

Otsego County Forest #9

George L. Bockes Memorial Forest

Forest Management Plan



Daniel Zimmerman
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Introduction

Forest Management is a comprehensive science that allows for the maintenance of ecosystem health, sustainable growth and harvest of forest products, administration, aesthetics, and resource protection. Otsego County is dedicated to applying the principles of Silviculture to balance timber harvesting and forest growth to ensure the future viability of our forests. Otsego County forests are a public resource that is managed for timber production, outdoor recreation, wildlife, water, and natural resource conservation. By taking this multipurpose management approach we will be able to benefit the natural resources on county land and give residents the opportunity to enjoy their public land.

Forester Biography

Dan Zimmerman's experience revolves around procurement and consulting Forestry having worked extensively with landowners, timber harvesters, Foresters both public and private, trucking and construction firms, and the forest industry with over 35 years of experience. Presently, chapter chair of The New York Forest Owners Association's Central New York Chapter and past chapter chair of the Society of American Foresters Iroquois Chapter. Dan's education: Graduate of Morrisville State College, SUNY Polytechnic Institute, the University of Phoenix and Leadership Mohawk Valley.

Property Attributes

Otsego County Forest #9 is essentially a 190 acre +- forest located on Stevens Road in the Town of Hartwick, Otsego County. Public parking is on Stevens Road with a designated parking area. The main access point is a forest access road located on the east side of Stevens Road that leads to an old logging landing area. This is the main access point to the majority acreage of Otsego #9. Bockes forest also offers two ponds that could be developed further for public recreation: pond #1 located bordering Stevens Road on the West, and Pond #2 located to the east and south of Stevens road. Pond #2 offers a beaver dam and wildlife but requires further access development for public usage.

Property Attributes Continued

Several large Otsego #9 forest stands have been recommended within this plan for reforestation. Significant acreage has not seeded into commercially important forest stands after clear cutting twenty or more years ago. Natural seeding has failed due to Whitetailed deer impacts, poor seeding years, and native golden rod and other herbaceous plant occupation of the growing site. These areas require the establishment of new plantations or forest stands. Additionally, several stands contain significant amounts of White Ash that is now threatened by the Emerald Ash Borer. These stands should be harvested as soon as possible. A property survey is recommended, please see property lines.

Location Map

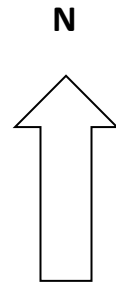
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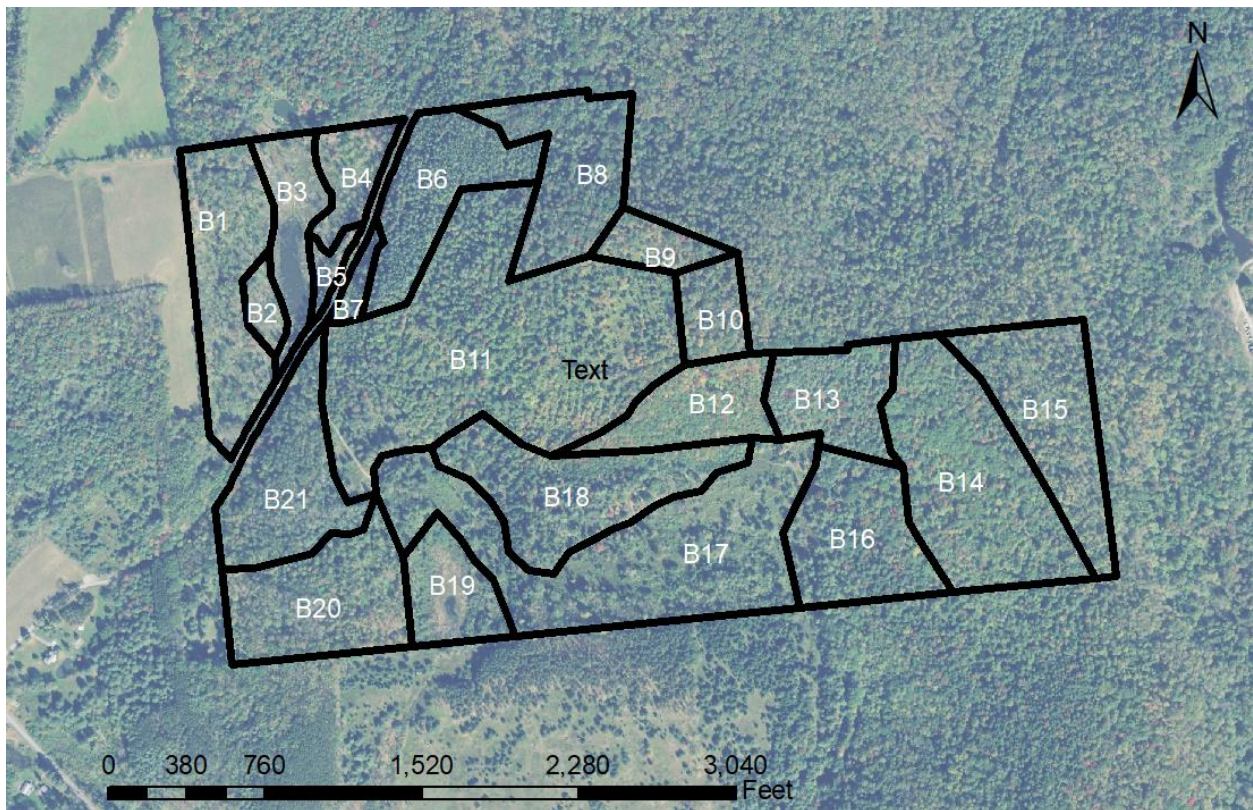
Town of Hartwick, Otsego County, NY.



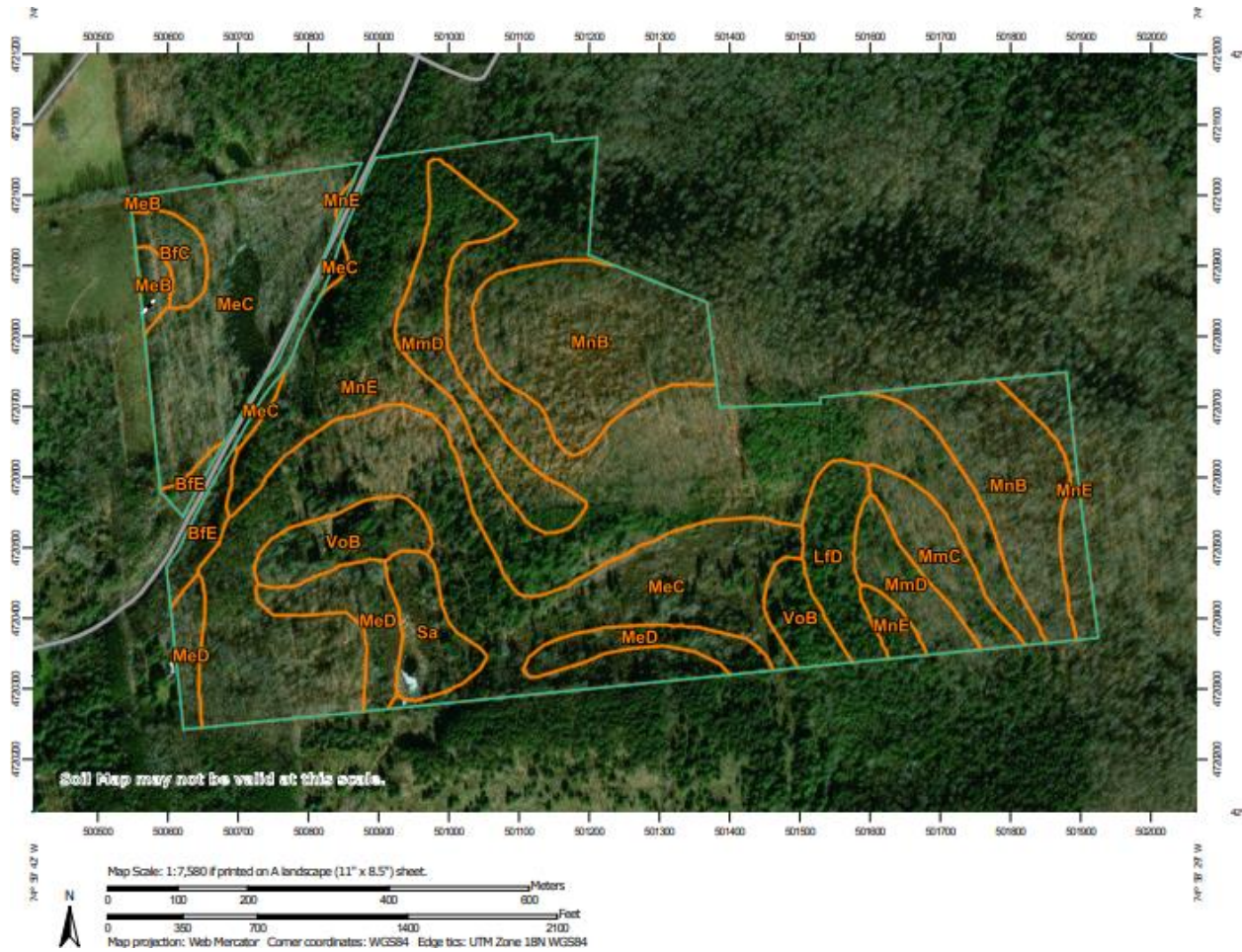
Overview Map
Otsego #9
Town of Hartwick, Otsego County, NY.



