A Brief History

of the

Caroline A. Fox Research and Demonstration Forest

Hillsborough, New Hampshire

Part of the New Hampshire Division of Forests and Lands

Bringing Research to New Hampshire's Forests

We know that at least 5 former farms make up what is now Fox Forest (Muzzey 2000), including:

The Gerry Kimball Farm settled in 1778 on Concord End Road, and

The Taylor / Kimball farm is the current headquarters of Fox Research Forest
This farm was settled in 1826 by Nathaniel Taylor who was originally from Hancock.

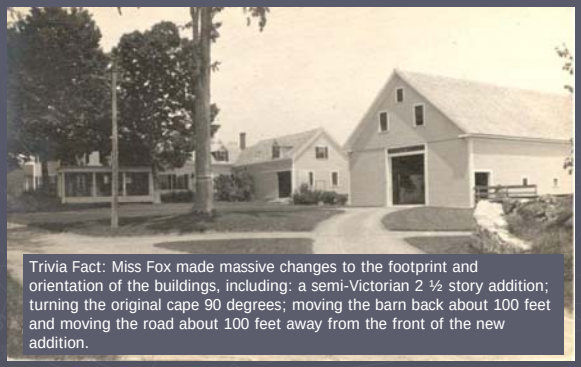
Trivia Fact: The Taylor / Kimball farm produced molasses.

Miss Caroline A. Fox

Miss Fox bought the Taylor farm in 1907 as a summer residence.

Miss Fox was interested in birds and conservation of wildlife. Through these interests, she became interested in forestry and gave generously in support of these activities.

Fox Forest about the time of State Acquisition



Trivia Fact: Miss Fox made massive changes to the footprint and orientation of the buildings, including: a semi-Victorian 2 ½ story addition; turning the original cape 90 degrees; moving the barn back about 100 feet and moving the road about 100 feet away from the front of the new addition.

Miss Fox donated her land in 3 pieces to the State of New Hampshire.

The first tract was donated in 1922 and came under management by the State. The second piece was donated in 1926. The final Fox land donation was done in 1928.

Miss Fox also established a trust fund "for purposes of forest research and demonstrations of forestry." After her death in 1933 the trust came to the state.

Trust Terms:

- Maintain a forestry research and demonstration station in Hillsborough, NH
- Conduct forestry researches and demonstrations bring about a use of more scientific methods of forestry utilization and management.

In 1933 Dr. Henry I. Baldwin was hired as the first Research Forester, a position he held until 1963.

The Baldwin family circa 1940

The house was both Dr. Baldwin's office and home. It now provides office and lab space for Fox, the Forest Management & Forest Protection Bureaus.

Fox was ideal to "serve as a demonstration of how low grade pastured woodlands in (southern NH) can be improved in quality by careful culture." (Henry Baldwin)

Two Focuses of Dr. Baldwin's work – Provenance Tests & Applied Research

Research at Fox Forest

Fox Forest Notes

1	Publications from the Fox Forest	Baldwin	1938
2	Table of Cord Contents	Holden	1938
3	An Attempt to Increase the Small Bird Population in an Old Growth Forest in NE	Wallace & Wyman	1938
4	Survey of Outlets for Forest Products in New Hampshire	Hopkins	1938
5	Comparison of Planting in Ploughed Furrows and Unbroken Sod	Baldwin	1938
6	Interception of Snowfall by Forests	Baldwin	1938
7	Variations in Dry Weight of Pine Needles from Different Sources	Baldwin & Hopkins	1938
8	Comparison of Spring and Fall Planting	Baldwin	1938
9	Rate of hatching of Gypsy Moth Larvae	Holden	1938
10	Effect of Girdling Hardwoods on Diameter Growth of Conifer Understory	Baldwin	1938

The Fox Forest Notes generally deal with everyday forest management topics

There are currently 128 individual Fox Forest Notes on file!
105 were published during Dr. Baldwin's tenor at Fox.

Several Fox Note focus on the aftermath of the 1938 hurricane....

11	Survival of Nursery Stock After Cold Storage	Hopkins	1938
12	**Hurricane Damage to the Fox Forest**	**Baldwin**	**1939**
13	Forest Insects and Diseases Prominent in New Hampshire - 1938	Baldwin	1938
14	Direct Seeding Experiments	Baldwin	1939
15	Forest Statistics for New Hampshire	Baldwin & Brown	1939
16	Costs of Girdling Hardwoods	Baldwin	1939
17	Phenological Observations	Baldwin & Holden	1939
18	Humus Types on the Fox Forest	Baldwin	1939
19	Spruce Sawfly Infestation as Indicated by Cocoon Population	Brown and Paquette	1939
20	Experiments in Marketing Fuelwood	Baldwin	1940
21	**Natural Regenration on White Pine Lands Following the Hurricane**	**Baldwin**	**1940**
22	Forest Soil Biota in Relation to Soil Transformation	Johnston	1940
23	A Mull-Forming Biota Under the Red and White Pine Type	Johnston	1940
24	Forest Fire Weather Observations 1939-1940	Brown	1941
25	Course of Seasonal Height Growth in Summer Planted White Pine	Baldwin & Hopkins	1941
26	Growth of Hybrid Poplars	Baldwin	1941
27	Roofing Cordwood Piles	Baldwin	1941
28	Diameter Growth on Fox Forest 1935-40	Baldwin	1941
29	**The Porcupine as a Factor in Regeneration of Hurricane Areas**	**Spencer**	**1941**
30	**Rapid Method of Testing White Pine Regeneration**	**Baldwin & Flemion**	**1941**

1938 Hurricane

The hurricane of 1938 blew down about 1,567,000 board feet (3134 cords) of timber at Fox Forest. Salvage crews harvested about 1,170,059 board feet (2,340 cords) of it.

