

# **Town of Cumberland Forest Management Plan**



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## **Town of Cumberland Forest Management Goals**

Below is a list of forest management goals set forth by the Rines Forest Committee. These guideposts should be consulted during any decision making process for the Forest.

- Influence forest stands to enhance habitat to the extent that is possible by maintaining and expanding mature portions of the forest while adding balance by creating some early successional habitat in small forest openings.
- Protect biological features and functionality intrinsic to the Rines Forest (i.e. riparian zones and wetlands, forest structure, etc.).
- Manage and realistically maximize the biological diversity using the focus species forestry approach.
- Make every reasonable effort to control invasive plant species on the Rines Forest while reaching out to adjacent landowners to encourage the same.
- Implement exemplary forest management that is certified to the highest globally accepted standard, Forest Stewardship Council (FSC). See Appendix 10, page 76 for further information about FSC certification.
- Manage the Rines Forest as a model of a well managed forest.
- Strive to keep forest management activities revenue neutral over the long run.

## **Plan Methodology**

The following pages contain the detailed stand descriptions, silvicultural recommendations and rationale for each forest stand as depicted on the forest type map. These pages represent my conclusions and are based on significant thoughtful analysis. The details of some of this analysis can be found in the body of the plan as well as in the appendix to this plan and include:

- Forest typing including GPS'd stand boundaries, see map section, page 21.
- A more detailed definition/ discussion of the silvicultural methods prescribed for the Rines Forest, see Definitions on page 26.
- Exploration of the history, origins and past treatments conducted on the Rines Forest, see Appendix 1, page 29.
- Analysis of the current soils found on the forest including discussion of the most relevant types, their influence on productivity and species composition and operability, see Appendix 2, page 30.
- Details of the resource inventory cruise, see Appendix 3, page 34.
- A copy of the site review prepared by the Maine Natural Areas Program (MNAP), see Appendix 4, page 35.
- Synthesis of the most critical and readily applied management concepts for enhancing biodiversity in the forests of Maine, adapted from: Biodiversity in the Forests of Maine: Guidelines for Land Management (Flatebo, Foss & Pelletier, 1999), see Appendix 5, page 39.
- An Integrated Pest Management (IPM) plan for control of Buckthorn, and other invasive species found on the forest, see Appendix 6, page 47.
- A review of some of the more relevant forestry regulations concerning timber harvesting in the State of Maine, see Appendix 8, page 51.
- An application of Focus Species Forestry, including examination of the 2,000 acre zone that surrounds the Forest, see Appendix 9, page 54.

## Stand Descriptions, Silvicultural Objectives and Recommendations

Table 1. 2010 Treatment Schedule					
Stand	Type	Description	Acres	Next Treatment	Approximate % Removal
1	RP4A	Red Pine Plantation	48	2nd Entry, Long Shelterwood Grow	30-40%
1	RP4B	Red Pine Plantation	24		
2	WP4A	Mature White Pine	20	1st Entry, Long Shelterwood Grow Grow	20-30%
2	WP4A	Mature White Pine	20		
2	WP4A	Mature White Pine	5		
3	WP4C/H3B	2 Aged Mixedwood	25	Selection Grow	25%
3	WP4C/H3B	2 Aged Mixedwood	25		
4	EH4A	Hemlock	15	Grow	NA
4	EH4A	Hemlock	20	Reserve	
5	SH4C/HS2C	2 Aged Mixedwood	20	Grow	
6	WP4B	White Pine, B Density	11	Grow	
6	WP4B	White Pine, B Density	5	Grow	

**\*\*Tables for proposed 2020 and 2025 – 2030 treatments appear in the appendix**

### Objectives of Initial Entry

- Given that much of the forest is in a mature condition, take measures that create some early successional habitat, in small forest openings, while fostering the continued development of the mature portions of the Forest.
- Look for opportunities to foster any inclusions of classic northern hardwood patches. Create opportunities to initiate new hardwood stands to balance the proportion of softwood found on the Forest.
- Generate revenue sufficient to cover the cost of management planning and implementing the first phase of Buckthorn as outlined in the Integrated Pest Management plan (IPM).
- Establish access points and landings for long term management

### **Stand 1, RP4A and RP4B**

The current collection of stands is dominated by planted red pine (*Pinus resinosa*). Originally a much larger area of pasture was reverted back to a forested condition. Due mostly to variations in soil types and hydrology, small pockets of the plantation did not survive and regenerated naturally. The naturally regenerated species include Eastern white pine (*Pinus strobus*) and northern red oak (*Quercus rubra*). Basal areas in this stand average 127 ft<sup>2</sup> per acre. In general, this stand is comprised of larger diameter (12" dbh on average) stems with about 255 trees per acre. Most of the poorly formed trees were addressed during previous entries or had succumbed and fallen out of the stand. With that said there still represents a dichotomy in the overstory; well formed, larger diameter trees, and smaller, lower vigor individuals. This second group should be targeted for removal at this time.

The regeneration in this stand is mixedwood in nature with a good representation of eastern white pine, some red pine and balsam fir (*Abies balsamea*), with red oak and American beech (*Fagus grandifolia*) making up the hardwood component. There is also a significant and expanding population of buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*Frangula alnus*). Where regeneration is free from buckthorn it is vigorous, where buckthorn is abundant little or no regeneration exists.

