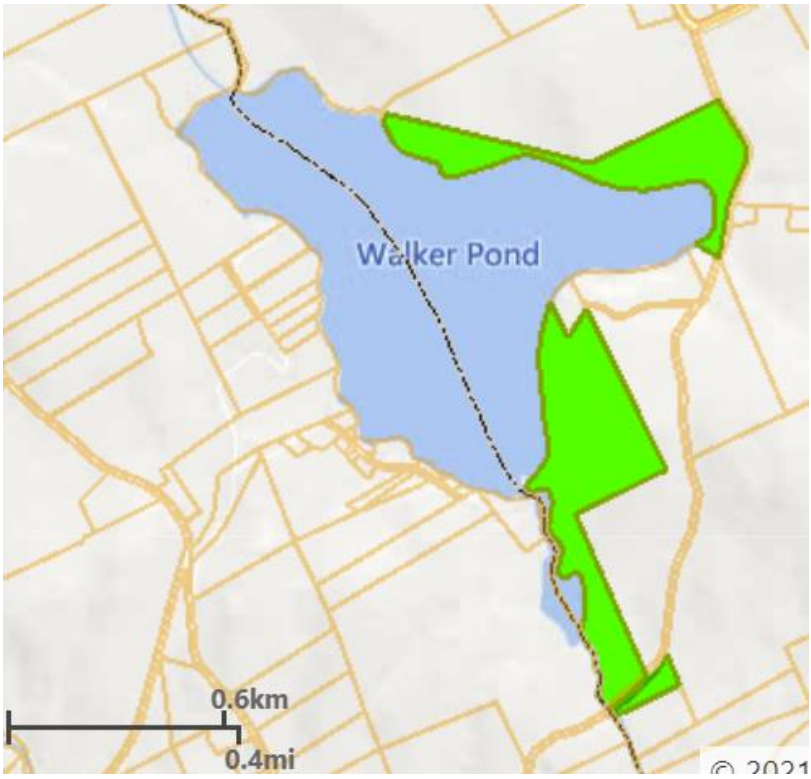
Town of Boscawen, NH

Forest Inventory and Management Plan for Walker Pond Lots



Prepared for Boscawen Conservation Commission

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Introduction and Purpose

The Town of Boscawen's Walker Pond Lots refer to two non-contiguous tracts of undeveloped forest land owned by the Town of Boscawen located on the shoreline and within the drainage watershed of Walker Pond, off Chadwick Hill Road. The two tracts (Map 45/Lot 74 and Map 45/Lot 78 contain approximately 92 acres, of which 77 acres is upland and riparian forest and approximately 15 acres is forested wetland and marsh along Walker Pond and Beaverdam Brook.

The town has entrusted the Boscawen Conservation Commission (BCC) with the responsibility for making and implementing recommendations on the use and management of the Walker Pond Lots for forestry, wildlife habitat, pondshore protection, and outdoor recreation. Little has been documented about the condition or value of the timber resource on this property, or the extent of its public recreational use or use by a diversity of wildlife habitat.

The BCC has determined to undertake a comprehensive inventory of timber resources to better ascertain the quality, quantity and value of this resource. This information is used to develop a set of recommended forest management practices to guide the town on which portions of the property 1) may be suitable for potential future forest/wildlife habitat management and development of outdoor recreation, 2) have unique and important wildlife habitat features, and/or 3) unique and important ecological values. These recommendations can then help the BCC and Town of Boscawen determine whether some portion or all the property may be suitable for designation as a Town Forest, certified Tree Farm, and/or some form of permanent protection as conservation land.

