items:
    - A schedule of activities
    - An estimate of the amount of material to be removed
    - Expected use of roads and infrastructure
Rehabilitation measures for stabilizing soil, protecting water quality, restoring vegetation, and protecting visual quality

- **Regeneration Cuts Standards and Guidelines:**
  - G-2: Shelterwood with reserves regeneration method may be used to regenerate species that are somewhat tolerant of shade in areas where the second cut of a standard shelterwood should be delayed beyond 20 percent of rotation years to:
    - Maintain overstory trees in locations of high visual sensitivity or to eventually convert even-aged stands to uneven-aged stands when current stocking is insufficient.

- **Openings Standards and Guidelines:**
  - G-1: Permanent upland openings and temporary openings should have irregular shapes to provide more interspersion with forested lands and to improve visual quality; a maximum of 100 feet around permanent openings should be managed to provide vertical diversity and gradual transitions between the opening and surrounding forest.

- **Visuals Standards and Guidelines:**
  - S-1: Visual quality objectives shall be determined when implementing the 2006 Forest Plan on specific areas.
  - S-2: Visual quality objectives shall be met for all activities.
  - S-3: For the viewshed as seen from the Appalachian Trail and the Long Trail, but outside of the AT and LT Management Areas, activities shall meet a visual quality objective (VQO) of at least Partial Retention.
  - G-1: The Built Environment Image Guide (BEIG) (FS 710 December 2001) should be used to develop the image, appearance, or architectural character of existing or proposed facilities, when considering rehabilitation, expansion, replacement, or the addition of new improvements.
  - G-2: Forest Plan Tables 2.3-2 and 2.3-3 should be used as guidelines to determine visual quality objectives (VQOs). Table 2.3-2 requires use of desired Recreation Opportunity Spectrum (ROS) objectives for areas to determine VQOs (see glossary for definitions of terms).

**Forest Plan Desired Future Conditions**
The major emphasis, desired future conditions, and standards and guidelines for the visual resource varies by Forest Plan management area and are summarized as follows:

**Diverse Forest Use**
- **Major Emphasis:** The mix of vegetation conditions and recreation opportunities across the landscape provides a mosaic of landscape conditions that strives to be visually attractive to people visiting the Forest.
- **Desired Future Condition:** Along road and trail corridors, large diameter trees of diverse species will predominate. Vistas of landscapes with a mosaic of vegetative patterns will be provided along roads and trails. Permanent upland and temporary openings will occur across the landscape in shapes and sizes that are consistent with visual objectives in the area. Views, ecological processes, and management practices will be interpreted at some vista sites.
Remote Backcountry Forest

- **Major Emphasis:** Management actions are limited to those that help restore or maintain natural processes, natural communities, and associated species within their natural ranges of variation in the landscape. Public use is managed at a scale and intensity that has minimal effect on the area’s integrity. Non-motorized trail recreational opportunities will be available in a predominantly natural or natural-appearing landscape.
- **Desired Future Condition:** Desired ROS class of Semi-primitive Non-motorized. Recreational impacts will be managed to minimize visual disturbance and to preserve a sense of wildness.
- **Timber Management Guideline:** G-1: Changes resulting from vegetation management activities should be kept as naturally appearing as possible.

Diverse Backcountry

- **Major Emphasis:** When viewed from a distance, human activity will not be evident on some of the upper elevations of the more noticeable peaks and ridges. Some evidence of activity may be noticeable on lower levels but will blend with the surrounding landscape. While these areas will be predominately natural appearing, evidence of human use may be evident, but will not dominate. A predominantly natural or natural-appearing environment characterizes the area.
- **Desired Future Condition:** Desired ROS class of Semi-primitive Motorized. Appropriate for a wide variety of recreational uses. Concentration of users will generally be low, but there will often be evidence of other users. Recreation facilities may be present and will complement the desired recreation opportunities. Trail systems will be present and new trails may be developed.
- **Timber Management Guideline:** G-3: Uneven-aged management should be used where even-aged management is incompatible with other resources and values such as along certain roads and trails that have high visual sensitivity.
- **Openings Standard:** S-1: Temporary openings resulting from even-aged management shall be less than 20 acres and in accordance with the Forest-wide standards and guidelines for Recreation and Visuals.

Remote Wildlife Habitat

- **Major Emphasis:** Creation of diverse habitat
- **Desired Future Condition:** Desired ROS class of Semi-primitive Non-motorized.
- **Openings Standard:** S-1: Temporary openings resulting from even-aged management shall be less than 20 acres and in accordance with the Forest-wide standards and guidelines for Recreation and Visuals.
- **Visuals Guideline:** G-1: Visual condition guidelines should meet Roaded Natural objectives.