**Recommended action:** 2<sup>nd</sup> entry of a long shelterwood on A density stands

**Timeframe:** 2010

**Rational:** Regenerate natural stands

**Goals of treatment:**

- Create early successional habitat for:
  - Eastern Towhee
  - Chestnut-sided warbler
- Capture potential mortality
- Initiate a new, naturally regenerated, cohort of trees
- Where such regeneration already exists, foster it's development
- Retain mast producing species like red and white oak as well as American beech
- Provide mechanical control of Buckthorn (see IPM plan for Buckthorn control, Appendix 6, page 47)

Based on much discussion from the Rines Forest Committee, and sound silvicultural and ecological criteria, I recommend that the A density portion of this area be treated at this time. Given the interest in creating some early successional, I recommend that this stand be managed under an even-aged model, employing a shelterwood method. This next entry would be the second entry of a long shelterwood (modified) and can be implemented in either a uniform (individuals removed across the entire stand) or a patch (small groups up to an acre in size) design.

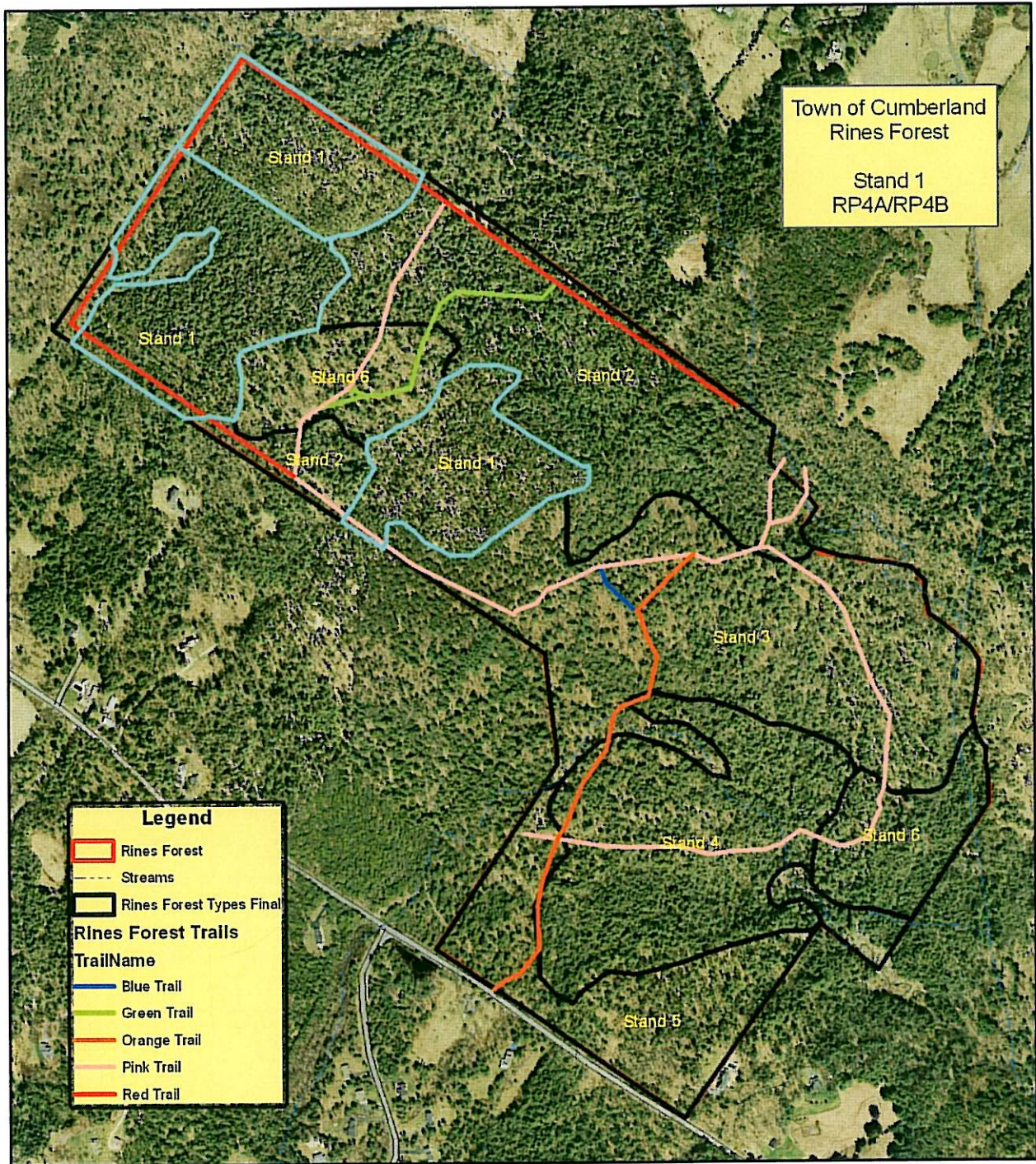
If a patch method is chosen, opt to center patches in areas where advance regeneration exists. The idea here is to remove about 30% of the current stand volume. A traditional second entry would remove about half of the volume and I believe this is too intense a treatment.

