Forest Stewardship Plan

(10–Year Planning Period)

Town of Pelham Kirby/Ivers Property Rte 111A Pelham, NH 03258–6002 71.1 Acres +/– December 31, 2014

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Property Owners:	Town of Pelham
	6 Village Green
	Pelham, NH 03076

Location:Off of Rte 111A (Windham Road)

Total Acreage: 71.1 +/-Map/Lot Numbers: M 8, L 9-64, 9-65 Deed Book/Page: Date Prepared: March 19, 2014

General Description of the Property

The Kirby-Ivers Forest is located in the northern-central part of the town of Pelham close to the Pelham/Windham town border. The property is approximately 71 acres in size and it is made up of two parcels. The eastern parcel(M 8, \bot 9–64) has been owned by the Town for quite some time. The parcel to the west has just been acquired by the Town over the last few years. (M 8, \bot 9–65) The property is very important as open space as it is surrounded by single family homes on all sides and it serves as a large contiguous forested parcel that provides habitat for wildlife as well as an area for passive recreation such as hiking and nature-watching for Town residents.

Access into the property is off of Rte 111A, where a small parking area has been constructed. This access point allows residents to access the hiking trails that are found within the property. These trails have been located on the boundary map found in this plan. There are two other right of way access points located off of Woodlawn Circle and Arlene Drive.

There has been no recent harvest activity on the property within the last 30 years. A timber sale was set up back in 1998; however access issues forced the sale to be cancelled. Subsequently, tree stocking levels within the property are quite high. The property is made up of all forest land with a few small wetlands and vernal pools scattered across the landbase. A small clearing is located in the western-most part of the property where a small parking area has been constructed. The forest stand types and recommendations will be discussed in greater detail later in this plan.

Boundaries

Most of the boundaries found around the property are discernable and have been blazed and painted. Corner monumentation in the form of drill holes in stone walls and iron pins have also been located. The western-most lines are a little more difficult to locate. There is not much evidence on the ground showing where these lines are located. More time will need to be spent looking for and re-establishing these boundary lines in this location.

Access

Access into the property was poor before the Town acquired the newest parcel in the western part of the property. This parcel has road frontage along Rte. 111A. A small parking area has been constructed just off of Rte 111A which gives Town residents access to the hiking trail system that is found throughout the property. Access for forestry equipment would be from this access point as well. A short logging road would need to be constructed and a landing area would need to be established in the western part of Stand 1. This landing would service the entire property and should be maintained over time so that it can be used again for future projects.

A great network of hiking trails can also be found throughout the property. These trails are well defined and are well maintained. These trails offer a great opportunity for passive recreation for the Town residents.

Forest Types & Harvest History

Forests with varying composition in terms of species, age, and density are able to respond with more resiliency to catastrophic events than monocultures. Most trees in unmanaged, overgrown forests are chronically short of much-needed nutrients, sunlight, and water, and are therefore constantly living in a stressed environment. Pre-stressed trees are much more susceptible to disease than their healthy counterparts growing in a well-spaced, healthy forest. Forests are broken down into management units called stands, which are areas of trees with similar species composition, size, and frequency of occurrence. This property has been broken down into four separate stands. Each stand is described in greater detail later in this plan, and specific management recommendations are discussed as well.

Very little if any harvesting has occurred on this property in the last 30 years. There were no signs of stumps or other logging debris that would indicate any recent activity. The forest can be described as being healthy but somewhat overstocked. We would expect the forest to be in this kind of condition if it has not been managed in quite some time.

As is typical for the Town of Pelham, species composition on the property is dominated by white pine and red oak. Black oak also occurs on the property as well as a mix of other hardwood species such as red maple, white birch and pignut hickory. The forest can be described as being in the late successional stage of development. Most overstory trees can be described as being mature and in the medium to large sawlog size class. (16–24" dbh) There is a very weak mid–story made up of mostly red maple ranging in size from large sapling to small pole. Some white pine can also be found in this mid story strata. Most of these trees are quite suppressed and as a result the crowns have been weakened to a point where tree mortality is imminent. Regeneration across the property varies, but for the most part tree regeneration is sparse and the regeneration that is present is suppressed. Most of the regeneration is made up of white pine. Many of these small sapling–size trees have been suppressed to the point of mortality. White pine regeneration seems to be doing a little better where it is growing under an oak overstory as opposed to growing under an overstory that is heavier to white pine. This may be due to more sunlight being able to penetrate the understory in the stands that are heavier to oak.