Appalachian National Scenic Trail

- **Major Emphasis:** Provide for the conservation and enjoyment of the nationally significant scenic, historic, natural, and cultural qualities of the land through which the AT passes.
- **Desired Future Condition:** Because of the linear nature of the AT, this management area will encompass a great variety of physical features. These will range from remote, natural-appearing settings having a mixture of tree sizes and forest types, to agricultural landscapes, to locations where developments are noticeable. This management area will retain a natural, forested, or pastoral appearance shaped by both natural and human processes. Management practices will recognize the nationally significant aesthetic and
recreational values of these lands. Vistas and desirable open areas will be created and preserved through management actions.

**Long National Recreation Trail**

- **Major Emphasis:** Provide for the conservation and enjoyment of the significant scenic, historic, natural, and cultural qualities of the land through which the LT passes.
- **Desired Future Condition:** Because of the linear nature of the Long Trail, this special area will encompass a wide variety of physical features. These will range from remote, natural-appearing settings having a mixture of tree sizes and forest types, to locations where developments are noticeable. This management area will retain a natural, forested appearance shaped by both natural and human processes. Management practices will be modified to recognize the significant aesthetic and recreational values of these lands. Management activities needed to preserve or create vistas and desirable open areas will be a high priority.

**Existing and Candidate Research Natural Areas**

- **Major Emphasis:** Preservation and protection of ecologically significant natural features.
- **Desired Future Condition:** Recreation management will be towards the desired ROS class of Primitive.

**Eligible Wild, Scenic, and Recreational Rivers – Recreational Segment**

- **Major Emphasis:** The emphasis of this management area is to protect and enhance the “outstandingly remarkable values” (ORVs) that led those rivers and streams within this management area to be determined as eligible Wild Scenic, and Recreational Rivers.
- **Desired Future Condition:** The sights and sounds of others will be evident. The landscape character may range from natural appearing to transitional-mixed use. There may be substantial evidence of human activity along the shores of these rivers. Visitors will encounter a natural-appearing setting with a range of human-made developments.

4. **GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION**

**Gap Description**

Viewpoints in the project area provide scenic viewing opportunities. However, active management is needed to reduce encroaching vegetation and to continue to provide views of landscape features within the project area. This would meet Goal 15: Maintain or enhance visual resources such as view sheds, vistas, overlooks, and special features.

New vista creation on trails and along state highways has not occurred in the project area, therefore a gap exists in the enhancement of visual resources.

**Opportunities**

There is an opportunity to maintain and enhance existing vistas through vegetation management on the Appalachian Trail, Long Trail, Bloodroot Gap, Puss N Kill, A & D, and Canty Trails. This could be coordinated with timber harvesting activities that may be proposed within the project area.

There is an opportunity to manage a new vista on the South Pond parcel once the harvested area revegetates.
There is an opportunity to retain the visual quality objectives in areas potentially proposed for timber harvesting along state roads through careful selection and placement of harvest treatments.

**Initial Possible Activity List**


### 5. ISSUES AND CONCERNS

Public comments received on previous projects around visual resources focused on the creation and maintenance of vistas, and the visual effects of timber harvesting on the side slopes and ridgelines that are visible from state highways.

### 6. REFERENCES


Heritage Resources

1. INTRODUCTION AND BACKGROUND

General Description
The Telephone Gap IRP project area encompasses a range of natural resources and landscapes that have been occupied by humans for thousands of years. This is evident by remnant archaeological materials and features across the landscape, and the stories and traditions shared among the Western Abenaki and Mohican communities of Vermont. For the most part, the project area contains rural Euro-American sites located along the hills and valleys and there is evidence of numerous 18th and 19th century historic farmsteads. Unlike other parts of the GMNF, evidence of industrial pursuits within the project area are somewhat sparse. Mining, quarrying, logging, lime and charcoal operations have occurred most primarily from the latter part of the 19th century, with some extending into the early 20th century. Additionally, Native American sites have been identified throughout the GMNF, however our knowledge of site locations in the project area is limited. The area contains tributaries for both the Otter Creek and White River, which have offered travelways in the past for Native American groups crossing the Green Mountain divide.

2. EXISTING CONDITION

Inventory Methodology/Process
An existing data review was conducted for the project area to identify known, potential, and sensitive areas for both Euro and Native American archaeological sites. This review typically involves examining:

- USDA Forest Service National Resource Management (NRM) and Geographic Information Systems (GIS) files
- USDA Forest Service - GMNF inventory records, site forms, and maps
- Historic maps and aerial photographs
- Local and state historic documents
- Vermont Division for Historic Preservation (VDHP) site files

Conducting an existing data review allows Forest Service Heritage staff to identify known and potential cultural resources that require field verification, monitoring, and mitigations for proposed activities in the project area. The data is used to develop an identification strategy and helps determine the intensity of the field survey needed prior to any project implementation. Based on a review of inventory records, select sites were then visited to evaluate the current condition of the site and determine the degree of stabilization efforts that would be needed.