Otsego #9
George Bockes Memorial Forest
Forest Stand Map
Tax Parcel # 162.00-1-24.00



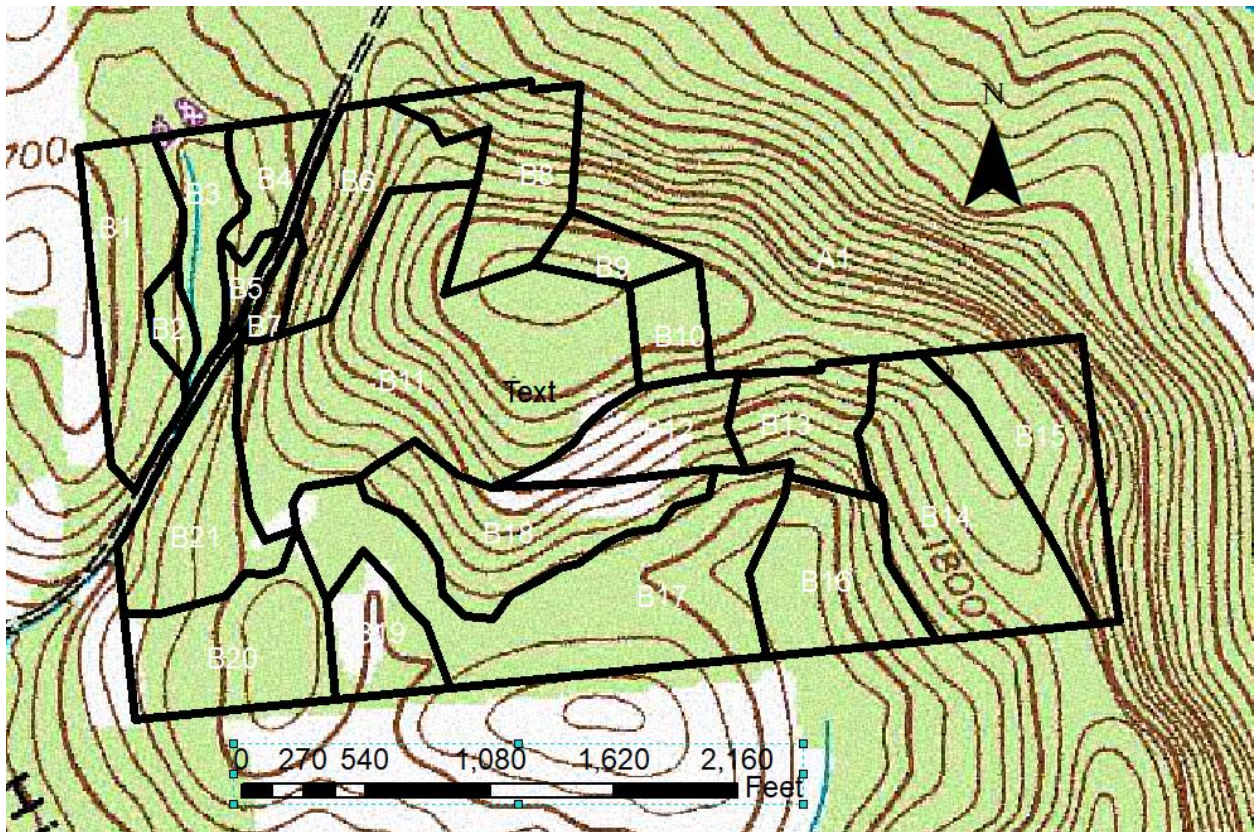
USGS Soils Map Otsego Forest #9



USGS Soils Legend Otsego #9, Bockes Forest

Map Unit Symbol	Map Unit Name
BfC	Bath channery silt loam, 8 to 15 percent slopes Well drained
BfE	Bath channery silt loam, 25 to 45 percent slopes Well drained
LfD	Lewbath channery silt loam, 15 to 25 percent slopes Well drained
MeB	Mardin channery silt loam, 3 to 8 percent slopes Moderately Well drained
MeC	Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained
MeD	Mardin channery silt loam, 15 to 25 percent slopes Moderately well drained
MmC	Mongaup-Franklinville complex, 8 to 15 percent slopes Well drained
MmD	Mongaup-Franklinville complex, 15 to 25 percent slopes Well drained
MnB	Mongaup-Hawksnest complex, 1 to 8 percent slopes, rocky Well drained
MnE	Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained
Sa	Saprists and Aquents, inundated Very poorly drained
VoB	Volusia silt loam, 3 to 8 percent slopes Somewhat poorly drained

Topographic Map
George Bockes Memorial Forest
Otsego #9



Desired Future Conditions

The overall future condition of this property should focus on the continuous production of high quality forest products from commercially important softwood and hardwood species. Substantial amount of merchantable high quality and low value hardwood and softwood is present in this parcel in varying degrees of density in many of the forest stands. It is envisioned that a harvesting program be instituted for the whole parcel, especially targeting stands containing White Ash. Control of interfering vegetation: mainly golden rod and striped maple to be instituted prior to commencement of harvesting. Significant reforestation is recommended in past clear cut stands to get these acreages producing forest products again. Future end state would be: completed harvesting for the parcel as a whole, on a twenty year rotation before any additional substantial forest management activities. Encouraging and promoting biodiversity helps overall forest and ecosystem health. Resiliency of the forest through diversity is another future benefit in the face of possible threats from invasive species, native pathogens, and possible climate change. It is envisioned a future forest with three or more succession stages of forest stands.

Goals and Objectives

Forest Inventory

Complete a comprehensive inventory of the twenty one forest stands. Inventory was completed November 2021 that included assessment of commercially important timber species, acceptable growing stock (AGS), and also low grade or pulpwood that also includes interfering vegetation.