Soils, Terrain, & Hydrology

Forests are essential for preventing erosion of existing soil and maintaining clean water. Riparian and wetland areas are the places that open water and upland sites meet. A riparian zone is the general term for the area where water and land meet, whereas a wetland is an area in a riparian zone that specifically has hydric, or wet, soils as well as vegetation that grows on that type of soil. Riparian areas are important for a number of reasons. They offer critical habitat for many wildlife species, providing shelter, food, water, and travel corridors. They are also very useful for flood control by acting as a sponge during times of high water volume, and then releasing that water slowly and consistently over time. Without wetlands, streams would fluctuate greatly between periods of high flow and dry streambeds. Finally, riparian areas are key for filtering water as it travels from upland sites to the open water, keeping out many chemical impurities and keeping water silt-free.

A small wetland area occurs in the eastern-most part of the property. This area has mostly red maple growing in the overstory and an understory composition of highbush blueberry and what appears to be alder. There are also two small vernal pools, which serve as critical habitat for breeding amphibians. There is a small stream flowing in the south-western part of the property (Stand 2) which flows from the west to east.

The terrain can be described as being fairly flat with small rolling hills. The terrain is very accessible for forestry equipment. Soil conditions in general can be described as being moderately well drained to well drained. Some exceptions would be Stand 2 which is located in a low-lying part of the property and soil conditions can be described as being somewhat poorly drained to poorly drained.

Wildlife

Biological diversity can be described as the variety of plants and animals located in a given tract of land or landscape and the communities that are formed by that variety of species. Two of the biggest threats to biological diversity today are loss of habitat to non-forest uses and invasive species. Fortunately there were no invasive plant species observed on this property, which is extraordinary because the property is surrounded by single family homes. Many invasive plants migrate from ornamental plantings around homes into the forested setting.

This forest could be described as being in the later stages of development, meaning the forest is mature in terms of the ages of the trees. The forest itself, because it is open space, serves as crucial habitat for wildlife; however there is not much diversity within the forest in terms of species composition and age. Active forest management will help to promote new growth which will translate into a forest stand structure with varying age classes, which should benefit long term forest health as well as provide more diversity for wildlife habitat.

Timber Cruise

A detailed timber cruise was completed on the property using a 300' by 300' spacing, which yielded of tree data. A cruise is a statistical sample that is used to determine the volumes of various forest products growing on the property. This data was

used to tabulate the current volumes by species on the property and the field notes taken during this cruise helped to create many of the maps in this management plan.

This cruise generates volumes in terms of cords (for all trees 6–11" in diameter, or trees larger than 11" that are not suitable for sawtimber) and board feet (for trees 12" and greater in diameter that could be sold and sawn into boards). The diameter of a tree is measured at 4.5' above the ground, which is an industry standard referred to as diameter at breast height (DBH). From this intensive cruise, a total of four stands are shown for this property. Stands are areas of trees with similar species composition, size, and frequency of occurrence. These stands will be the basis for the methodical analysis of the forest management plan, and are depicted on the following Stand Map.

Landowner Goals & Objectives

The main goal for the town acquiring forest land is to protect it from development. The town recognizes the importance of acquiring land and maintaining it as open space for passive recreation as well as maintaining and managing forest land for wildlife habitat. Many of these town parcels are associated with wetland areas that benefit greatly from the forested buffer they have instead of having pavement and lawns located in or close to the riparian zones. Forests protect water quality by providing a type of filter that keeps non-point source pollution such as sediment from entering wetlands, ponds or lakes directly.