Inventory Findings
An examination of site files revealed 76 confirmed and 26 potential archaeological sites located on NFS land in the project area. The vast majority of these are domestic sites from the mid to late 19th century, with a small number of potential Native American sites. Several potential sites were identified based on notations found on historic maps but have yet to be found and recorded. Numerous other sites are located outside NFS land and are concentrated around the towns of Chittenden and Pittsfield.

Historic records revealed a Native American travelway in the project area that was used as recently as the 18th century. The route was described by Euro-Americans during an expedition...
to find a path through the Green Mountains that would connect the Connecticut River to the Otter Creek (Wheeler and Webster, 2008). Areas along this potential route have been marked as high sensitivity for archaeological sites and would be evaluated further when projects are proposed. Records also revealed the existence of a historic town, New Boston, once located north of the Chittenden Reservoir. Evidence of the town in the form of stone-lined cellar holes and old roads are still present on both public and private land and is depicted on the 1854 Scott’s Map of Rutland County.

Field visits to multiple sites revealed some are in varying levels of disrepair and have become overgrown by trees and brush. Stone features appear intact and in relatively good condition, however removal of encroaching vegetation would improve future impacts to the site and underlying deposits. There has also been documented vandalism or inadvertent damage to three of the sites in the project area which would require additional review to assess how those impacts may have altered the site over the years.

3. DESIRED FUTURE CONDITION

The following are the Forest Plan goals and objectives related to the heritage resource (USDA Forest Service 2006):

Forest Plan Goals and Objectives

- Goal 16: Provide protection and stewardship for significant heritage resources on the GMNF.
  - Heritage Resource Objectives:
    - Reduce the backlog of unevaluated heritage sites.
    - Move toward 100 percent heritage resource inventory.
    - Increase the number of partnerships that help accomplish the Forest’s heritage inventory, evaluation, and interpretation and education needs.
  - Tribal Relations Objectives:
    - Maintain relationships with federally recognized tribes and tribal groups with historical ties to the Forest by having contact quarterly with appropriate representatives.

Forest Plan Desired Future Conditions

- All identified sites will be fully and properly recorded, and the site data will be entered into the current Forest Service and Vermont site databases.
- All recorded archaeological sites within the various proposed project boundaries will be protected from any project activities that could potentially damage the sites.
- All sites will be protected from illegal activities such as vandalism and looting.
- Certain sites within the project area can be enhanced, and/or interpreted. These efforts should involve interested members of the public, tribes, avocational partners, and research institutions.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description

Although the Telephone Gap IRP project area has been reviewed on an individual project basis in the past, the majority of the landscape has not had a systematic inventory of Heritage
resources. There is a need to complete a pedestrian survey and sub-surface testing to work towards achieving 100 percent inventory and assure current and future proposed activities are in compliance with Section 106 of the National Historic Preservation Act. This can be accomplished with intensive survey and volunteer opportunities, as site-specific project activities are proposed.

Opportunities

- Develop opportunities for volunteers to conduct important stabilization and research activities on the GMNF. This has been accomplished in the past with the Vermont Archaeological Society and local universities.
- Consult with the federally recognized Stockbridge Munsee Mohican and state recognized Abenaki communities. This will provide opportunities to decrease the gap in our knowledge of Native American presence in the Telephone Gap IRP project area and provide opportunities to collaborate on efforts to expand public knowledge.
- Focus on identifying and surveying areas that possess a high potential for buried archaeological sites. The results will help us in the understanding of site potential in proposed activity areas where no surface manifestations are present.
- Conduct site evaluations on previously recorded sites to determine their eligibility for inclusion on the National Register of Historic Places.

Initial Possible Activity List

- Site stabilization at historic farmstead sites. This can be accomplished with volunteer effort to remove trees and vegetation encroaching on stone features.
- Site eligibility evaluation and brush removal for VT-RU-0156. This site potentially contains the remnants of the only known rectangular charcoal kiln in the State of Vermont.
- Brush removal and cleaning of the grave marker at VT-RU-0144.

5. ISSUES AND CONCERNS

A major concern for Heritage resources is associated with ground disturbing activities within close proximity to heritage sites. Fortunately, an interdisciplinary resource approach for project development presents many options to ensure that sites are avoided by these types of activities. Heritage-specific mitigations are put in place to protect the resource and intensive surveys prior to project implementation is completed to identify sites that are at risk to be affected by the proposed activity.