This entry should happen as soon as is practical and should be coordinated with the plan to control buckthorn where the timing is of paramount importance. Typically, where recreation is important to a landowner, I recommend that activity be scheduled so as to not interfere with such activities. Given the near year round use of the property, it will be difficult to avoid some interface. However, a winter harvest will minimize ground disturbance and this should trump any conflict with recreational use of the property.

Also please note, and this goes for all treatment recommendations in all stands, that the not every acre in this stand needs nor should receive treatment. The prescription is more outcome based focusing on the stated goals for the stand. That is why it is imperative that the stand be marked by a careful practitioner and the harvest be carefully supervised.

The B-density portion of this stand should be allowed to grow for 10 more years and then receive a similar treatment.





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**Stand 2, WP4A (two separate blocks, c. 40 acres north, and 5 acres south)**

This stand is characterized by large diameter, mature white pine and hemlock, with scattered inclusions of planted red pine. The average diameter exceeds 14" dbh across this expansive stand. Additional overstory components include species like red oak and a mixture of northern hardwoods like yellow birch (*Betula Alleghaniensis*), red maple (*Acer rubrum*) and American beech. However, all these secondary components do not exceed 25% of the composition and that is the reason for the pure pine designation. In general, this stand is fully stocked averaging 152 ft<sup>2</sup> per acre with about 250 trees per acre. However, individual pockets far exceed this average stocking.

The understory is somewhat patchy and in general has a composition similar to that of the overstory. As you would expect, where the density is higher regeneration is scarce with the exception of a few scattered shade tolerant hemlocks. Where more light has been allowed to reach the forest floor, more advance regeneration is present but is still suppressed. Because of this deprived condition, it is unlikely that this cohort will make up the next generation of trees. There are also scattered sections where the regenerating understory is composed of shade tolerant hardwoods like American beech, red and white oak, and balsam fir. None of this is of significant consequence as we are not at a point where it is critical to be regenerating the stand. At this point the objective is to tend the stand.