Problem identification

Results of the inventory, together with observations of the Forester on any threats or impediments that would mitigate the overall effort to achieve the desired future condition of the parcel or stand. The “Keep Forests Healthy” scorecard by The Nature Conservancy, Cornell Cooperative Extension of Onondaga County will be implemented also.

Trail Maintenance

There is a good set of skid roads on the property that are partly in good condition and some that are wet and rutted. A goal would be to continue the present condition or upgrade where needed and maybe mark possible hiking trails. Overall access is attained through Stevens Road, a town seasonally maintained road.

Recommendations

Prescriptions on individual forest stand to be outlined and aligned with future desired conditions. Recommendations to include implementation and alignment with the desired future forest condition. Prescriptions will include considerations for basal area and trees per acre (TPA), volume (board feet and cords), Acceptable Growing Stock (A.G.S.), pulpwood, but also for species, vigor, invasive species, wildlife, ecology, and Forester experience.

Inventory Methodology

Forest inventory was conducted on the twenty one forest stands that compromise Otsego County Forest #9. Forest Stands were constructed based on species composition, basal area, forest cover type, geological considerations, and past cutting history. Each stand was inventoried by using variable plot radius data points with a 10 Basal Area Factor (BAF) wedge prism. Trees that fall into each data plot was measured for Diameter at Breast Height (DBH) with a Biltmore stick and their height will be determined by the judgment of the Forester. Species of every tree in the data plot will also be recorded. Recorded data will be averaged throughout the stand to determine the stand's basal area, trees per acre, species composition, product classification, and overall health. Each stand will have a different number of data plots based on their area measured in acres. The chart used to determine the number of data plots for each stand can be seen in Table 1.

Table 1 Ratio chart of plots in a stand

Acres	# Of Plots
0-4	3
5-7	4
7-10	5
10-15	7
15-25	10
26-30	14
31-40+	15

#9 George Bockes Memorial Forest
Plots/stand acreage

Stand	acres	# Plots
B1	10.6	5
B2	1.5	3
B3	5.15	4
B4	3.6	3
B5	1.05	3
B6	8.5	5
B7	1.3	3

B8	9.3	5
B9	2.7	3
B10	3.4	3
B11	34	15
B12	6.2	4
B13	6.5	4
B14	16.5	10
B15	10.6	7

B16	9.6	5
B17	23	10
B18	12.2	7
B19	5	4
B20	10.7	7
B21	9.6	5

Property Lines Otsego #9
Tax Parcel # 162.00-1-24.00
George Bockes Memorial Forest

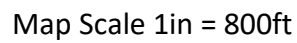
Parcel Lines east of Stevens Road.

Most northerly parcel line(s) and corners were found with blue blazed county markers with the exception of the most easterly portion of the northerly line with Fred Dilorenzo. A portion of the line has no blue county blazes that were discernible upon field inspection. Corner stake was found containing caps with the following information: Austin Surveying with the following numbers: 49327 indicating that a licensed land surveyor had surveyed the line. In addition, old blue flagging was found along portions of the line but was very hard to distinguish. The corner with Dilorenzo, Blue Spruce Mountain LLC, and Otsego was not found (difficult terrain: steep, old logging debris and hardwood blow down present).

Most southerly property line consists of very infrequent (considerable distances of 40 to 50 yards) identifiable county blue blazes that were present until reaching common line with Goey Staits LLC where said blue blazes were not found. This portion with Goey has three corners that were found containing stakes with caps with the following information: Sprague Surveying LS 00340 or LS57340 (hard to read). In addition the Goey/Otsego common line has been rib boned out with red/orange flagging that connects all three corners. In addition Goey's timber has been marked with blue paint as seen from the common property line. It is surmised that Goey will be conducting a timber sale and hired a surveyor (Sprague) for the property line. These two rib boned lines follow land glide's hand held field property line locations but no Blue County Blazes.

Property lines to the west of Stevens Road: These lines were also infrequently marked with county blue blazes also. On the common line of Otsego and James Ross, an earthen dam exists that was constructed a while ago that appears to be all or in part on county property or on the line. This would require the appropriate surveying equipment to more accurately ascertain. The southerly corner stake bordering Stevens's road was not found but the approximate location was rib boned.

N



Forest Stand B1

10.6 acres more or less are found within this stand. Primary soil type in stand B1 is Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained with Mongaup-Hawksnest complex, 1 to 8 percent slopes, rocky Well drained, Bath channery silt loam, 8 to 15 percent slopes Well drained, and Mardin channery silt loam, 3 to 8 percent slopes Moderately Well drained; all making up a much smaller percent of total soil/stand area. B1 is located west of Stevens Road and is most north westerly stand of Otsego #9, bordering private agricultural land. This forest stand is an old clear cut Red Pine plantation. The most northerly two or three acres are a northern hardwood stand.

Forest Diversity and Composition

Species diversity is low with White Ash occupying the majority of commercial tree basal area (38.81 square feet), commercial trees per acre (27.76) and 5379 board feet). The other four commercial tree species sampled occupy 9.94 square feet, 20.53 trees per acre, and 1411 board feet. Species suitability to the growing site is average. General tree health is questionable with the White Ash. These trees grew scattered within the Red Pine plantation and were left as residuals. The growth patterns are mostly poor with little growth occurring and misshapen crowns a direct result of too much sunlight after the removal of the Red Pine. No insect or disease factors were observed.

Forest Structure

Structural diversity is essentially missing with widely scattered Ash of similar age and size making up a very limited canopy. Little standing dead trees or down dead wood were observed. Wide open tree spacing (except most northerly two or three acres) and misshapen crowns indicating poor tree growth and health.

Regeneration

This stand's regeneration is best described as a stark failure. Acceptable Growing Stock (AGS) is 2 square feet of basal area containing .6 cords per acre. Very few seedlings and saplings are present and are mostly White Ash and Sugar Maple. Of concern are the interfering plants: Invasive Buckthorn in the northern part of stand B1, invasive Multiflora Rose, native Black Berry, native Striped Maple, and native Golden Rod are found throughout this stand in substantial quantities that have a high negative impact on the establishment of regeneration. Deer browsing is judged to be substantial and an underlying factor for the natural seeding/regeneration failure.

Site Level Risks

With predominate well drained soils; the highest risk factor to impact this stand would be wind/blow down and ice storm damage. Shorter and milder winters would not have a substantial affect on the management of this stand.

Stand Prescription

The reason for the Red Pine clear cut that occurred in stand B1 can only be a guess. But undertaking a harvest of that magnitude bordering a pond is rather risky to that pond's ecosystem. The attempted natural seeding objective for stand regeneration is a failure. It is recommended that reforestation with a conifer specie be undertaken to reclaim this acreage. The objective would be more wildlife – ecosystem benefits than forest products production. Care in site preparation and species selection for planting due to the proximity to the pond.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
White Ash	27.76	38.81	5379
Red Pine	6.89	2.63	433
Black Cherry	4.40	2.06	396
Red Oak	3.18	3.93	303
Sugar Maple	6.06	1.32	279
Total	48.29	48.75	6790

Pulp	4.97	9.06	.89 cords
AGS	38.90	2.00	.60 cords

Forest Stands B2, B3, B4, B5

All four of these small stands that border and include the pond in Otsego #9 west of and bordering Steven's Road will be considered as one stand since all shares the same properties. Acreages: B2-1.5, B3-5.5, B4-3.6, and B5-1.05; more or less. Soil type: Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained. These stands are the result of a long ago Red Pine plantation clear cut; the same plantation as that clear cut in Forest Stand B1. No forest measurements were conducted on these four stands due to little to no tree cover.

Forest Diversity and Composition

Little to no tree species diversity was found in these stands. Occasional Ash tree was found but general health was judged poor due to excess sunlight. No insects or diseases were noted.