Many address practical questions of the day...

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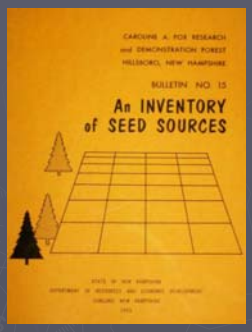
31	Charcoal Making in New Hampshire	Baldwin & Weld	1941
32	Protection of White Pine from Weevil Injury by Spraying	Baldwin	1942
33	Insect and Disease Control by Forest Management	Baldwin	1946

Fox Forest Bulletins

Between 1934-1980 twenty publications.

Plantations



Many exotic and native tree plantations have been established at Fox Research Forest and elsewhere on New Hampshire State lands since the early 1930s (Baldwin 1965). These plantations consist chiefly of **Norway spruce** *Picea abies*, **European larch** *Larix decidua*, and **Scot's pine** *Pinus sylvestris*. Other species planted to a lesser extent include **Douglas fir** *Pseudotsuga menziesii*, **hybrid poplars** *Populus spp.*, **hybrid chestnuts** *Castenea spp.*, **concolor fir** *Abies concolor*, **red spruce** *Picea rubens* and **Austrian pine** *Pinus nigra*.

The two species that received the greatest attention from the Fox Forest research program are **Norway spruce** and **European larch**. (K. Desmarais)

Larch

Fox Tree Nursery

Fox Forest is the site of an International Union of Forest Research Organizations (IUFRO) provenance test for **European larch**. Seed collection (occurred) from 1942 to 1944, seeds were planted at the Fox Forest nursery in 1946 and out-planted in 1948. This plantation contains replicates of 14 sources of seed from as far north as N58º 02' and as far south as N49º 16'. Countries represented in the seed sources include Germany, the Czech Republic, Scotland, Poland, Finland and Sweden. There also are several non-IUFRO plantations of larch at both (Fox and Vincent State Forest) including 2 hybrid larch plantations (Dunkeld). (K. Desmarais)

Larch

Norway Spruce


Fox Tree Nursery

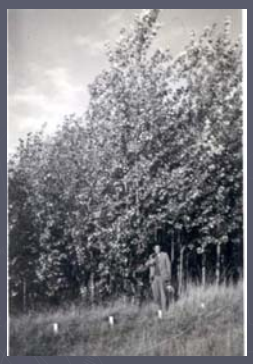
Vincent State Forest is the location of a IUFRO provenance test for Norway spruce. The seeds were planted in (the Fox) nursery in 1938 and transplanted in 1940 and out-planted in 1942. This plantation contains replicates of 25 seed sources ranging from as far north as N65º 58' to as far south as N43º 50'. Countries represented in the seed sources include the Czech Republic, Finland, Italy, Yugoslavia, Latvia, Norway, Poland, Romania, Sweden and Switzerland. Norway spruce was planted in a few other Non-IUFRO plantations at both (Fox and Vincent). (K. Desmarais)

Norway Spruce

Other Plantations

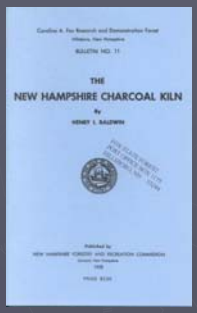

Fox Tree Nursery

Other plantations of interest are the 1943 trial of Eastern white pine at Vincent State Forest, the 1952 plantation of Douglas fir at Fox Forest and the 1935 plantation of hybrid poplars at Fox Forest.
(K. Desmarais)



Hybrid poplars/cottonwoods

Charcoal Making



Manufacturing and Marketing Natural Hardwood Charcoal in Virginia. Natural hardwood charcoal affords an opportunity for utilization and marketing of small diameter wood and wood from non-commercial tree species in Virginia. ... to encourage landowners, forest managers and entrepreneurs to realize the potential of this opportunity. (Dr Philip Radtke, VA Tech.)

Peter Allen followed Henry Baldwin as Research Forester from 1964-1974. His focus was on growth and pruning.

107	White Ash and Red Oak Growth Rates	Allen	1964
108	Should We Prune New Hampshire White Pine ? - How High ?	Allen	1964
109	How Fast Should Pruned White Pines Grow ?	Allen	1964
110	A Case for Hardwood Pruning	Allen	1964

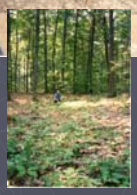
He was followed by Phil Verrier

112	Trees and History	Verrier	1976
113	Pales Weevil Damage After Overstory Removal	Lavoie	1977
114	20 Years Basal Area Growth on Fox Forest	Baldwin & Verrier	1977
115	Growth of exotic Larches on Fox Forest	Baldwin & Verrier	1979
116	Fuel Conversion Saves at Fox Forest	Verrier	1981
117	A Comparison of Three Norway Spruce Thinnings	Verrier	1981

More Recent Work

Growth & Yield of Pine/Oak types.