**Recommended action:** 1<sup>st</sup> entry of a long shelterwood on c. 50% of the stand area

**Timeframe:** 2010

**Rational:** Tend high volume portions, choose and retain crop trees

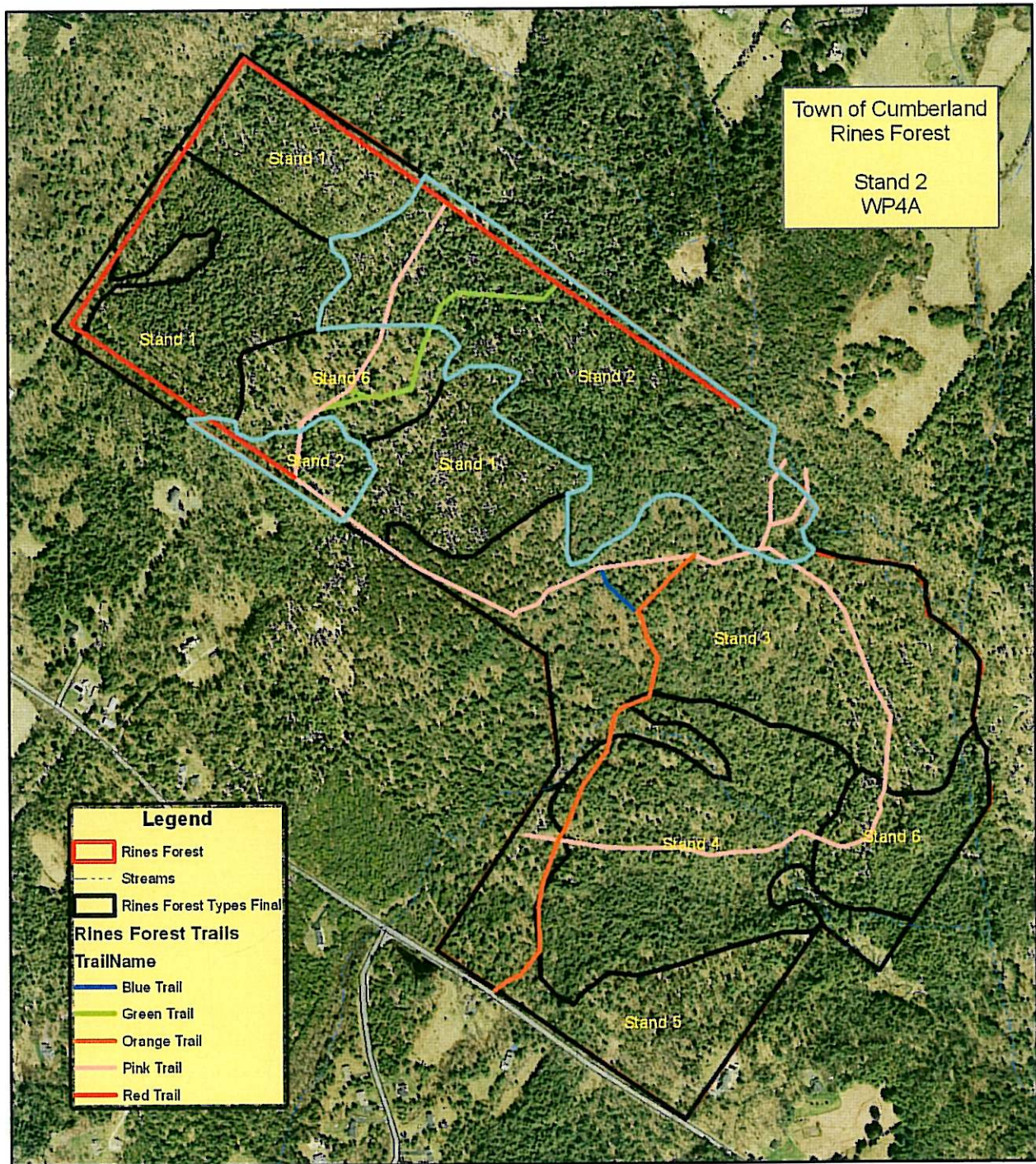
**Goals of treatment:**

- Allow much of the stand to mature fostering habitat for our focus species:
  - Pileated woodpecker
  - Barred Owl
  - Wood Thrush
  - Pine Warbler
  - Redback Salamander
- Capture potential mortality
- Tend the stand, concentrating site resources on most ecologically and economically valuable trees
- Foster and expand hardwood inclusions. Retain:
  - Red and white oak (*Quercus alba*)
  - Sugar maple (*Acer saccharum*)
  - Yellow birch
  - Healthy beech
- Foster and expand mature pockets of hemlock

- Thin red pine pockets to a density that is more consistent with natural mixed softwood stands. Note: *natural* stands of red and white pine are ranked as S3, or Rare in Maine (20-100 occurrences) by MNAP.

Given the interest in eventually creating early successional habitat in this stand, I recommend that this stand be managed under an even-aged model, employing a shelterwood method. Note that this entry is not designed to initiate a new cohort of trees, but is designed to tend the stand. So the early successional habitat creation in this stand will commence during the next entry, the 2<sup>nd</sup> entry of a long shelterwood. This current entry should cover about half of the stand. The balance should be allowed to grow for 10 – 20 years, unless monitoring of the stand discovers a reason to treat earlier. The decision regarding which 50% should be based on current conditions. The idea is to treat areas that were not treated during the last entry. So which 25 acres will be up to the forester who marks the stand. One factor to keep in mind is that it may make sense to “attach” the uncut portion to the riparian zone and the portion of the neighboring stand that is scheduled to grow during this entry as well.





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### **Stand 3 WP4C/H3B**

This stand is at least a two aged stand with pockets that are developing a third age class. It represents a significant portion of the forest and is well poised for active, but low intensity forestry. As the typing suggests, the primary overstory component is relative well spaced large diameter white pine. However it is not uncommon to see small assemblages of eastern hemlock (*Tsuga canadensis*) or even red oak. In general this component is comprised of well formed individuals, which is not unexpected given the careful and disciplined tending it has received in the past. The second age class is predominantly shade tolerant hardwoods, similarly well spaced and of favorable composition. It is curious that only a small fraction of this second age class is softwood given it's abundance in the overstory. This would lead one to conclude that this is truly a hardwood site and that the softwood in the overstory arose as a result of past agricultural practices. However, the soils analysis (see appendix 2, page 30 ) for this area suggests other wise. One remaining explanation is that the previous silvicultural treatments did not allow sufficient light to reach to forest floor to regenerate the less shade tolerant eastern white pine. This fact should be considered when applying the prescribed treatment. Basically, make certain that we create at least some patches large enough to regenerate white pine. It would be a shame to lose this component altogether.

When taken as an aggregate, this stand boasts the highest average basal area on the property at 167 ft<sup>2</sup> per acre with trees per acre in excess of 300. Further the majority of the stems are fairly well formed and average about 17" dbh. This is likely the result of careful, disciplined previous entries.