Forest Structure

No structural diversity due to no forest canopy. Little to no standing dead trees or down dead wood was found in these stands. The few trees that do exist have misshaped tree crowns and poor quality and growth attributes.

Regeneration

Poor to nonexistent commercial tree regeneration within these stands. Very few seedlings and saplings are present and are mostly White Ash, Sugar Maple, and American Beech. Of concern are the interfering plants: invasive Multiflora Rose, native Black Berry, native Striped Maple, root suckered beech, and native Golden Rod are found throughout this stand in substantial quantities that have a high negative impact of the establishment of regeneration. Deer browsing is judged to be substantial and an underlying factor for the natural seeding/regeneration failure.

Site Level Risks

With well drained soils; the highest risk factor to impact this stand would be wind/blow down and ice storm damage. Shorter and milder winters would not have a substantial affect on the management of this stand.

Stand Prescription

With close proximity to the pond, it is recommended that no action be undertaken and to allow the present condition of these stands to continue. Site preparation needed for tree planting could negatively impact the pond ecosystem. Good benefits for wildlife abound. It is also proposed that a hiking trail be constructed around the pond to further recreational aspects of these four stands.

Forest Stand B6

Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky well drained is the soil type that stand B6 consists of. The ability to work this stand with forest management equipment is good. 8.5 acres more or less with a westerly slope of 40 to 50 percent is found within the confines of this stand. B6 is located along the property line with private property in the northern section, east of Stevens's road in Otsego #9. Basically, this stand is an Eastern White Pine plantation that has seen no management activity. This stand had a blow down event many years ago chiefly occurring on the most easterly parts of the stand

Forest Diversity and Composition

White Pine plantation that features one dominates specie making for very low species diversity. Species suitability to the growing site is average with average or typical growth patterns. General tree health is average but beginning to decline due to crowding, no thinning, and maturity. No insect or disease factors were present upon stands inspection.

Forest Structure

Low structural diversity typical of plantations that have not been thinned is prevalent in stand B6. Single aged trees forming a simple canopy. Fair amount of standing dead trees are found within stand B6, a result of less vigor trees succumbing to competitive pressures. Considerable amount of a long ago blow down that resulted in substantial amounts of down dead wood is found in the most easterly section of this stand. Tree crowns are mature and declining due to crowding and high stocking levels.

Regeneration

No Pine regeneration is present within this stand. Very sparse beech and other hardwood regeneration are present due to lack of sunlight, but do not constitute a future forest stand. No interfering plants and no deer browsing were found within B6.

Site Level Risks

Highest risk factor to this stand is a wind storm or blow down similar to what already has happened in the past. Steep slopes together with a westerly facing stand present high risk for this stand especially if harvesting or thinning were to occur. Shorter and milder winters would not adversely affect this stand.

Stand Prescription

A mature, never thinned Eastern White Pine stand that contains 40 to 50 percent slopes and had a blow down event in the past presents three options:

- 1) Commercial thinning, approximately 10 to 20 square feet or more of basal area in rows or corridors 50 feet wide or so (to accommodate machinery). Risk of blow down is present. The purpose would be to encourage White Pine regeneration by allowing more sunlight to the forest floor. In ten years time an addition cut would be instituted to further regeneration or if established, removal of the remaining parental trees.
- 2) Harvesting of the mature stand and allowing the establishment of natural hardwood regeneration (contending with deer impacts) or the reforestation with White Pine seedlings or another coniferous species.
- 3) Do nothing and allow the stand to atrophy and slowly evolve into a naturally established stand. This option would take considerable time.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Eastern White Pine	85.22	104.57	17,090
Red Maple	7.34	1.10	264
Red Oak	3.67	.55	132
Total	96.23	106.22	17,486
*AGS	27.40	1.25	1.17 cords

*these trees meet all of the requirements for acceptable growing stock and consist of White Pine exclusively. However, in reality these are less vigorous trees that are being overtopped and in substantial decline.

Forest Stand B7

Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained is the soil type found in this approximately 1.3 acre area. Located in the central part of Otsego #9 bordering Stevens road; this stand consists mostly of American Beech root suckers that have formed a thicket. No forest measurements were undertaken due to no measurable trees was located within this area's boundaries.

Stand Prescription

Leave as is, this "stand" has value for wildlife and produces both food and cover for many early succession wildlife species

Forest Stand B8

9.3 acres more or less reside within this stand located in the most northerly section of Otsego #9, east of Steven's road. Primarily a northern hardwood ecosystem, this stand has seen no forest management actions and contains significant commercial timber. 40 to 50 percent slopes are found here together with soil type Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained. Soils should support forest equipment; care in skidding should be exercised due to the slopes contained therein.

Forest Diversity and Composition

Excellent species diversity is found in stand B8 with nine species found, five exercising significant basal area. Excellent specie suitability to the growing site exists together with excellent tree health expressed by growth characteristics typically found in good growth forest sites. No insect or diseases were observed in this stand. Impending Emerald Ash Borer infestation of the White Ash is of substantial concern in this stand due to the trees per acre of 11.62, basal area per acre of 17.48 square feet, and board foot volume per acre of 2260 of Ash.

Forest Structure

The forest stand B8 contains good structural diversity with trees of many different sizes as well of many vertical layers. Tree crowns and spacing have just arrived at their mature, optimal states exhibiting good occupation of growing space, densities, and stocking levels. Occasional standing dead trees and down dead wood were noticed within this stand making for acceptable wildlife cover.

Regeneration

Fair regeneration of commercial tree species was observed within stand B8 with mostly Red Maple and Sugar Maple seedlings and saplings making up the population. AGS composition was Red Maple and White Birch. Regeneration species suitability to the growing site was good with the exception of the White Birch that will eventually be succeeded by more shade tolerant hardwood species, most likely the maples. Interfering plants noted: Striped Maple, mostly in the seedling and sapling stages; Eastern Hophornbeam (Iron Wood) in the seedling, sapling, and AGS stages. Deer Browsing was judged to not be of significance.

Site Level Risks

Highest risk factors were assigned to blow down-wind storms and ice storm damage due to the topography and soil type. Shorter and milder winters would affect this stand little.

Stand Prescription

Due to the looming threat of the Emerald Ash Borer, it is recommended that the White Ash be harvested from this forest stand. Mature and with significant presence, the loss of value due to infestation is significant. It is further recommended that select harvesting of the Eastern White Pine be instituted; mainly on individuals past optimum maturity and imposing lowered growth through over story dominance on good growing neighboring hardwood specie trees. At the same time reduction of interfering Iron Wood should be undertaken along with Red Oak harvesting in neighboring forest stand B9. Care in timber marking in stand B8 to promote good growth and biodiversity in the residual stand.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Red Maple	29.30	11.52	2498
White Ash	11.62	17.48	2260
Eastern White Pine	8.86	18.74	2081
Red Oak	6.48	7.14	924
Black Cherry	1.67	5.46	548
Sugar Maple	6.28	2.93	434
Yellow Birch	4.72	1.71	385
White Birch	7.34	1.10	178
Popple (Aspen)	.92	2.18	369
Total	77.19	68.26	9677
Pulp (Iron Wood)	30.72	3.38	1.63 cords
AGS	73.94	2.38	2.68 cords

Forest Stand B9

Mongaup-Hawksnest complex, 1 to 8 percent slopes, rocky well drained is the soil type found in this stand located in the northeastern section of Otsego #9 east of Stevens's road. The workability of this stand is good for forest equipment. This area contains 2.7 acres more or less and is a northern hardwood stand that has not seen any forest management activity.

Forest Diversity and Composition

Below average species diversity in stand B9 with three commercial species significantly making up stand stocking. Species suitability to the growing site is excellent together with overall tree health. Excellent tree growth characteristics are found on most of the sampled trees. No insect or disease issues were observed.

