Timber Inventory
Prepared for:
Nordic Aquafarms, Inc.
159 High Street
Belfast, ME 04915

Location: Belfast, Maine
Date of data collection:
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Prepared by:

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Purpose:

The purpose of this timber inventory is to provide Nordic Aqua Farms, Inc. with volume estimates on the standing timber in the project area.

Site Description:

The undeveloped project area located in Belfast, Maine consists of forestland and field gradually sloping southward towards Belfast Reservoir Number One. The forested stands are either hardwood or pine dominated. The composition and growth of the stands and evidence of old barbwire fence suggests that areas of the forested property were once fields or utilized for pasture. Small portions of the forested stands appear to have been recently selectively harvested or cleared for access.

Methods Statement:

Per Natural Resource Conservation Service forest inventory requirements, one sample plot was inventoried every three acres. To meet this requirement and reduce any bias, a GIS platform was used to systematically place variable radius sample plots across the forested property. The forested stands were delineated as either pine or hardwood (see attached map). Seven sample plots were inventoried across the two pine stands (1 & 3) and nine sample plots were inventoried in the hardwood stand (2). The pine stands were treated separately from the hardwood stand in the stand metrics and volume calculations to reduce variability and improve accuracy. This inventory also meets NRCS requirements with a showing that the estimated mean basal area per acre for each inventoried stand was within an allowable error less than 30% with a probability (confidence level) of 68% (see Table 1).

Table 1. Sample plots per stand and inventory accuracy

Stand	Acreage	Sample Plots	Inventory Sampling Error in Percent with 68% confidence Level
Pine Stand 1 & 3	±15	7	14.1
Harwood Stand 2	± 19	9	14.4

The center of each sample plot was located on the ground using a GPS enabled device. At each sample plot center, a 10 basal area factor (BAF) prism was used to determine the in trees that would be inventoried in that plot. For every in tree, the tree species, tree value class (1=desirable quality tree, 2=acceptable quality tree, and 3=cull tree), and the diameter at breast height (DBH) was measured and recorded for trees $\geq$4.5 inches DBH with calipers and a diameter tape. Tree heights were measured and recorded on every 10th tree using a clinometer.

Microsoft Excel and Microsoft Access were used to input the data into the Forest Vegetation Simulator (FVS) and Suppose Interface, USDA Forest Service program. The Northeast FVS variant was used to derive specific measurements about each inventoried stand. All data interpretation is assumed to be as accurate as known possible and is subject to the accuracy of the field methods, the data summarization and the FVS projected models. The volume estimates were gathered using the tree value classes and current market specification for pulpwood and sawlogs. FVS outputs of pulpwood were calculated and reported in cubic feet and converted to tons and cords and outputs of sawlogs were calculated and reported in board feet using the international 1/4 -inch log rule and converted to thousand board feet (MBF) and cords.

Conclusion:

The volume estimates from the timber inventory are provided in Tables 2-9. The estimates are broken down by stand type and per species. In addition, the total per acre estimates for each stand type and the total stand estimates of volume are also provided. The total volume of standing timber for the $\pm$34 acres of forested area within the project (Pine Stand 1, Harwood Stand 2, and Pine Stand 3) is **1,146 cords.**

Table 2. Pine stand 1 and 3: inventory metrics

	Area of stand (acres)	Basal Area (square feet/acre)	Trees Per Acre	Quadratic Mean Diameter (inches)
Pine Stand 1 & 3	±15	131	169	11.9

Table 3. Pine stand 1 and 3: pulpwood per acre volume by species

Species / Product	Volume (cubic feet/acre)	Volume (tons/acre)	Volume (cords/acre)
red maple pulp	166	4.15	1.84
American beech pulp	34	0.92	0.41
Paper birch pulp	182	4.73	2.10
bigtooth aspen pulp	143	3.07	1.43
balsam fir pulp	180	4.05	1.93
eastern white pine pulp	766	13.41	6.23
northern white cedar pulp	30	0.54	0.32
Total pulpwood	**1,501**	**30.87**	**14.26**

Table 4. Pine stand 1 and 3: sawlog per acre volume by species

Species / Product	Volume (board foot/acre)	Volume (MBF/acre)	Volume (cords/acre)
balsam fir logs	109	0.11	0.22
eastern white pine logs	11,873	11.87	23.74
Total logs	**11,982**	**11.98**	**23.96**

Table 5. Pine stand 1 and 3: total volume

Product	Cords
Pulpwood	214
Sawlogs	359
Total	**573**

Table 6. Hardwood stand 2: inventory metrics

	Area of stand (acres)	Basal Area (square feet/acre)	Trees Per Acre	Quadratic Mean Diameter (inches)
Harwood Stand	±19	119	250	9.4

Table 7. Harwood stand 2: pulpwood per acre volume by species

Species / Product	Volume (cubic feet/acre)	Volume (tons/acre)	Volume (cords/acre)
red maple pulp	278	6.95	3.09
sugar maple pulp	34	0.94	0.35
bigtooth aspen pulp	247	5.31	2.47
yellow birch pulp	79	2.33	0.86
paper birch pulp	29	0.75	0.34
red oak pulp	864	27.65	10.24
eastern white pine pulp	168	2.94	1.37
balsam fir pulp	90	2.03	0.96
eastern hemlock pulp	56	1.40	0.58
red spruce pulp	73	1.24	0.59
Total pulpwood	**1,918**	**51.54**	**20.85**

Table 8. Hardwood stand 2: sawlog per acre volume by species

Species / Product	Volume (board foot/acre)	Volume (MBF/acre)	Volume (cords/acre)
red oak logs	2,722	2.72	5.44
eastern white pine logs	1,952	1.95	3.90
Total logs	**4,674**	**4.67**	**9.34**

Table 9. Hardwood stand 2: total volume

Product	Cords
Pulpwood	396
Sawlogs	177
Total	**573**