**Recommended action:** Selection entry (single tree and groups) c. 50% of the stand

**Timeframe:** 2010 or 2011

**Rational:** Shift to uneven aged management

**Goals of treatment:**

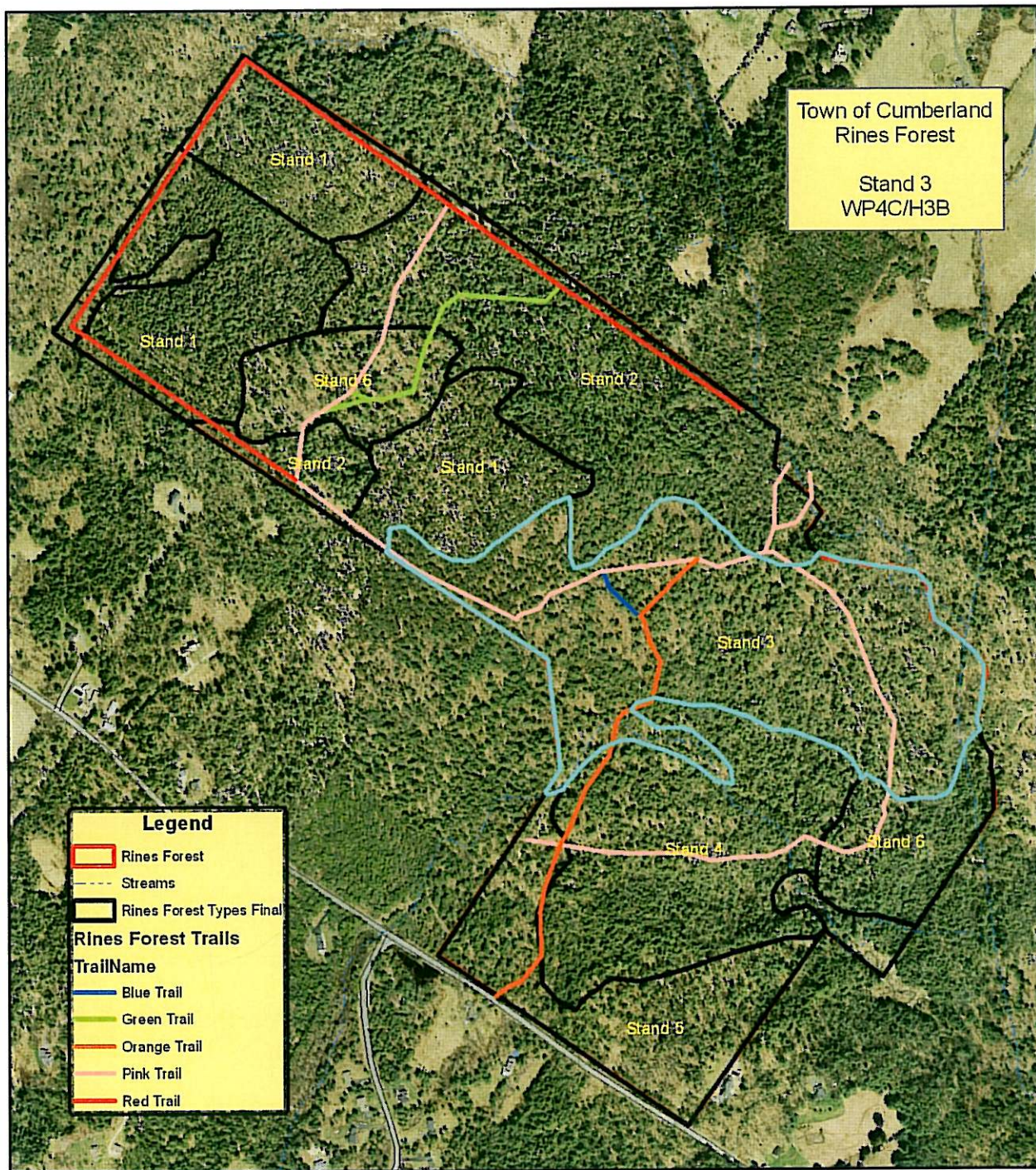
- Initiate new age class
- Tend the intermediate size/age classes, by capturing potential mortality
- Retain mature condition in perpetuity

This stand marks the separation point between that portion of the forest that is to be managed under an even-aged system and that which is to be more lightly tended under an uneven aged method. This will allow for a buffer around the Rines Reserve area where a more diffuse treatment will be applied. The mature condition we find today will be maintained and enhanced with harvest treatments and intervals that more closely mimic natural disturbance.



With that said, this stand should be encouraged to develop multiple age classes and be managed under an uneven aged management system. A selection harvest, both single tree and groups (here we are talking about  $\frac{1}{4}$  acre patches or smaller) are appropriate for portions of this stand at this time. This treatment should be applied to about 50% of the area focusing on areas not treated during the last entry and opportunities to either release well formed sapling cohorts or create new classes. In the oak and white pine dominated portions of the stand, a light single tree approach will likely result in a significant change in species composition. So keep in mind the desire to regenerate these species and other desirable yet less shade tolerant species.





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#### **Stand 4, EH4A**

This stand is comprised of a nearly pure core of eastern hemlock and mixes with other softwoods and hardwoods as it fans out from the center. The basal area ranges from 150 ft<sup>2</sup> to over 200 ft<sup>2</sup> near the brook. The hemlock portion is composed of predominantly eastern hemlock in the 12 to 14" (dbh) range. There is a scattering of dominant red oak with the hemlock, and a minor component of other northern hardwoods like red maple, yellow birch and white birch mostly in the intermediate and suppressed crown positions. These tend to be smaller diameter and poorly formed. The understory is absent at the center where the nearly complete crown closure precludes light from reaching the soil. As you approach the edges where light from the last entry makes it's way to the forest floor, a sapling component composed of mostly hardwood exists.

Within this stand are some significant riparian features that warrant special attention leading to my recommendation that this area contain the Rines Forest Reserve, or at least part of it.

This stand should be treated in two ways. A portion should be placed in a Reserve and the balance of this stand should be allowed to grow. This second portion will be considered for a selection entry in 2020.