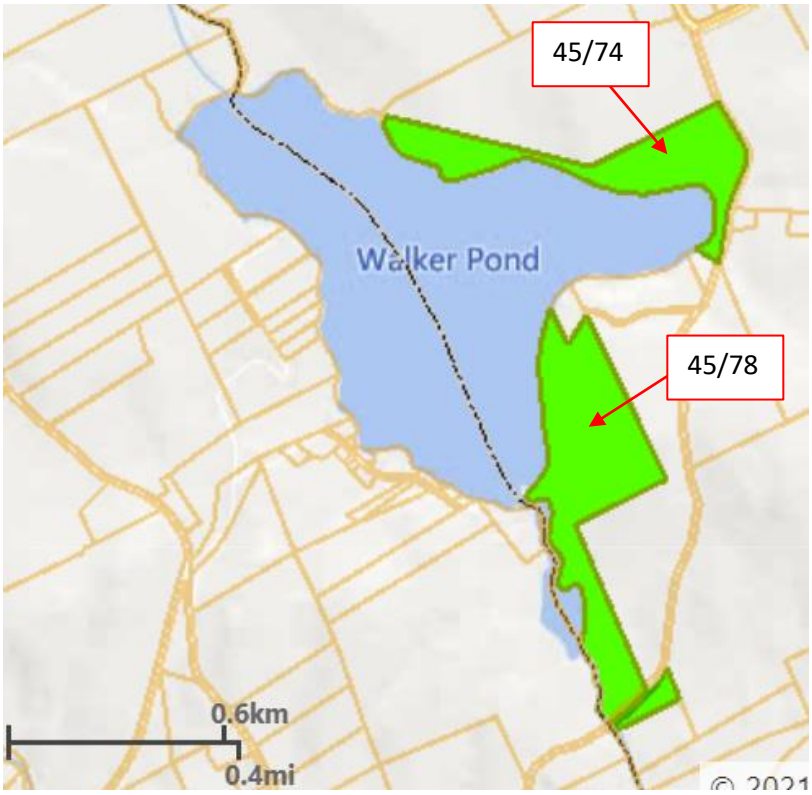
This report presents the results of the forest resource inventory and management recommendations.

History of Town Acquisition and Land Use

Sometime in the early 1900's, the Penacook-Boscawen Water Precinct (PBWP) acquired these lots to protect the shoreline of Walker Pond, which served as the precinct's surface water supply until the early 1990's. At that time, the precinct developed a new source of drinking water from stratified drift aquifer wells drilled off Route 3 near the Merrimack County Nursing Home. The PBWP retained ownership until 2021 when precinct voters authorized the sale of the lots to the Town of Boscawen, with the intention that the lands would be managed by the Boscawen Conservation Commission on behalf of the town as permanent conservation lands. Legal title passed to the town on September 29, 2021. A survey completed in July 2019 determined acreage as follows:

Map 45/Lot 74	29.43 acres
Map 45/Lot 78	53.05 acres
TOTAL	92.48 acres

Figure 1. Town of Boscawen tax map boundaries showing two lots that comprise Walker Pond Lots.



These lands were all cleared for agriculture during the late 18th and 19th centuries, as evidenced by extensive stone walls throughout. Some portions may have been cropped, while sloping, ledgy and wet areas either remained forestland (but were periodically harvested) or were pastured.

Following agricultural abandonment in the late 19th century, nearly the entire tract returned to forestland. It has been harvested infrequently since that time, with the most recent harvest taking place in 2011-2012 on approximately 40 acres of 45/78 in a sale administered by the late John Conde. There are no stumps or other evidence of recent harvesting on 45/74.