Many of the previously recorded sites have not been visited in the last twenty years or more. It is important when moving towards 100 percent inventory of Heritage resources on NFS land, that unevaluated sites have their records updated to assess any potential environmental or human impacts. This can be achieved when conducting intensive survey and through partnerships or volunteer efforts.

6. REFERENCES

Gazetteer and Business Director of Rutland County, VT., for 1881-1882. (1881). Compiled and Published by Hamilton Child, Syracuse, NY.

Moore, Isaac W, J Chace, and James D. Scott & Owen McLeran (1854). Scott's map of Rutland County, Vermont. Published by Owen McLeran & James D. Scott, Philadelphia, PA.

Transportation System (Rocks)

1. INTRODUCTION AND BACKGROUND

General Description

Roads provide access for many uses on the GMNF including public and administrative. They provide the infrastructure to facilitate vegetation management and other mission-critical work such as recreation management and watershed restoration. However, their presence can also have negative effects on the natural and cultural resources within the Telephone Gap IRP project area.

2. EXISTING CONDITION

Inventory Methodology/Process

Roads within the project area have been inventoried to verify their existence and current condition. Inventories were completed by passenger car, utility vehicle (UTV) or foot. Although all roads were verified, a full inspection of each road was not completed. More detailed inspections will be completed as proposed projects are developed.

Inventory Findings

There are currently Ten roads (12.31 miles) under Forest Service jurisdiction having various Operational Maintenance Levels (OML) within the project area (see Tables 26 and 27). This includes four bridges and five major culverts (cross sectional area greater than 36 square feet). The three major culverts on Michigan and Caryl Brook Roads are not barriers to aquatic organism passage. The two major culverts on Furnace Brook Road are barriers to aquatic organism passage. All roads meet the required maintenance for their assigned maintenance level.

Table 26. Permanent system roads by Operational Maintenance Level (OML) under Forest Service jurisdiction within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>Miles of Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Basic Custodial Care (Closed)</td>
<td>0.95</td>
</tr>
<tr>
<td>2 – High Clearance Vehicles</td>
<td>6.79</td>
</tr>
<tr>
<td>3 – Suitable for Passenger Vehicles</td>
<td>4.57</td>
</tr>
<tr>
<td>4 – Moderate Degree of User Comfort</td>
<td>0.00</td>
</tr>
<tr>
<td>5 – High Degree of User Comfort</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12.31</strong></td>
</tr>
</tbody>
</table>

Table 27. Summary of permanent system roads under Forest Service jurisdiction within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Road Number</th>
<th>Road Name</th>
<th>Begin Mile Post</th>
<th>End Mile Post</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>HEWITT BROOK</td>
<td>0</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>99A</td>
<td>NEW BOSTON SPUR</td>
<td>0</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td><strong>Total OML 1</strong></td>
<td><strong>0.95</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>BAKER BROOK</td>
<td>1.5</td>
<td>1.91</td>
<td>0.41</td>
</tr>
<tr>
<td>97</td>
<td>CARYL BROOK</td>
<td>0</td>
<td>2.02</td>
<td>2.02</td>
</tr>
</tbody>
</table>
3. DESIRED FUTURE CONDITION

The desired future condition for the transportation system in the project area is a minimum road system (MRS). The MRS is the road system needed for safe and efficient travel and for administration, utilization, and protection of the National Forest System lands (36 CFR 212.5(b)(1)). Roads included in the MRS serve the Forest Service mission and achieve goal 14 of the Forest Plan by providing access for forest management activities, recreational opportunities, and utilization of forest resources. The MRS includes roads designated for public motorized use as well as closed roads that are necessary for forest management.

Forest Plan Goals and Objectives
- Goal 14: Provide a safe, efficient, and effective Forest transportation system that meets both the needs of the Forest Service and the public.
  - Objectives:
    - Use design elements and standards that permit maximum economy while meeting management direction for resource and environmental protection and user safety.
    - Design roads constructed or reconstructed for use by the general public in accordance with the latest standards using American Association of State Highway Transportation Officials (AASHTO) Policy on Design of Highways and Streets section on rural roads and special purpose roads.
    - Complete comprehensive transportation system planning for 100 percent of the Forest.

4. GAP BETWEEN EXISTING CONDITION AND DESIRED FUTURE CONDITION

Gap Description
Recent funding allocations are adequate to perform annual maintenance on many, but not all, roads in the project area. The deferred maintenance costs are considerably higher than the appropriated funding.

Opportunities
The Forest Service completed a detailed travel analysis of the entire forest in August 2015 including those within the project area (USDA Forest Service 2015). There are no roads in the project area identified as “Not Likely Needed for Future Use”. There are no roads in the project area proposed for decommissioning. There is potential for changing the maintenance level of some roads to a level more consistent with their actual maintenance.
Initial Possible Activity List

- Road Gate Installation: Forest Roads 35 and 394.
- Replace two major culverts on Forest Road 57 with AOP structures.
- Road Improvements and reconstruction: Forest Road 394 re-alignment, timber haul roads, recreation site and trailhead parking.