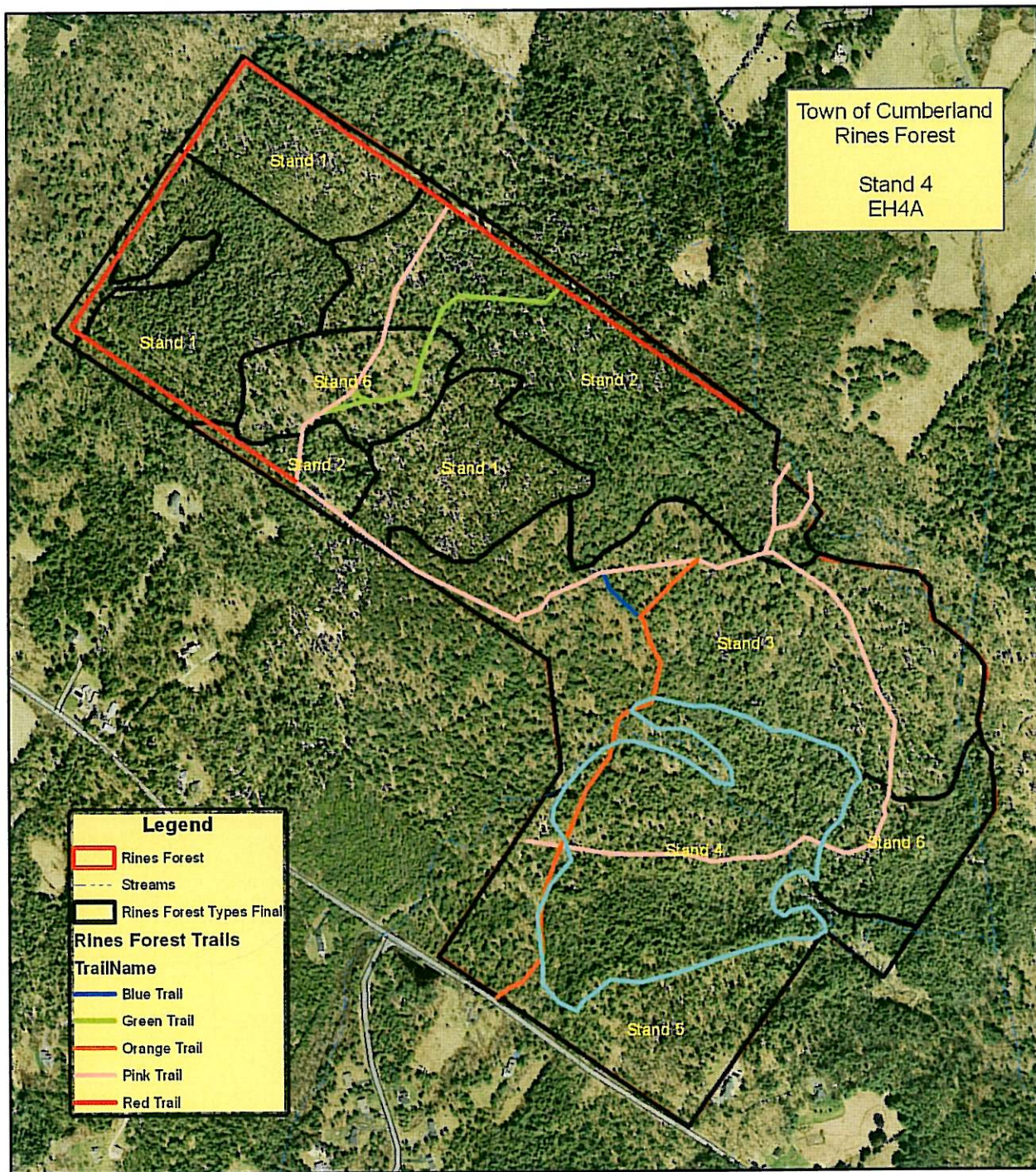
**Recommended action:** Reserve 20-40+ acres, Grow balance

**Rational:** Allow mature hemlock to approach late successional conditions while buffering the reserve with an area that maintains a mature condition.

**Goals of treatment:**

- Expand, maintain and foster habitat for:
  - Fisher
  - Pileated woodpecker
  - Barred Owl
  - Wood Thrush
  - Redback salamander





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### **Stand 5, SH4C/HS2C**

This area is similar to Stand 4 in that it is at least two aged. The reason it is being treated separately here is that it has a lower stocking level and was either entered more recently or more volume was removed during the previous entry if they were in fact conducted simultaneously. The average basal area ranges from 90 ft<sup>2</sup> to 135 ft<sup>2</sup> and the average diameters are in the 9 to 12" (dbh) range. In contrast to Stand 4, the overstory composition here includes to a greater degree, eastern hemlock as well as red spruce (individuals) and balsam fir, and therefore the mixedwood designation SH (more softwood than hardwood). A further contrast is that the second cohort contains more softwood, and that both age classes are less well stocked.

There are some small pockets present in this stand that contain very large diameter hemlock and white pine with a very advanced large sapling cohort that is mostly hardwood. This section of the forest has not been treated for many years yet still does not warrant an entry at this time and is grouped into this stand for that reason.