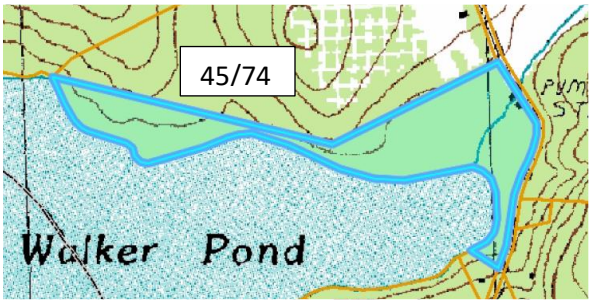
Description of Land

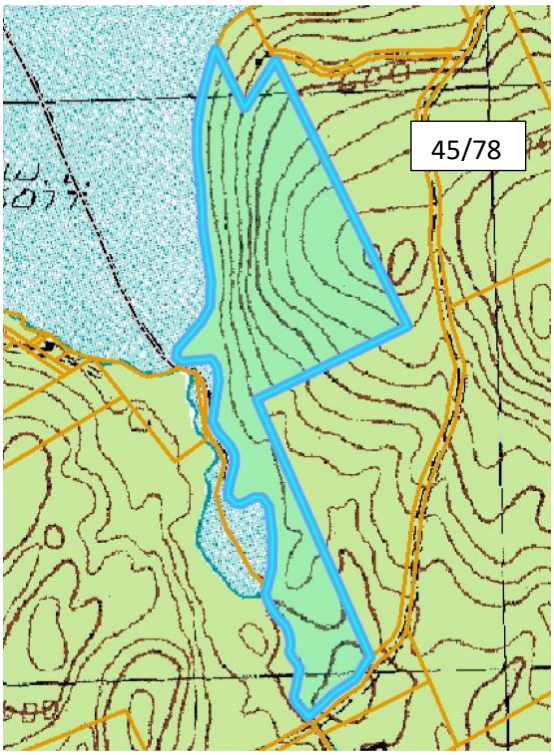
The Walker Pond Lots cover an elevational transect ranging from 500 to about 700 feet above sea level, with the low point along the pond and Beaverdam Brook just below the dam. The pond itself has an elevation of 507 feet above sea level. The land is gently sloping with some ledgy outcrops on 45/78 and some slopes exceeding 25%. 45/74 is generally flat with about four acres of low forested wetland pockets. There is approximately three acres of open marsh behind the former PBWP pump house and another eight acres of open marsh/wetland along the Beaverdam Brook outflow to the dam. These are high habitat value wetlands. The property boundary along Beaverdam Brook is the centerline of the brook, which has shifted over time due to beaver activity and flooding. Figure 2 shows topography.

There are a small number of vernal pools located on 45/78, especially in ledgy areas where water has collected in bedrock depressions. These “perched” wetlands and pools have unique plant communities and invertebrate communities. There are no significant streams on either tract, although seasonal water courses can be found on 45/74 draining from the north toward Walker Pond.

The forest is a mixed hardwood/softwood forest type dominated by northern red oak, red maple, eastern white pine and hemlock, with lesser components of black birch, American beech, white and black oak, and white ash. Hemlock tends to hug the pond and Beaverdam Brook shoreline.

Figure 2. Topography of Walker Pond Lots. 20' contour intervals. Source: USGS.





Site Quality/Soils

Soil types are the ultimate determinant of what types of forest tree species will grow, how productive the land is (site quality) and how rapidly trees grow to commercial sizes. The Walker Pond Lots are characterized by a range of soil types illustrated in Figure 3.

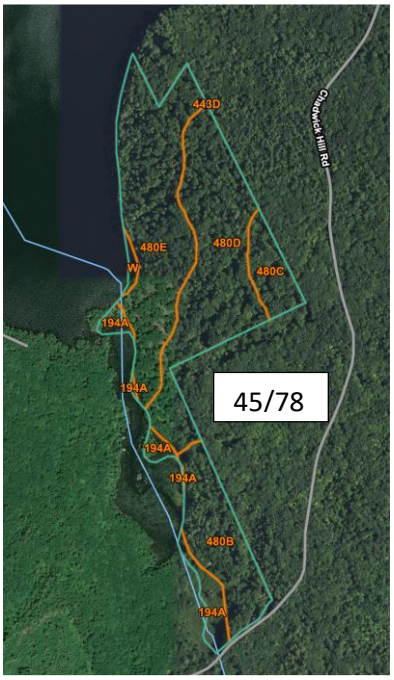


Figure 3. Soils map of Walker Pond Lots (2014 USDA NRCS soils survey).

For understanding forest productivity, the USDA Natural Resource Conservation Service has grouped forest soils into Important Forest Soil Groupings, summarized in Table 1. The entire acreage of the Walker Pond Lots is comprised of highly productive soil groupings: IA, IB, and IIA.