The general goals of the town can best be summed up with the key words of the New Hampshire Tree Farm System, of which the town is a member: wood, water, wildlife, and recreation, meaning the town is interested in a multiple use concept for its forested properties. One of the many benefits that can be derived from long-term sustained yield forestry is the generation of periodic revenue from timber harvests. The benefits from a timber harvest are not only income production, but also the encouragement of quality wood growth on residual trees as well as the encouragement of **regeneration of new trees; in order to grow tomorrow's forest beneath the forest of today**. In short the main goal of long term forestry is to continually improve the overall health of the forest with each harvest entry, by removing low quality and mature trees.

The town owns many of its properties in order to protect sensitive wetland sites and waterways by maintaining a forested buffer between the open water and built–up areas. Because Pelham is a town with a growing population, the municipal officials recognize that the citizens of the town benefit from having wooded areas for walking and nature watching. The town hopes to keep these areas open to responsible recreation without compromising the other three goals.

Finally, the town recognizes that the native wildlife species of New Hampshire need areas for food, water, shelter, and raising young. To that end, diversity is encouraged by utilizing proper forest management practices.

Forest Products Summary Table for Accessible Stands Town of Pelham – Kirby/Ivers Property—Pelham, NH Total Acreage: 71.1+/- acres

Species	Total Board Feet
White Pine	399,589
Red Oak	349,826
Black Oak	29,833
Red Maple	9,695
Hickory	7,847
White Ash	5,755
White Oak	4,584
White Birch	1,372
Total	808,501 ¹

Hardwood Cordwood	437 cords	
Softwood Pulpwood	297 cords	
Total	734 cords ²	





A basal area factor 10 prism was used to conduct the inventory sample. A total of 34 plots, distributed across each forested stand, were taken to arrive at this cruise summary.

² These cordwood totals, both softwood and hardwood, represent all the standing trees with diameters of 6– 11.9 inches found in this block, as well as trees of larger diameters that do not meet sawtimber quality specifications. In order to capture this total volume, all trees of this specification would have to be harvested

¹ This sawtimber total represents all the trees of sawtimber quality 12 inches and greater in diameter found in this block. In order to capture this total volume, all trees of this specification would have to be harvested.









General Management Strategies

Timber – One of the main goals for this property is sound timber management to maintain forest health and to produce periodic income. A list of management strategies on a stand-by-stand basis is discussed later in this plan.

Fish/Wildlife Habitat – Although some activities can manage for a specific plant or animal (species specialists), most forest management activity focuses on habitat generalists by managing for a diversity of species, protecting existing critical habitat, and enhancing existing habitat. Care will be taken retain dead snag trees which provide shelter and areas to forage for a variety of wildlife. Harvesting trees causes some areas to be opened up to sunlight and encourages young growth on the forest floor, which becomes a food source for browsing wildlife. Oak trees, especially white oak will be retained which will provide hard mast for squirrels, turkey and deer.

Soil – Care will be taken to not harvest during wet times of the year, when the ground is saturated, or on excessively steep slopes, to minimize rutting and erosion during harvest operations. Landings will be seeded with a conservation mix and limed at the conclusion of the job to stabilize the soil. Waterbars will be installed on skid trails where necessary.

Water Quality – In accordance to NH law and best management practices, buffers will be left along streams and the edges of wetlands. This will provide soil stabilization along waterways and adequate shade. This shade will decrease water temperature and therefore **increase the water's oxygen**-holding capacity. The wetlands and streams will be left intact to keep the water clean and silt-free. Poled fords, bridges or culverts will be used when crossing smaller streams to further prevent siltation. Fueling of machines will not **take place near the water's edge to prevent pollution**.

Wetlands – In order to preserve the integrity of more sensitive areas of this woodlot, *forested* wetlands will only be harvested under dry or frozen conditions if at all.

Recreational Resources – Skid roads can provide a nice network of trails for recreational opportunities, both for walking and wildlife viewing. To this end, main trails will be kept free of slash where possible.

Aesthetic Values – To maintain aesthetics, logging operations will minimize rutting and soil disturbance and will chip or cut up the tops of trees so they lay close to the ground for rapid decay.