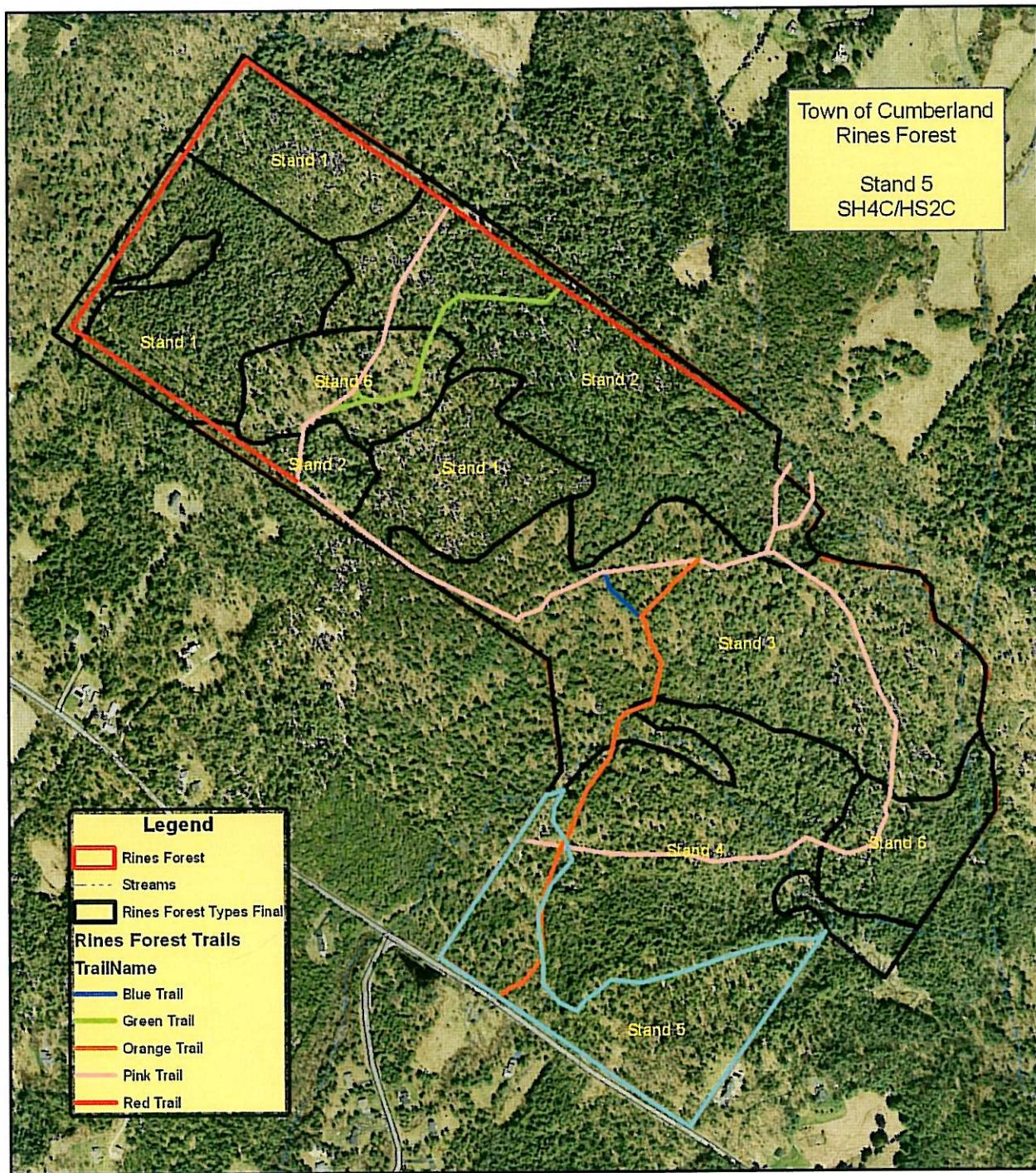
**Recommended action:** Grow

**Rational:** Allow stand to recover and mature from last treatment

**Goals of treatment:**

- Increase stocking level allowing stand to mature
- Balance the forest in terms of treatment timing
- "Buffer" the Reserve area







**Stand 6, WP4B (two separate blocks, c. 11 acres west, and c. 10 acres east)**

These two blocks are composed of B density eastern white pine and were harvested during the last entry. The overstory is composed of relatively well formed sawlog sized white pine. The stocking here is a bit lighter than we see on the balance of the property running at an average basal area of about 110 ft<sup>2</sup> per acre with an average of 300 trees per acre and a mean diameter of approximately 14" DBH.

Despite the near uniform overstory of white pine, the understory is nearly all hardwood. The last harvest entry was likely both low intensity and conducted in the winter. The resulting low light penetrating the residual canopy and the lack of soil scarification led to the lack of pine regeneration. If subsequent entries are designed to regenerate white pine (and oak), both of these conditions must be reversed. However, given the lower density of this stand it is likely prudent to forestall any treatment at this time.