5. ISSUES AND CONCERNS

Recent funding allocations are adequate to perform annual maintenance on many, but not all, roads in the project area. The deferred maintenance costs are considerably higher than the appropriated funding. There is no precise number of miles of road that can be maintained under any given future budget scenario. It appears likely that future allocations will make it difficult to maintain the existing system to an acceptable level.

6. REFERENCES

### Appendix A: Telephone Gap Project Area Rare Plants

Table A-1 includes Regional Forester Sensitive Species (RFSS) and those *species no longer thought to be rare* enough to be tracked in Vermont known to occur within the Telephone Gap IRP project area. In the column “On NFS land”, if the letters are parentheses it indicates historical populations not observed in 20 or more years. Also listed is whether they occur in areas mapped as old forest or in State Significant Natural Communities.

**Table A-1. Rare plants within the Telephone Gap IRP project area.**

<table>
<thead>
<tr>
<th>Scientific Name, Common Name, and State Status if not RFSS</th>
<th>Site Name</th>
<th>On NFS Land</th>
<th>In Mapped Old Forest?</th>
<th>Overlap with Stands that are Unsuitable for Harvest?</th>
<th>In a State Significant Community?</th>
<th>Concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arceuthobium pusillum (dwarf mistletoe)</td>
<td>Steam Mill Brook Seeps</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td></td>
<td>Red spruce cinnamon fern swamp, Rich fen</td>
</tr>
<tr>
<td>North Pond</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td>Cold air talus woodland, Montane spruce fir forest</td>
</tr>
<tr>
<td>The Cape</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td></td>
<td>Control small vegetative patch of Phragmites on NE end of North Pond about 1000’ away.</td>
</tr>
<tr>
<td>Blephilia hirsuta var. hirsuta (hairy wood-mint)</td>
<td>Mt. Carmel</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y</td>
<td></td>
<td>Control common buckthorn about 50’ away</td>
</tr>
<tr>
<td>The Cape</td>
<td>Y/N</td>
<td>N</td>
<td>Partly, and in a wetland</td>
<td>Rich northern hardwood forest</td>
<td></td>
<td>Not found; search again</td>
</tr>
<tr>
<td>Farr Peak</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Northern hardwood seepage forest</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Bloodroot Mountain</td>
<td>Y/N</td>
<td>Y/N</td>
<td>Y</td>
<td>Northern hardwood seepage forest</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Calystegia silvatica ssp. fraterniflora (twin-flower hedge bindweed) S2</td>
<td>Chittenden Reservoir</td>
<td>Y</td>
<td>N</td>
<td>No</td>
<td></td>
<td>Many adjacent NNIP (Phragmites, Morrow honeysuckle, purple loosestrife) need control; consider for future RFSS</td>
</tr>
<tr>
<td>Cardamine maxima (large toothwort)</td>
<td>Blue Ridge</td>
<td>Y</td>
<td>N</td>
<td>Partly</td>
<td>Northern hardwood seepage forest</td>
<td>Morrow honeysuckle (mentioned, but not in NRIS)</td>
</tr>
<tr>
<td>Carex albursina (Minnesota sedge) S4</td>
<td>The Cape</td>
<td>(Y)</td>
<td>Y/N</td>
<td>Y</td>
<td>Rich northern hardwood forest</td>
<td>No concerns (Historical, but not tracked)</td>
</tr>
<tr>
<td>Scientific Name, Common Name, and State Status if not RFSS</td>
<td>Site Name</td>
<td>On NFS Land</td>
<td>In Mapped Old Forest?</td>
<td>Overlap with Stands that are Unsuitable for Harvest?</td>
<td>In a State Significant Community?</td>
<td>Concerns</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>-------------------------------------------------</td>
<td>----------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Carex buxbaumi (Buxbaum's sedge) S1-E</td>
<td>Chittenden Road Beaver Meadow</td>
<td>(N)</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>Not found, search again (though not NFS land)</td>
</tr>
<tr>
<td>Carex cryptoplepis (northeastern sedge)</td>
<td>North Pond</td>
<td>Y</td>
<td>Surrounded by it</td>
<td>N, but on pond shore that is mostly surrounded by it</td>
<td>Surrounded by montane yellow birch-red spruce forest</td>
<td>Phragmites on North Pond</td>
</tr>
<tr>
<td>Carex haydenii (cloud sedge) S4</td>
<td>Gifford Woods</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None; no longer tracked and not NFS land.</td>
</tr>
<tr>
<td>AT Ottaquechee (on easement)</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None; no longer tracked and not NFS land.</td>
<td></td>
</tr>
<tr>
<td>Carex laevivaginata (smooth sedge) S3</td>
<td>Steam Mill Brook Seeps</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td>None; consider for future RFSS</td>
</tr>
<tr>
<td>Carex michauxiana (Michaux's sedge)</td>
<td>Blue Ridge Bog</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td>None</td>
</tr>
<tr>
<td>Carex schweinitzii (Schweinitz's sedge)</td>
<td>Steam Mill Brook Seeps</td>
<td>Y/N</td>
<td>N</td>
<td>N, N/A</td>
<td>Rich fen (part)</td>