Forest Structure

Good forest structure with different sized trees and a good exhibit of varying multiple vertical layering. Tree crowns are well developed, healthy, and vibrant. Good spacing exists despite a lower basal area density of 37 square feet. This stand also contains some very mature and high quality Red Oak timber that dominates the growing area it is found. Average amounts of down dead wood and standing dead trees are found here.

Regeneration

Stand B9 regeneration can be separated into two subclasses. The first consists of Sugar and Red Maple seedlings, saplings, and AGS. The second characterized by Eastern Hophornbeam (Iron wood) seedlings, saplings, and some pole sized recorded in the pulp category. The regeneration is well suited to the growing site. The Iron wood can be referred to as interfering, with some significance in negatively affecting the viability and growth of the maple regeneration. Deer browsing is a smaller factor also.

Site Level Risks

Due to topographical concerns (some 40 to 50% slopes) it is judged that blow down and ice storm represent the highest risk factors to this stand. Moisture and extreme rainfall are of lesser concern. Shorter and milder winters would not have a substantial affect on this stand except for reduction of available harvesting time.

Stand Prescription

A small commercial light harvest or thinning principally of the Red Oak mature trees in conjuncture with any harvesting activities on adjacent neighboring stands is recommended. Reduction of the stocking level of the Ironwood at the same time is also recommended as an aid to spur maple regeneration growth and viability. If no activity on neighboring stands, it is proposed to allow the stand to continue on its present course of development and to revisit this stand in ten years time.

Stand Data

Species	Trees Per Acre (TPA	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Red Oak	18.68	16.97	3606
Sugar Maple	34.09	7.07	1718
Red Maple	17.25	8.04	1487
White Ash	3.61	.92	243
Total	73.63	33.00	7054
Pulp	43.62	3.88	2.72 cords
AGS	45.66	1.25	1.94 cords

Stand B10

Approximately 3.4 acres are contained within this hardwood forest stand that has not seen any management activity. B10 is located on the northeast boundary with private lands of the central section east of Stevens's road of parcel #9 of Otsego County. Soils type: Mongaup-Hawksnest complex, 1 to 8 percent slopes, rocky Well drained. This stand can be easily worked by forest equipment.

Forest Diversity and Composition

Three commercial species were tallied upon stand inspection making for a relatively low diversity of species. Species suitability to the growing site along with tree health is good with good growing characteristics. Large amounts of pulp wood was noted, 6.48 cords per acre with 17.48 square feet of basal area. The pulp category consists of two standout components. The first is the preponderance of large hardwood wolf trees with exceeding large crowns in various stages of decline and decay. The second component is made up of small Eastern Hophornbeam (Iron Wood) trees. No insect or disease manifestations were noted.

Forest Structure

Forest structural diversity was deemed low with a noticed lack of seedlings, saplings, and lower amounts of AGS. Most of the diversity that was present is found in the timber class and pulp class. Tree Crowns are well developed in the over story with some in decline. Little to no standing dead trees or down dead wood were observed.

Regeneration

Desirable regeneration is not present within stand B10, no to little seedling, saplings were found. AGS is fair with 1.47 cords per acre. Interfering plant Iron wood in significant quantities (as measured in pulp) is present in this stand. Slow growing and shade loving, this plant slows growth of nearby commercial tree species and stays in the understory for long periods of time impacting regeneration and subsequent growth rates negatively. Deer browsing was deemed a corresponding and significant negative impact also.

Site Level Risks

Highest risk factors were assigned to Blow down and ice storm damage due to maturity of this stand and topography. Milder and shorter winters affect would be on stand accessibility

Stand Prescription

Due to impending climate change and biodiversity considerations, Bitternut Hickory should be favored for inclusion in any residual forest stand after management actions. It is further recommended that the Eastern Hophornbeam (Iron wood) stocking be reduced wherever possible to favor commercial tree growth and regeneration while saving some for diversity reasons. In addition, girdling either frill or herbicidal of many of the exceedingly large hardwood wolf trees be undertaken being sure to leave some for wildlife purposes (approximately three per acre). Overall reduction of the pulp class by 10 square feet or more within this stand.

Stand Data

Species	Trees Per Acre (TPA	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Bitternut Hickory	8.25	6.76	1741
Sugar Maple	6.55	5.83	1155
Red Oak	3.12	1.07	243
Total	17.92	13.66	3139
Pulp	122.53	17.48	6.48 cords
AGS	36.1	.90	1.47 cords

Forest Stand B11

34 acres more or less make up this stand located in the central section of Otsego #9 east of Stevens's road. This stand dominates the parcel due to the amount of acreage and the location. Soil Types: Mongaup-Hawksnest complex, 1 to 8 percent slopes, rocky Well drained; Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained; Mongaup-Franklinville complex, 15 to 25 percent slopes Well drained; Mongaup-Franklinville complex, 8 to 15 percent slopes Well drained. The ability to operate forest management equipment in this stand is good to excellent. B11 is an old Red Pine clear cut that has not regenerated to commercial tree species with substantial American Beech presence along with golden rod, grass, and open areas.

Forest Diversity and Composition

Species diversity is low with one tree species being dominant: American Beech. Eight species were tallied overall but the occurrence in the plot tally was typically once or twice for most of the commercial tree species found in stand data, making for very low TPA and basal area. Species suitability to the growing site was judged to be relatively poor with poor form and growth characteristics indicative to poor suitability and growing in very open areas. Same determination for tree health for stand B11. No insect issues were found within this stand. Beech Bark disease is very pronounced in this stands heavy presence of Beech.

Forest Structure

The forest in stand B11 contains trees (mostly Beech) mostly from a single age and size grouping that forms a simple canopy where prevalent (substantial open areas exist also) thus lowering structural diversity. No standing dead trees or down dead wood were found thus limiting wildlife cover for some species. Tree crowns were largely misshapen from open area growth, low stocking, or beech bark disease.

Regeneration

Desirable regeneration is largely absent in this stand with substantial presence of interfering plant American Beech seedlings, saplings, and pole sized timber in fluctuating densities with open areas containing golden rod and grasses. The beech is largely a result of heavy deer browsing of the more commercial tree species and the deer leaving the less palatable beech to grow. The beech presence in regeneration is also a result of extensive root sprouts forming beech thickets as response to beech bark disease and past clear cutting of the red pine.

Site Level Risks

Moisture stress or drought risks to this stand are judged to be higher due to nature of the soil types and topography than extreme rainfall. Ice storms can also be judged higher risk due to open area type growth. Shorter and milder winters would not affect this stands ability to be worked.

Stand Prescription

The ability to establish a commercial tree stand is judged to be the main problem for Stand B11 from the clear cut of the Red Pine long ago through and to today. Failure of natural seeding is a result of deer browsing, lack of a close good seed source at the time of clear cutting, heavy beech presence, and thick golden rod and grass areas. While this ecosystem is suitable for wildlife it is opinion that efforts should be made to establish a commercial tree stand when considering the acreage involved.

Two options to be considered: 1) Clear cutting and removal of all beech and other trees as firewood and chips through mechanical means followed by herbicidal treatment. Golden rod and grass areas would be scarified to mineral soil where applicable. Natural seed sources are now present though not concentrated enough for optimum results. The deer problem will still be present and it is hoped that substantial natural seeding and regeneration could overwhelm deer foraging. 2). Reforestation with a conifer species resistant to deer and suitable to the stand growing site. Involves the above minus the natural seeding. This option may not qualify for carbon markets.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
White Pine	1.00	11.53	351
Black Cherry	1.23	5.43	213
Red Maple	2.24	3.64	190
Red Pine	2.71	2.24	142
Red Oak	1.10	2.69	118
White Ash	.38	1.77	89
Sugar Maple	.85	.79	48

White Birch	1.22	.55	44
Total	10.73	28.64	1195
Pulp (Beech)	47.33	16.10	2.58 cords
AGS	13.37	2.44	.67 cords

Forest Stand B12

Soil type found within the approximate 6.2 acres of this stand is Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky, well drained. This stand is located in the central section east of Stevens Road in Otsego #9. This stand is an old Red Pine clear cut resulting in a hardwood young forest.