Cultural Features – Care will be taken to avoid breaching or breaking the stone walls during timber harvests unless no openings exist to allow the trees to be skidded to the landing. To accomplish this, loggers will use existing barways for skidding.

Forest Protection – The diversity of tree species does well to protect this property from a forest pest looking for a monoculture of timber. By keeping logging slash low to the ground, decay is speeded up; this prevents too much of a buildup of fuels as a fire hazard.

Threatened/Endangered Species, Unique Natural Communities and High Conservation Value Forest – During all the walks through this forestland, no species were identified as either threatened or endangered. NH Natural Heritage Data based was utilized to check for threatened and or endangered species. If at some time any flora or fauna are identified on this property as such, appropriate measures will be taken to prevent disturbing that species.

This forested parcel is very important to conserve as forest land, the forest composition is primarily and oak pine type which is very typical of southern NH. This particular forest would not be considered a high conservation value forest.

Forest Management Plan

Stand 1 – White Pine/Oak-57.3 acres

Species	Average BA per acre (sq. ft.)	Volume per acre (bd. ft.)	Total Volume (bd. ft.)
Pine, white	43	5,963.0	341,678
Oak, red	47	4,514.5	258,680
Oak, Black	5	491.8	28,183
Maple, red	2	139.2	7,978
Hickory, all	1	112.5	6,448
Oak, white	1	79.9	4,580
Ash, white	0	34.6	1,981
Sawtimber Total	99	11,336	649,526
Cordwood	32	6.1 cds	352 cds
Pulpwood	19	4.6 cds	261 cds
Cord/Pulp Total	51		
All Products	150		

Description:

This large stand is located in the central part of the property. It encompasses 80% of the property. The overstory tree composition is made up primarily of white pine and red oak. The white pine and red oak range in size from small to large sawlog size. The concentrations of overstory pine and oak vary somewhat within the stand, but for the most part, the species composition is fairly homogeneous. Overstory trees seem to be in good health, with some crown damage being observed in the oaks from the 2008 ice storm. Some limited crown damage was also observed in the oak from the October 2011 snow storm which caused extensive tree damage in the Town of Pelham. Much of the red oak growing in the stand is of very good guality. The northwestern part of the stand is at a higher elevation and soil conditions seem to be less conducive to growing red oak. The soils in this part of the stand seem to be well drained and there appears to be more poor quality black oak growing in this location. The better quality red oak is found in the lower elevations towards the central part of the stand. The quality of the white pine growing on the property could be described as medium to good. Many of the pine have large black knots (dead limbs) growing on the boles of the trees, which reduce the quality and desirability of the lumber that can be sawn from these trees.

As can be seen in the stocking data in the table above the basal area is quite high for a mixed-wood stand. As a result understory stocking is quite low as many of the understory trees have dropped out of the stand over the years. Some pole size red maple and white pine can be seen in the understory, however the crowns have been severely suppressed

and these trees are not growing well. Tree regeneration varies throughout the stand as well, but is primarily made up of white pine saplings. Again this young growth has been suppressed over time from lack of sunlight and as a result some sapling mortality has been observed throughout the stand. Areas of the stand that have a heavier oak overstory seem to have better quality pine regeneration growing in the understory. This could probably be attributed to the greater amount of sunlight able to penetrate through the oak canopy.

Soil conditions could be described as being moderately well drained to well drained. Some surface boulders and ledge can be seen in the central portion of the stand, however the stand could be considered to be very accessible to forestry equipment. The terrain is not entirely flat, but is rolling and generally slopes gently to the south. In the eastern part of the stand there is a small wetland area in which there is primarily red maple growing in the overstory and the understory contains mainly high bush blueberry. Soil conditions in this wetland area, as would be expected are very poorly drained.

Recommendations:

This stand is overstocked and growing conditions have stagnated due to over competition. It is recommended that the basal area be reduced to a level that will stimulate growth in both the overstory and understory trees. Poor quality red maple and suppressed white pine should be targeted for removal. These trees are mainly growing in the intermediate strata in the understory. Poor quality black oak in the northern part of the stand should also be looked at for removal. If the basal area can still be kept at an acceptable level, some of the lager, mature white pine and red oak can be harvested from the stand as well. The goal for the residual stand should be a well spaced stand of trees with healthy crown structure. The overall species composition won't change too much, meaning that the residual stand post harvest will remain a white pine/oak stand. Harvesting the stand in the described manner above will also provide sunlight to white pine regeneration in the understory and will hopefully stimulate growth and allow new seedling germination.