<td>Goutweed and wild chervil along road near sub-pops; Morrow honeysuckle nearby; ditch maintenance and mowing may be a threat</td>
</tr>
<tr>
<td>Ceratophyllum echinatum (prickly hornwort)</td>
<td>Kent Pond</td>
<td>(N)</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None; historical, and not NFS land.</td>
</tr>
<tr>
<td>Chimaphila maculata (spotted wintergreen) S3</td>
<td>Gifford Woods</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None &amp; not NFS land.</td>
</tr>
<tr>
<td>Cirsium muticum (swamp thistle) S3</td>
<td>Blue Ridge Fen</td>
<td>Y</td>
<td>Y/N</td>
<td>N, but in a wetland</td>
<td>Rich fen (part)</td>
<td>None &amp; no longer tracked</td>
</tr>
<tr>
<td>Clematis occidentalis ssp. occidentalis (purple clematis)</td>
<td>The Cape</td>
<td>(Y)</td>
<td>Y/N</td>
<td>Y</td>
<td>Rich northern hardwood forest, Red spruce-northern hardwood forest</td>
<td>Not found I over 20 years, search again.</td>
</tr>
<tr>
<td>Crepidomanes intricatum (weft fern) S1</td>
<td>Mt. Carmel</td>
<td>N</td>
<td>Y</td>
<td>N/A</td>
<td>Rich northern hardwood forest</td>
<td>None</td>
</tr>
<tr>
<td>Cryptogramma stelleri</td>
<td>The Cape</td>
<td>Y/N</td>
<td>Y</td>
<td>Y, N/A</td>
<td>Temperate calcareous cliff</td>
<td>None</td>
</tr>
<tr>
<td>Scientific Name, Common Name, and State Status if not RFSS</td>
<td>Site Name</td>
<td>On NFS Land</td>
<td>In Mapped Old Forest?</td>
<td>Overlap with Stands that are Unsuitable for Harvest?</td>
<td>In a State Significant Community?</td>
<td>Concerns</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>-------------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>(fragile rockbrake)</td>
<td>Fish Hatchery</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None &amp; not NFS land</td>
</tr>
<tr>
<td>Cypripedium reginae (showy lady’s-slipper)</td>
<td>The Cape</td>
<td>Y/N</td>
<td>N</td>
<td>N, but in a wetland; N/A</td>
<td>Rich fen</td>
<td>Common buckthorn needs control before it reaches this rich fen</td>
</tr>
<tr>
<td></td>
<td>Steam Mill Brook Seeps</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td>None</td>
</tr>
<tr>
<td>Eleocharis intermedia (matted spikerush)</td>
<td>The Cape</td>
<td>Y/N</td>
<td>N</td>
<td>N, but in a wetland; N/A</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>The Elbow</td>
<td>Y*</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Intermediate fen</td>
<td>Phragmites, purple loosestrife, wild parsnip in/near these wetlands</td>
</tr>
<tr>
<td>Eleocharis ovata (ovate spikerush)</td>
<td>The Elbow</td>
<td>Y*</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>No</td>
<td>Phragmites, purple loosestrife, wild parsnip in/near these wetlands</td>
</tr>
<tr>
<td></td>
<td>North Pond</td>
<td>Y</td>
<td>Surrounded by it</td>
<td>N, but on shore and surrounded by them</td>
<td>Surrounded by montane yellow birch-red spruce forest</td>
<td>Phragmites, purple loosestrife, wild parsnip in/near these wetlands</td>
</tr>
<tr>
<td></td>
<td>Dave’s Peak Marsh</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Beaver Meadow</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Elodea nuttallii (Nuttall’s waterweed) S3</td>
<td>Colton Pond</td>
<td>(N)</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None; not NFS land, not found in more than 20 years</td>
</tr>
<tr>
<td></td>
<td>Fowler Pond</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None &amp; not NFS land</td>
</tr>
<tr>
<td>Epilobium palustre (marsh willowherb)</td>
<td>The Elbow</td>
<td>Y*</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Intermediate fen</td>
<td>Phragmites, purple loosestrife, wild parsnip in/near these wetlands</td>
</tr>
<tr>
<td>Equisetum pratense (meadow horsetail) S3</td>
<td>Mt. Carmel</td>
<td>Y</td>
<td>N</td>
<td>N, but in seepage forest</td>
<td>Northern hardwood seepage forest</td>
<td>None</td>
</tr>
<tr>
<td>Eriophorum tenellum (rough cotton-grass)</td>
<td>The Elbow</td>
<td>Y*</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Dwarf shrub bog</td>
<td>None</td>
</tr>
<tr>
<td>Galium kamtschaticum</td>
<td>Farr Peak</td>
<td>Y</td>
<td>N</td>
<td>Y/N</td>
<td>Northern hardwood seepage forest</td>
<td>None</td>
</tr>
<tr>
<td>Scientific Name, Common Name, and State Status if not RFSS</td>
<td>Site Name</td>
<td>On NFS Land</td>
<td>In Mapped Old Forest?</td>
<td>Overlap with Stands that are Unsuitable for Harvest?</td>
<td>In a State Significant Community?</td>
<td>Concerns</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>-----------</td>
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<td>-----------------------------------------------------</td>
<td>---------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>(boreal bedstraw)</td>
<td>North Pond</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Montane yellow birch-red spruce forest</td>
<td>Phragmites</td>
</tr>
<tr>
<td><em>Geum lacinatum</em> (rough avens) S3 (?)</td>
<td>The Cape</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None; no longer tracked, not NFS land</td>
</tr>
<tr>