Forest Diversity and composition

Species diversity is good with many hardwood species present chiefly in the AGS, sapling, and seedling classifications. Species suitability to the growing site is excellent with good growth characteristics. General tree health is excellent also. No insect or disease issues were observed in stand B12.

Forest Structure

Since this stand is young forest, the structural diversity is low chiefly due to the lack of timber class trees and the preponderance of trees in the AGS, Sapling, and Seedling classifications. There is a developing over story that is slowly occurring due to natural succession factors. Little to no standing dead trees or down dead wood was observed. Tree crowns are healthy and developing but natural crowding is occurring, typical of a young forest.

Regeneration

Profuse regeneration is found throughout this stand and is deemed desirable with the stocking made up of principally of commercial hardwood species. Species adaptability to the growing site is excellent with excellent form and growth patterns. Interfering plant Beech is found in this stand but the occurrence is extremely limited and deemed uncommon. Deer browsing surprisingly is deemed very light and not a factor affecting regeneration.

Site Level Risks

With the soil type found in stand B12, topographical side hill; moisture stress and extreme rainfall are deemed lesser risk while Blow down and ice storm risks are deemed higher. Shorter and milder winter's basic influence affecting this stand would be through accessibility.

Stand Prescription

A hardwood young forest with profuse regeneration in the process of developing under natural succession necessitates hands off recommendation. Allow this successful young forest to develop and in ten years reassess to ascertain development progress.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Red Oak	9.92	6.98	736
Red Maple	2.56	3.95	671
Sugar Maple	9.79	5.76	532
Total	22.27	16.69	1939
AGS	70.94	1.33	.74 cords

Forest Stand B13

Approximately 6.5 acres of Eastern White Pine plantation is located in the eastern portion of Otsego #9. Dominate soil type: Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained. This soil type facilitates use of forest management equipment. This stand was selectively commercially thinned once and is now mature.

Forest Diversity and Composition

Five commercial species are found within this stand with Eastern White Pine dominating in stocking levels, Trees per acre (TPA), basal area, and footage per acre. Therefore, a case can be made that species diversity is low but typical for a plantation stand. Suitability of the White Pine to the growing site is excellent with good form and growing characteristics. General tree health like suitability is excellent also. No insect or disease issues were found within this stand.

Forest Structure

Structural diversity is low due to the fact that this stand is plantation and mature. Little to no standing dead trees or down dead wood was found thus limiting wildlife cover requirements. Tree crowns are well developed but narrowing due to maturity and the need for thinning/harvesting.

Regeneration

Desirable regeneration is nonexistent within this stand due to lack of sunlight reaching the forest floor. Interfering plant American Beech is significantly present in the understory and together with the lack of sunlight has negatively influenced the establishment of commercial hardwood trees.. The Beech can also be viewed as a plant that can grow in the shade of the White Pine within this stand and site index. Deer browsing is not a factor.

Site Level Risks

Located on a side hill, with good drainage soils, this stand risks to excess moisture, drought conditions, and extreme rainfall are less than blow down and ice storm damage risks. Shorter and milder winters chiefly affect the accessibility of this stand.

Stand Prescription

Two courses of action are seen as distinct possibilities.

Option#1: Harvest the stand and replant to Eastern White Pine or allow hardwoods to become established.

Option #2: Employ a shelter wood silvical system. This would entail two or more commercial cuts or harvests with the purpose of generating a naturally seeded White Pine stand over time. Recommendation would be to reduce basal area by at least 30 to 40 square feet or more through row harvesting followed by a final cut removing the residuals in about ten or so years depending on regeneration success.

Selection of either option would entail management goals, resources, markets, and actions in neighboring stands.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Eastern White Pine	51.80	90.67	12,762
Red Oak	5.06	13.91	1700
Red Maple	24.40	8.15	1432
White Birch	3.19	.79	179
Eastern Hemlock	2.34	1.07	183
Total	86.79	114.59	16,256

Forest Stand B14

Approximately 16.5 acres are contained within this stand located in the easterly section of Otsego #9. Soil types found within this stand: Mongaup-Franklinville complex, 8 to 15 percent slopes Well drained, Mongaup-Franklinville complex, 15 to 25 percent slopes Well drained, and Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained. The ability to work this stand with heavy equipment is good. This stand is a result of a long ago very heavy selection harvest that centered on the valuable hardwood species and did not harvest the low grade at the same time.

Forest Diversity and Composition

Four commercial species occupy about 34 square feet of Basel area along with 40 square feet of Basel area deemed pulp and comprised exclusively of American Beech. Species suitability to the growing site is good. General tree health is below average for the four commercial species due to too much sunlight and wide spacing producing growth of epicormic branching and less than straight trunk growth. Beech bark disease is very pronounced on the beech and is either producing slow growth or slow mortality.

Forest Structure

Structural diversity is difficult to assess due to the beech component that is heavily diseased. If included, structural diversity can be described as good, without the beech and centering on the other species the determination is poor. Significant standing dead trees and down dead wood were found within stand B14. Tree crowns were not developed well on most species due to wide open spacing and beech presence.

Regeneration

Desirable regeneration is seriously lacking with American Beech seedlings and saplings thoroughly dominating the regeneration found in this stand. AGS is lacking altogether. Species suitability to the growing site is good but the predominance of Beech is a function of past harvesting activity. The Beech is deemed interfering. Deer browsing is very significant on non beech reproduction; even prevalent upon the beech itself (usually deemed a starvation deer food).

Site Level Risks

Due to the soils and how the topography is within this stand, moisture stress or drought together with extreme rainfall is deemed a lesser risk. Higher risk is judged to be onto blow down or ice storm damage. Shorter and milder winters would chiefly affect stand accessibility.

Stand Prescription

Either cutting of all beech through chip marks or firewood markets during summer months or cutting beech with herbicidal application to stumps or herbicidal bark application is recommended. Failure to address the beech in this stand will effectively limit the stands viability to produce valuable timber and also affect biodiversity in this stand for years into the future. It is further recommended to implement these recommendations in conjuncture with other nearby more value laden stand actions and activities.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Red Oak	11.00	13.61	1143
Red Maple	11.94	11.78	862
Hemlock	2.61	7.23	343
Sugar Maple	2.92	1.47	139
Total	28.47	34.09	2487
Pulp (Beech)	82.63	40.44	6.62 cords
AGS	7.97	.55	.29 cords

Forest Stand B15

This stand is comprised of 10.6 acres more or less and is located in the most easterly acreage of Otsego #9 and is an old northern hardwood seed tree or selection heavy timber cut or harvest. Old substantial blow down exists in this stand also with most of the slash disintegrated leaving many old root balls above ground level. Predominant soil type is Mongaup-Hawksnest complex, 1 to 8 percent slopes, rocky well drained making this stands ability to support forest management equipment good.

Forest Diversity and Composition

Species diversity in stand B15 is poor with only three species represented, one occurring very infrequently. Suitability of species to the growing site appears adequate and general tree health can be characterized as fair with poorer growth form, epicormic branching, and slower rate of growth resulting from too much sunlight exposure and lower stocking levels. No insect or disease issues were observed.

Forest structure

Structure is best described as poor due to lower stocking levels due to past harvesting and blow downs. Good amounts of standing dead trees and down dead wood are present within this stand adding distinct benefits for wildlife. Tree crowns vary in size and health due to too much sunlight, low stocking levels and spacing that is too wide.