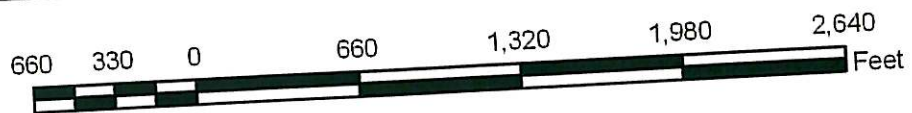
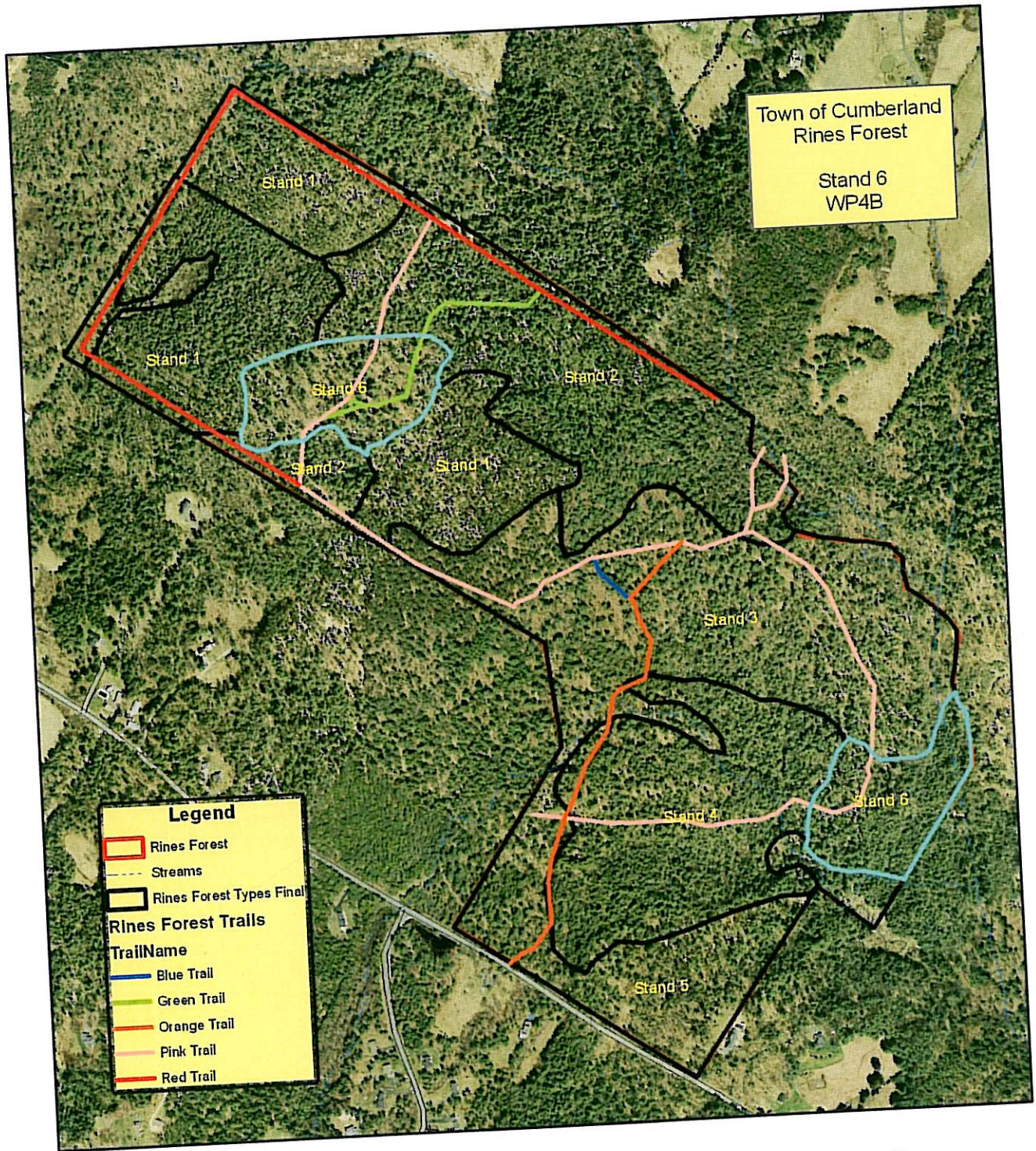
**Recommended action:** Grow

**Rational:** Allow stand to recover and mature from last treatment

**Goals of treatment:**

- Increase stocking level
- Balance the forest in terms of treatment timing
- "Buffer" the Reserve area





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## **Rines Forest Reserve Area**

The concept for the Rines Forest Reserve is to designate an area that would remain free from treatments into perpetuity. This area should be centered on some biologically important features and range in size between 20 and 40+ acres. As outlined in the description for stand 4 above, a significant portion of this reserve will be located in stand 4. This portion of the forest is comprised of nearly mature trees and encompasses two very important riparian zones. The first is a major stream leaves a culvert under Range road and leads into this area eventually emptying into a forested wetland near the corner of the property. This wetland expands as it exits the Rines forest into a larger wetland before draining back into Mill Brook. The second is the riparian that crosses Range road to the south west and eventually feeds the large protected vernal pool on the southern side of the road.

This Reserve area should contain the entire portion of the nearly pure hemlock stand, the forested wetland to the north, and the riparian corridor leading from Range Road (see map for recommended layout). The Reserve will be further expanded to include the steep slopes and the stream zones that run north and west of the Reserve.

### **Recommended action:** Preserve

**Rational:** This portion of the State lacks forest blocks of this size that are allowed to grow and mature undisturbed.

### **Goals of treatment:**

- Develop late successional conditions in this nucleus
- Expand, maintain and foster habitat for:
  - Fisher
  - Pileated woodpecker
  - Barred Owl
  - Wood Thrush
  - Redback salamander