<td></td>
<td>AT Ottaquechee</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None; no longer tracked, not NFS land</td>
</tr>
<tr>
<td><em>Juglans cinerea</em> (butternut)</td>
<td>The Cape</td>
<td>(Y)</td>
<td>Y</td>
<td>Y</td>
<td>Rich northern hardwood forest</td>
<td>Not found in over 20 years; may not be there anymore</td>
</tr>
<tr>
<td><em>Luzula parviflora</em> (small-flowered rush) S2S3</td>
<td>Mt. Carmel</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>Montane yellow birch-red spruce forest</td>
<td>None</td>
</tr>
<tr>
<td><em>Muhlenbergia uniflora</em> (fall dropseed muhly) S3</td>
<td>Blue Ridge Bog</td>
<td>Y</td>
<td>Surrounded by it</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td>None</td>
</tr>
<tr>
<td><em>Ophioglossum pusillum</em> (adder’s tongue) S1</td>
<td>Sherburne Pass</td>
<td>(Y/N)</td>
<td>N</td>
<td>Y/N; N/A</td>
<td>No</td>
<td>None; not found in over 20 years</td>
</tr>
<tr>
<td><em>Panax quinquefolius</em> (American ginseng)</td>
<td>The Cape</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Rich northern hardwood forest</td>
<td>Garlic mustard is about 1 mi. away on road; also, monitor more ginseng frequently as it may be vulnerable to harvesting.</td>
</tr>
<tr>
<td></td>
<td>North Pond</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Rich northern hardwood forest</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Gifford Woods</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Rich northern hardwood forest</td>
<td>Continue to search suitable habitat</td>
</tr>
<tr>
<td></td>
<td>Townsend Brook</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>No</td>
<td>Barberry bushes previously pulled at this site; needs monitoring to be sure they are gone</td>
</tr>
<tr>
<td></td>
<td>Beaudry Brook</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>No</td>
<td>None (but missing EOR)</td>
</tr>
<tr>
<td><em>Panicum tuckermanii</em> (Tuckerman’s panic-grass) S3</td>
<td>The Elbow</td>
<td>Y*</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Mt. Carmel</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Scientific Name, Common Name, and State Status if not RFSS</td>
<td>Site Name</td>
<td>On NFS Land</td>
<td>In Mapped Old Forest?</td>
<td>Overlap with Stands that are Unsuitable for Harvest?</td>
<td>In a State Significant Community?</td>
<td>Concerns</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
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<td>-------------</td>
<td>-----------------------</td>
<td>----------------------------------------------------------</td>
<td>---------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Pinus banksiana (jack pine) SH-T, but likely planted</td>
<td>Lefferts Pond, Chittenden</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Platanthera huronensis (Huron orchid)</td>
<td>The Cape</td>
<td>N</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Woodland seep</td>
<td>None</td>
</tr>
<tr>
<td>Mt. Carmel</td>
<td>Y</td>
<td>N</td>
<td>N, but in a seepage forest</td>
<td></td>
<td>Northern hardwood seepage forest</td>
<td>Identity needs confirmation, surrounding area should be searched</td>
</tr>
<tr>
<td>Pogonia ophioglossoides (rose pogonia) S3</td>
<td>Lefferts Pond</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Poor fen</td>
<td>None</td>
</tr>
<tr>
<td>Blue Ridge Bog</td>
<td>Y</td>
<td>Surrounded by it</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Potamogeton obtusifolius (blunt-leaf pondweed) S3</td>
<td>The Elbow</td>
<td>Y*</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Lefferts Pond</td>
<td>(Y)</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Ranunculus pensylvanicus (Pennsylvania buttercup or bristly crowfoot)</td>
<td>The Cape</td>
<td>Y/N</td>
<td>N</td>
<td>N, but in a wetland; N/A</td>
<td>No</td>
<td>Garlic mustard on FR 403; Morrow honeysuckle at 4 corners, neither on NFS land; infestations are 1 and 2 miles away, respectively</td>
</tr>
<tr>
<td>Ranunculus sceleratus var. sceleratus (cursed crowfoot) S3</td>
<td>The Cape</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Salix candida (hoary willow)</td>
<td>Steam Mill Brook Seeps</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Red spruce cinnamon fern swamp, Rich fen</td>
<td>None</td>
</tr>
<tr>
<td>Solidago patula (roundleaf goldenrod)</td>
<td>Steam Mill Brook Seeps</td>
<td>Y</td>
<td>N</td>
<td>N, but in a wetland</td>
<td>Rich fen</td>
<td>Identity needs confirmation; goutweed on Furnace Brook Rd. is mentioned as a concern, not sure of location</td>
</tr>
<tr>
<td>Spiranthes lucida (shining ladies’-tresses) S3</td>
<td>Chittenden Reservoir</td>
<td>Y</td>
<td>N</td>
<td>N, but on a shore</td>
<td>No</td>
<td>Many adjacent NNIP (Phragmites, Morrow honeysuckle, purple)</td>
</tr>
</tbody>
</table>
Appendix A-2 provides a summary of rare plant species, their populations, and whether they occur on or off NFS land, in preliminarily mapped old forest, or state significant communities.