Regeneration

Below average amounts of hardwood seedlings and saplings (mostly Sugar Maple and White Ash) levels exist within the stand, acceptable growing stock (AGS) stocking levels of 30.36 trees per acre. The suitability of the existing regeneration and AGS to the growing site is judged to be good. Interfering plants Striped Maple, Iron Wood (Eastern Hophornbeam), and Golden Rod constitute noticeable impediment to full occupation of the growing site by valuable northern hardwoods. Substantial White Tailed Deer browsing was noticed also.

Site Level Risks

Moisture stress and drought together with extreme rainfall were judged to be of lesser risk than wind (blow down) and ice storms. Shorter and milder winters would affect this stand most adversely through access due to location and distance to road/landing locations.

Stand Prescription

This stand will have to be allowed to grow with the hope that the AGS and commercial regeneration can gradually add to the stocking levels of this stand. Optimally, control of the interfering plants and deer browsing would go a long way in successfully obtaining future stand development and viability.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Sugar Maple	15.97	27.42	2664
White Ash	2.70	4.95	695
Bitternut Hickory	1.02	1.40	184
Total	19.69	33.77	3543
Pulp	30.36	8,85	1.74 cords
AGS	38.32	1.99	1.48 cords

Forest Stand B16

Contrasting soil types found in this stand are: Lewbath channery silt loam, 15 to 25 percent slopes well drained and Volusia silt loam, 3 to 8 percent slopes somewhat poorly drained and are mainly a function of topography. The higher ground is well drained and the lower ground bordering wet lands to the north and west is poorly drained. Because of the proximity to wet lands this stand has not had any forest management activity. 9.6 acres more or less are found within stand borders and this stand location within Otsego #9 is in the easterly section, on the southerly border with private property, east of Stevens Road. The ability to operate heavy machinery is limited to dry or frozen ground.

Forest Diversity and Composition

Species diversity is appraised at average for an unmanaged, mature stand. Species suitability to the growing site is good with the Hemlock and Red Maple growing mainly on the Volusia soils and White Pine and Red Oak on the Lewbath soils. General tree health is good but declining due to maturity and lack of thinning – overcrowding. No insect or diseases were noted upon stand appraisal.

Forest Structure

Structural diversity is typical of mature, unmanaged stands with little to no seedlings and saplings; AGS (mainly Hemlock) present in average amounts typical of conditions. Over story very pronounced, understory lacking and diminishing. Standing dead trees and down dead wood very sparsely distributed throughout the stand. Tree crowns are very mature with many very dominant, very old, over mature Hemlock and a few White Pine wolf trees. Spacing is very dense with stand basal area exceeding 120 square feet thus limiting available sunlight in the over story, and effectively eliminating sunlight to the forest floor.

Regeneration

Tree seedlings and saplings are absent in the understory due to no sunlight reaching the forest floor. Park like conditions. AGS is mainly Hemlock in pole timber quality. Species (AGS) suitability to the growing site is good. Interfering plants and deer browsing are not factors in this stand.

Site Level Risks

Due to the nature of the soils found in stand B16 and the topography it is judged that moisture stress and extreme rainfall are of significant risk factors for this stand. Shorter and milder winters would have significant adverse affects on logging viability. Care to be exercised in choosing the correct weather and stand conditions for operations.

Stand Prescription

This stand has been allowed to be in its present condition for reason of proximity to wet lands. However it is opinion that under good conditions (dry or frozen ground) there is enough acreage (9.6) to justify forest management activity. Reduction of the Hemlock basal area of about thirty square feet to accomplish: 1) regeneration establishment, 2) thinning to increase growth and health of the over story, and 3) provide more sunlight stimulation for the AGS. Care to be taken in stand marking to favor the AGS and healthy well growing timber class over story. The pulp trees should be harvested also, leaving adequate amounts for wildlife. In this stand there are some very old, large Hemlock and White Pine Trees that should be left as legacy trees.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Eastern Hemlock	43.72	92.28	11,354*
Red Oak	3.55	14.54	1503
Red Maple	7.89	5.20	702
Eastern White Pine	1.17	7.17	941
Elm	.76	2.64	280
Total	57.09	121.83	14,780

*Ring shake deductions applied where applicable

Pulp	6.40	3.80	.9 cords
AGS	56.75	1.13	1.82 cords

Forest Stand B17

This “stand” contains approximately 23 acres and is located in the south central section of Otsego #9 east of Stevens’s road. Volusia silt loam, 3 to 8 percent slopes somewhat poorly drained Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained are the principle soil types found in this stand. Basically a hydrophilic, wet, open site; the forest measurements found in stand data are a result of forest measurements made on two or three plots out of ten falling in peripheral areas of this predominantly open area.

Forest Diversity and Composition

Species diversity, species suitability, general tree health are all deemed poor in this mostly open, wet site. No insect or disease issues were noted.

Forest Structure

Structural diversity and tree crown and spacing were either poor or nonexistent. Occasional standing dead trees and down dead wood were observed in B17.

Regeneration

Basically little regeneration was found in this stand with very few seedlings and saplings. Occasional AGS was found though only on peripheral plots. Most dominant plant type found was invasive Honey Suckle and Multiflora Rose, together with native wild raisin. Deer browsing was not a factor within this environment.

Site Level Risks

Wet site with occasional standing water, the highest risk assignable would be to extreme rainfall that would and has flooded this site. A natural ecosystem geared to hydrophilic plants and animals that act like a natural sponge. Shorter and milder winters would not have any additional effects on this ecosystem beyond the properties already present.

Stand Prescription

Allow for continuance of the present ecosystem that is basically geared to wildlife and not forest products production.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Norway Spruce	20.24	11.86	1082
Red Oak	1.87	2.14	147
Total	22.11	14.00	1229
AGS	24.56	6.85	.75 cords

Forest Stand B18

12.2 acres more or less make up this mixed softwood Otsego #9 stand that is a result of an old selection cut and boasts profuse tree regeneration. This stand is difficult to traverse due to the heavy Spruce and Pine tree stocking. Stand B18 is located in the central/south central portion east of Steven's road. Primary soil type is Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained with some Mongaup-Franklinville complex, 15 to 25 percent slopes Well drained. Forest management equipment can work well on these soils.

Forest Diversity and Composition

Species diversity is basically low with just two primary species occupying the majority of the stocking levels and basal area. These species are Norway spruce and Eastern White pine, both comprising 94% basal area, 80% of the trees per acre in the timber class. Species suitability to the growing site is good along with overall tree health rated good also. Both tree species exhibit good growth characteristics. No insect or diseases were noted upon stand inspection.

Forest Structure

Structural diversity is good to excellent with trees of different sizes as well as multiple vertical layers. Few standing dead trees and down dead wood were observed within the confines of stand B18. Tree crowns and spacing are relatively good in the timber class but very crowded in AGS, saplings, and seedling classifications.

Regeneration

Profuse regeneration of Norway spruce and Eastern White Pine is present in this stand with species suitability good to excellent. Very dense seedling and sapling thickets exist that make walking sometimes difficult. No interfering plants were noted and deer browsing not a factor.

Site Level Risks

Difficult to judge with equal designation for moisture stress, extreme rainfall, ice storm damage, and blow down judged to be equal risk throughout this stand. Shorter and milder winters would pose significant difficulty in accessibility.

Stand Prescription

Let Mother Nature take her course and let succession take place and have this stand develop further. The high amounts of AGS, saplings, and seedlings with time will develop into more basal area timber growth together with natural growth of the present timber class. This stand borders significant wet lands to the south and east and poses excellent cover for many wildlife species. Reappraisal of this stand in ten years time is recommended. Eventually the harvesting of the Eastern White Pine timber class within this stand is recommended due to quality and tree crown dominance (Bully Pine).