Stand 2 – Red Maple-1.9 acres

Species	Average BA per acre (sq. ft.)	Volume per acre (bd. ft.)	Total Volume (bd. ft.)
Oak, red	10	1,127.1	2,141
Ash, white	10	947.9	1,801
Maple, red	5	397.6	755
Sawtimber Total	25	2,472	4,698
Cordwood	65	12.5 cds	24 cds
Cord/Pulp Total	65		
All Products	90		

Description:

This small stand is located in the south western-most part of the property. It is only 1.9 acres in size and can be characterized as a red maple stand. Scattered white ash and red oak can also be found growing in the overstory. The red maple found in the stand is of poor quality. There is very little sawtimber quality trees growing in the stand. Most of the volume can be found in the low grade cordwood category. The understory is made up of a mix of white pine and various hardwood species such as red oak, red maple and white birch. The white regeneration is about 3–10' tall and is suppressed and not growing well.

The terrain is flat and soils are poorly drained. There appears to be an old earth dam on the western side of the stand. A small stream flows out of this dam and joins a larger stream which flows along the southern part of the stand. The stream flows to the south east off of the property.

Recommendations:

Not much management activity should occur in this stand do to wet soil conditions. Some trees along the edge of the stand could be harvested if weather and soil conditions are appropriate. Low grade red maple should be targeted for removal. White ash should also be harvested from the stand if possible. The emerald ash borer, which is an exotic invasive insect, has recently been found in NH and in areas nearby in MA. The insect attacks and kills ash trees rapidly and has devastated the ash population in the mid-west. Other than this limited harvest activity the stand should remain relatively intact, as is. The stand provides habitat for wildlife that utilizes these wooded wetland areas.

Stand 3 - Northern Red Oak , 6.1 acres

Species	Average BA per acre (sq. ft.)	Volume per acre (bd. ft.)	Total Volume (bd. ft.)
Oak, red	100	10,956.7	66,836
Pine, white	10	1,538.3	9,384
Oak, Black	2	268.6	1,638
Sawtimber Total	112	12,764	77,858
Cordwood	30	6.0 cds	36 cds
Cord/Pulp Total	30		
All Products	142		

Description:

This stand is located in the central part of the property. The overstory composition is primarily made up of very good quality Northern Red Oak. Other species noted in the overstory to a lesser extent are white pine red maple and white birch, although the volumes of these species in this stand are fairly insignificant. The red oak ranges in size from small to medium sawlog with some scattered larger sawlog–size trees interspersed throughout the stand. The understory is made up primarily of a mix of red maple, white birch poles that are dead or dying due to over competition from the overstory oak. Regeneration is faring better in this stand growing under the red oak than in the stands that have a heavier white pine overstory.

The terrain is fairly flat or could be described as gently rolling. Soil conditions appear to be moderately well drained to well drained and the stand is very operable for forestry equipment. A small vernal pool is located in the eastern part of the stand. This pool provides habitat for a variety of wildlife species such as frogs and salamanders.

Recommendations:

This stand should be managed for continued growth of red oak. According to the cruise data, the stand is overstocked which would indicate that growth rates will have slowed down due to over-competition. Trees growing in the intermediate strata of the stand are severely suppressed and are either dead or dying. Many of these trees should be targeted for removal. Some of the larger overstory red oak can also be targeted for removal to open up growing space for residual crop trees. This will allow these residual trees to add more crown structure which will subsequently increase growth rates for these trees. The remaining red oak trees, post-harvest should respond vigorously to the more open growing conditions and should also produce an abundance of acorns which will be

beneficial to wildlife that utilizes hard mast as a food source. Harvesting in this stand will also provide sunlight to the already established white pine regeneration in the stand.