### Appendix A-2. Summary of rare plant species within the Telephone Gap IRP project area.

<table>
<thead>
<tr>
<th>Scientific Name, Common Name, and State Status if not RFSS</th>
<th>Site Name</th>
<th>On NFS Land</th>
<th>In Mapped Old Forest?</th>
<th>Overlap with Stands that are Unsuitable for Harvest?</th>
<th>In a State Significant Community?</th>
<th>Concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td>(needs confirmation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stellaria alpine (bog chickweed)</td>
<td>The Cape</td>
<td>N</td>
<td>N</td>
<td>N/A</td>
<td>Woodland seep</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Steam Mill Brook Seeps</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>No</td>
<td>Wild chervil needs control</td>
</tr>
<tr>
<td></td>
<td>Upper half, Furnace Brook Road</td>
<td>?</td>
<td>?</td>
<td>? ( unmapped)</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Symphyotrichum prenanthoides (crooked-stem aster)</td>
<td>East of Chittenden Reservoir</td>
<td>?</td>
<td>?</td>
<td>? ( unmapped)</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Mt. Carmel</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>New Boston</td>
<td>Y</td>
<td>Y/N</td>
<td>N</td>
<td>Rich northern hardwood forest</td>
<td>Potential use of trail for skid trail, use and maintenance of trail or vehicle turnaround – all potentially result in trampling, though potentially tolerates/benefits from disturbance?</td>
</tr>
<tr>
<td>Utricularia geminiscapa (hidden-fruited bladderwort) S3</td>
<td>Lefferts</td>
<td>(Y)</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Utricularia minor (mapped as U. gibba, but is a misidentification (lesser bladderwort) S3</td>
<td>Lefferts</td>
<td>Y</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Dave's Peak Marsh</td>
<td>Y</td>
<td>N</td>
<td>N/A</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>

1 N/A = not applicable because aquatic or not on NFS land.
<table>
<thead>
<tr>
<th>Rare Plants Status</th>
<th>Total</th>
<th>On NFS Land</th>
<th>In Mapped Old Forest?</th>
<th>In State Significant Community?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rare plants that are RFSS</td>
<td>27</td>
<td>23</td>
<td>7 &amp; 2 surrounded by it &amp; 2 unknown</td>
<td>18 &amp; 2 unknown &amp; 2 surrounded by it</td>
</tr>
<tr>
<td>RFSS populations</td>
<td>45</td>
<td>42 &amp; 2 unknown</td>
<td>9 &amp; 2 surrounded by it &amp; 2 unknown</td>
<td>29 &amp; 2 unknown &amp; 2 surrounded by it</td>
</tr>
<tr>
<td>Rare plant species no longer tracked by state</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Rare plant populations no longer tracked by state</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>