Red oak seedling improvement



Regeneration and release of white pine and red oak

1999 Timber Harvest Assessment

The study looked at 57 timber harvests covering all 10 counties.

FoxDen Analytical Tools

- FoxDen Stand Density Analysis
- Fox DS Cruiser w/ LMS Interface
- Flat angle Gauge Calculator
- “LogVol” Timber Volume Calculator
- SOFTCORD
- HARDCORD
- Form Class Calculator

Crop Tree Release of Young Hardwoods

Max Israel, red maple crop trees during the first post-release growing season. (80 trees/acre)

Fox Red Oak Crop Tree Release

Modified Diameter Limit Cutting

Pre-commercial release of White Pine

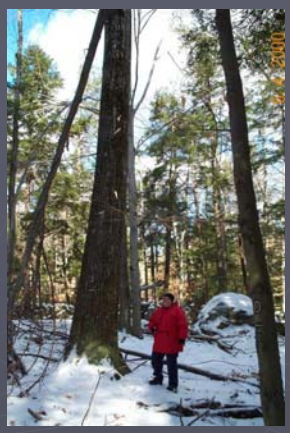
Forest Management & Invasive Exotic Species

In 1952 Continuous Forest Inventory plots were established at Fox Forest.

Re-measurement in 1955, 1960, 1965, 1975, 1984, 2001

Last re-measurement was done by Susan Campbell

Next re-measure in 2009

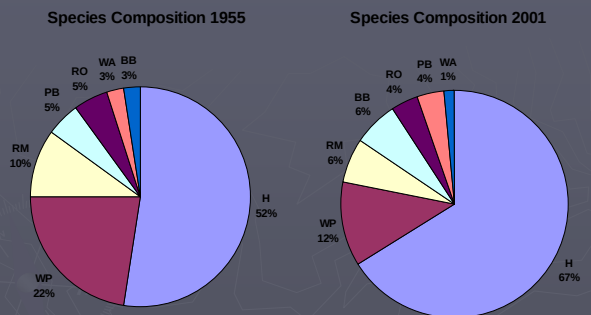


Changes in Volume, BA & D_q per year

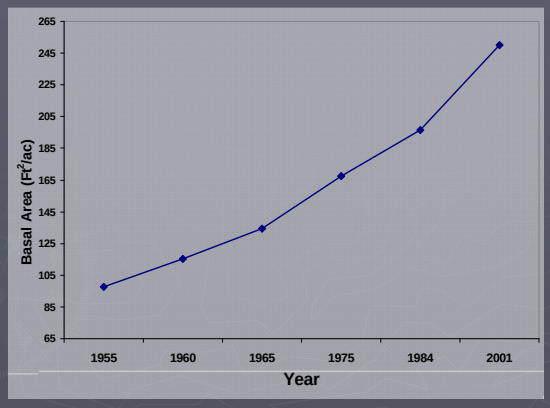
1984 - 2001

		Merchantable/Ac.		Stem			2001
Comp.	# of Plots	Cu.Ft./Yr	Cords/Yr	Recruitment	BA/Yr	Dq/Yr	G Cords/Ac.
1	8	117.79	1.39	7.06	2.91	0.00	23.56
2	7	88.21	1.04	5.76	2.50	-0.02	17.64
3	7	34.08	0.40	3.57	1.09	-0.01	6.82
4	12	157.26	1.85	7.87	3.92	-0.04	31.45
6	7	126.35	1.49	4.62	2.82	0.02	25.27
Mean		104.74	1.23	5.78	6.65	-0.01	20.95

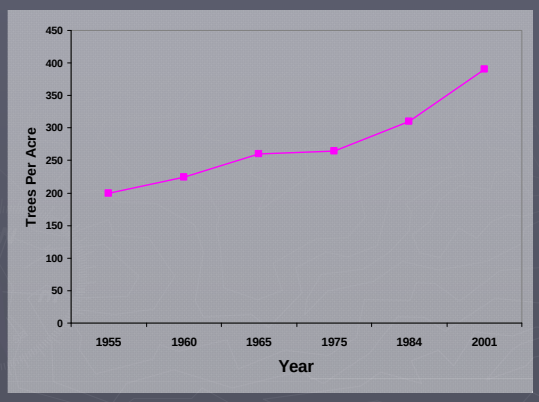
CFI Plot 137



CFI Plot 137



CFI Plot 137



Harvest planning based on growth data from CFI plots suggests that 861 cords are available for cutting annually. Also, the CFI plots indicate that the average acre contains about 54 cords. The 10 acres of regeneration cutting should produce 540 cords of timber leaving 320 to be harvested from thinnings or slightly more than 10 cords per acre from thinnings.
(K. Desmarais, Fox Management Plan)