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Norway Spruce	14.55	22.64	2279
Eastern White Pine (Bully)	7.44	22.08	1387
Red Pine	2.62	.55	94
Red Oak	1.82	.79	102
White Ash	1.02	1.40	184
Total	27.45	47.46	4046
AGS	119.30	4.65	4.07 cords

Forest Stand B19

5 acres more or less are found in this location east of Steven's road in the south westerly section bordering private lands in Otsego #9. Soils found here are Sapristis and Aquents, inundated Very poorly drained. This area is not a forest stand at all but a beaver pond with exceedingly wet areas surrounding the pond. Stand B19, has active beaver with substantial damming and characteristically flooding throughout. Distinct inability to traverse this area, scouting occurred from two vantage points. Environmentally sensitive area with a hydrophilic ecosystem, this location serves wildlife in many ways.

No forest measurements were taken due to conditions and no trees to measure. Recommendation is to protect this area from any encroachment from forest management activities in any neighboring stands and also neighboring private lands. This areas benefit to wildlife is further enhanced by recreational activities such as wildlife photography, canoeing, and possible camping to name a few. Access has to be enhanced for greater public usage to this unique area.

Forest Stand B20

10.7 acres more or less are contained in stand B20. Located in the most south western corner of Otsego #9, this stand is primarily a northern hardwood stand emanating from a long ago Red Pine clear cut. Good quality hardwood timber is found here. Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained and Mardin channery silt loam, 15 to 25 percent slopes Moderately well drained are the soil types that make up this stand. The ability to use forest management equipment on these soils is good.

Forest Diversity and Composition

Species diversity is good with five commercial species represented. Species suitability to the growing site is good with the Red Pine showing good quality characteristics and the hardwoods showing good to excellent growing characteristics. Pine and hardwood show good tree health overall. Eutepella canker infection was noted on several Sugar Maple trees and any trees exhibiting this canker should be removed from the stand when management activity commences.

Forest Structure

Good structure typifies this stand with multiple layers of understory with trees of different sizes. Little standing dead trees and down dead wood were noticed within this stand, limiting some habitat for certain wildlife species. Tree crowns have healthy characteristics due to good spacing among individual trees that make up this stand.

Regeneration

The understory of this stand contains ample AGS and saplings of various hardwood species found in the data table. The suitability of saplings and AGS to the growing site is good to excellent. Some beech that interferes somewhat with tree regeneration was present but not to a high degree. Deer browsing was very pronounced on the seedlings in this stand, basically removing a very significant percentage.

Site Level Risks

Moisture stress and extreme rainfall were judged to be of lesser impact level than ice storm or blow down were. Shorter and milder winter would not have a high risk involved in working this stand.

Stand Prescription

This stand contains a significant amount of mature, good quality White Ash that should be harvested before the emerald ash borer infects the stand. The infected Sugar Maple that has Eutepeella canker should be harvested also along with some of the pulp. Of consideration is the volume of ash present to make this feasible.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Ash	25.08	41.43	3413
Sugar Maple	18.44	11.86	1235
Red Maple	6.24	5.04	567
Red Pine	8.70	4.41	486
Red Oak	1.16	1.23	181
Total	59.62	63.47	5882

Pulp	6.26	2.12	.27 cords
AGS	37.33	1.48	1.28 cords

Forest Stand B21

Approximately 9.6 acres make up this stand bordering Stevens Road on the south west with both side hill and level topographical features. At least three soil types make up this stand: Bath channery silt loam, 8 to 15 percent slopes Well drained, Mardin channery silt loam, 8 to 15 percent slopes Moderately Well drained, and Mongaup-Hawksnest complex, 25 to 50 percent slopes, rocky Well drained. The ability to work this stand is good. This is a very old Red Pine select cut/thinning done many, many years ago.

Forest Diversity and Composition

Species diversity is good with six commercial species represented. Species suitability to the growing site is good with the Red Pine showing good quality characteristics and the hardwoods showing good to excellent growing characteristics. Pine and hardwood show good tree health overall. Leaf spot fungal infection was noted throughout the stand on the lower limbs and on the saplings of hardwoods, especially the sugar maple. This is probably a result of very wet growing conditions in the present year 2021 and should have a negligible effect on overall tree health and vigor. The beech exhibits a possibility of Anthracnose and/or beech leaf disease, continued monitoring in the next forest inventory is recommended for these issues.

Forest Structure

Structural diversity is excellent within stand B21, multiple, well developed vertical and horizontal layers of trees and a plethora of different sizes make up this stands structure. Tree crowns and spacing are excellent within the hardwood component. The Red Pine exhibit fair spacing but thinning and diminishing crowns. It is judged this is a result of age and resulting slowing of growth. Most of the pine exists in a dominant stand position with considerable height and clean, limb free quality boles. The DBH classes show a 60 to 70 percent frequency in 12 to 18 in class with fewer in excess of 19 inches. Down dead wood and standing dead trees were found to be occurring on average, typical frequencies.

Regeneration

Desirable regeneration in this stand is northern hardwood, no Red Pine. Seedlings and saplings were amply found throughout the stand with species mix represented by those found in the stand data table. This is primarily a hardwood site and as such, the regeneration is very well suited to the growing area. Interfering plants: Striped Maple, Beech, and ferns were found throughout the stand in association with the commercial species. Striped Maple and beech offer the greatest impediment to successful regeneration, especially where significant deer

browsing has occurred. Ferns occupy basically one foot of growing space above the forest floor, somewhat on a lower density but widespread. These plants await release by additional sunlight.

Site Level Risks

Soils are well drained and moisture and extreme rainfall should not present the highest risk. It is judged due to topography and the dominance in height and crown level of the Red Pine; blow down and ice storms present highest risk to this stand. Shorter and milder winters should not present too much of an adverse affect upon this stands workability or access.

Stand Prescription

It is recommended that the White Ash be harvested due to the impending emerald ash Borer infection. This harvesting if done carefully should result in an actual commercial thinning and release more of the hardwood residuals. Adjacent stand B20 has ash also that in tandem should produce a small timber harvest.

Monitoring of the Red Pine in this stand should be done in seven to ten years time with an eye to removal as it is judged this species is aging and will be slowly decreasing in stocking levels due to mortality. Removal now of the pine along with the ash would be too large a decrease in the optimal basal area density of the present stand.

Stand Data

Species	Trees Per Acre (TPA)	Basal area/acre (Sq. Ft.)	Volume/acre (int.1/4) BdFt F.C. 78
Red Pine	51.12	53.44	11,092
White Ash	12.58	13.25	1494
Red Oak	11.08	3.23	650
Sugar Maple	11.92	3.82	553
Black Cherry	3.06	2.63	406
Red Maple	2.17	.92	145
Total	91.93	77.29	14,340

Pulp	3.70	5.43	.70 cords
AGS	40.82	.78	1.22 cords

Tree Species Common and Latin Names

Common Name	Latin Name
American Basswood	Tilia americana
American Beech	Prunus serotina
American Beech	Fagus Grandifolia
Black Birch	Betula lenta
Black Cherry	Prunus serotina
Eastern Hemlock	Tsuga canadensis
Eastern White Pine	Pinus Strobus

Eastern Larch, Tamarack	Larix laricina
Northern Red Oak	Quercus rubra
Norway Spruce	Picea abies
Red Maple	Acer rubrum
Red Pine	Pinus resinosa
Striped Maple	Acer pensylvanicum
Sugar Maple	Acer saccharum
White Ash	Fraxinus americana

Yellow Birch	Betula alleghaniensis
Black Spruce	Picea Mariana