Care should be taken when harvesting around the vernal pool in this stand. Adequate shade should be retained around the pool and skid trail location should be laid out in such a manner that would avoid impacting the pool.

Stand 4 - White pine/hardwood , 5.1 acres

Species	Average BA per acre (sq. ft.)	Volume per acre (bd. ft.)	Total Volume (bd. ft.)
Pine, white	75	9,514.8	48,525
Oak, red	45	4,351.5	22,193
Ash, white	5	382.0	1,948
Hickory, all	2	268.6	1,370
Birch, white	2	268.6	1,370
Maple, red	2	191.0	974
Sawtimber Total	131	14,976	76,380
Pulpwood	28	7.6 cds	39 cds
Cordwood	20	4.1 cds	21 cds
Cord/Pulp Total	48		
All Products	179		

Description:

This stand is located in the eastern part of the property. The stocking within the stand is primarily composed of white pine and red oak, however the stand was typed differently than stand one because there is a little more of a mixed hardwood component found within the stand. White ash, hickory, white birch and red maple can also be found growing in the overstory and within the mid–story of the stand. Like the other stands on the property, Stand 4 is overstocked as well, which has caused many trees in the understory as well as the smaller tree regeneration to stagnate and become suppressed. This has resulted in some tree mortality, especially in the mid–strata of the stand. Tree regeneration consists mainly of suppressed white pine, with stocking levels being low to medium. Witch hazel can be found growing in the understory in the north–eastern section of the stand.

The terrain in this stand can be described as being flat and very operable for forestry equipment. Soils are moderately to moderately drained to moderately well drained.

Recommendations:

The inventory data provided by the timber cruise shows this stand as being over-stocked. Like the other stands on the property there has been little to no management activity in the last 20 to 30 years on the property and tree growth has begun to stagnate. Harvesting activity should focus on the removal of suppressed hardwoods growing in the understory of the stand and suppressed pine located in the overstory and understory of the stand. Some better quality overstory pine could also be harvested from the stand for spacing purposes, if the basal area can be kept at an acceptable level. Very little red oak should be harvested from this stand. These trees should be retained as future crop trees. They also will be a valuable source of hard mast production for wildlife in the area. Regeneration is not as prevalent in this stand, so removing groups of trees may create openings large enough to stimulate germination of white pine seedlings on the forest floor. Groups could be ¼ to 1/3 acre in size. Areas to target within the stand for group selection removal should be places where there is very little regeneration present and where there may be an abundance of low quality or overmature trees that could be harvested from the stand. Some of these areas where groups of trees are harvested will also results in some hardwood sprouting which has the added benefit of providing a source of browse for some species of wildlife.

Management Schedule

2014

- Prepare the forest management plan.
- Blaze and paint identifiable boundary lines.

2015-2016

• Improve infrastructure and access onto the property as well as conduct a biomass whole tree harvest, with the purpose of improving the overall growing conditions and quality of the forest.

2025-2035

- Re-establish and upgrade hiking trails post-harvest.
- Monitor the property for wind damage, ice damage, fire, or disease and take appropriate corrective actions as needed to ensure the continued health of this forested parcel.
- Re-assess the property in 10 years and write a new 10-year management plan, specifically looking at the potential for improving growth, quality of trees and wildlife habitat.

Concluding Remarks

The recommendations proposed in this 10-year management plan should be implemented within the next 10 years, although timing will depend on landowner priorities, market conditions, and environmental conditions such as pest outbreaks and weather. Through sound silvicultural practices and using best management practices (BMP's), mature, diseased, and defective trees will be harvested to provide healthier more vigorous growing trees more growing space, and to stimulate regeneration on the forest floor. This forest should be monitored for pest outbreaks and destructive weather events; corrective action should be taken as needed over the next 10 years in response to any such events. These recommendations are silviculturally and operationally sound and should result in meeting the landowners' objectives for their property. Implementing these recommendations will help ensure that this forestland is being managed with long–term sustainability in mind.

Respectfully Submitted,

Minh

Michael Powers, Consulting Forester, NH PLP #379