Table 1. Important Forest Soil Groupings of Walker Pond Lots (Source: USDA NRCS 2014 soil survey)

Soil Type	Important Forest Soil Group
167C - Canterbury fine sandy loam, 15 to 25 % slopes, very stony	IA
194A - Catden mucky peat, 0 to 1 % slopes, ponded	
443D – Chichester Sandy Loam	IB
459B - Skerry variant fine sandy loam, 3 to 8 % slope, very stony	IA
479B – Gilmanton Fine Sandy Loan	IA
480B, C, D - Tunbridge variant-Woodstock-Henniker complex, 8 to 15 % slopes, very stony	IB
480E - Tunbridge variant-Woodstock-Henniker complex, 25 to 60 % slopes, very stony	IIA
647B – Pillsbury Fine Sandy Loam	IIA

Group IA consists of the deeper, loamy, moderately well-drained and well-drained soils. Generally, these soils are more fertile and have the most favorable soil-moisture conditions. The soils in this group are well-suited for growing high-quality hardwood veneer and sawtimber, especially northern red oak. Softwoods are usually less abundant and are best managed as a minor component of predominantly hardwood stands. Where softwoods are present, such as white pine, they will be difficult to maintain over time.

Group IB generally consists of soils that are moderately well-drained and well-drained, sandy or loamy-over-sandy, and slightly less fertile than those in group 1A. Soil moisture is adequate for good tree growth but may not be quite as abundant as in group 1A. Group IB soils are well-suited for growing less-nutrient-and-moisture-demanding hardwoods such as northern red oak. Softwoods generally are scarce to moderately abundant and managed in groups or as part of a mixed stand. Successful regeneration of softwoods and the establishment of softwood plantations are dependent upon intensive management.

Group IIA consists of diverse soils and includes many of the soils that are in groups IA and IB. The soils in IIA, however, have limitations such as steep slopes, bedrock outcrops, erodibility, surface boulders, and extreme stoniness. Productivity of these soils isn't greatly affected by those limitations, but management activities such as thinning, and harvesting are more difficult and more costly.

It will be important in any forest management activities to ensure that silvicultural objectives are consistent with suitability and adaptability of soil types based on these groupings.

Forest Types, Natural Communities and Wildlife Habitat Diversity

The forest types of the Walker Pond Lots are typical of the mixed **white pine/hemlock/oak forests** of former pastureland in the Merrimack River Valley of central New Hampshire. These lands were all cleared for agriculture, as evidenced by the stone walls found along boundaries and in the interior of

both lots. Red/black oak, white pine, hemlock, black birch, white oak, and red maple comprise over 90% percent of sawtimber stocking, as will be discussed in more detail later in this report. Black and white oak are prevalent in drier more ledgy sections of 45/78. Young blight infected American chestnut root sprouts can be found throughout 45/78.

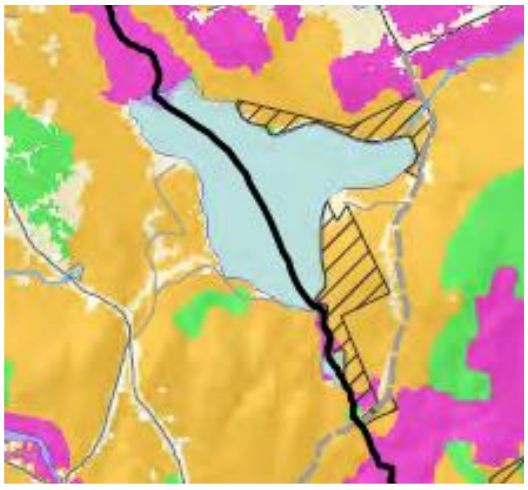
Black birch, beech, and red maple are the predominant species regenerating in sections of 45/78 where the 2011-2012 harvest occurred. There is very little oak regeneration even though red oak is the dominant overstory species. Some white pine regeneration can be found in former skid trails where mineral soils were exposed during the harvest. Densely stocked beech regeneration will be a major management challenge in the decades to come.

Sadly, white ash is showing evidence of dieback and mortality due to the recently introduced Emerald Ash Borer, which has become broadly established through the Merrimack Valley. Mortality is expected to be nearly 100% within the next several years.

The New Hampshire Natural Heritage Bureau maintains a database of threatened or rare plants and plant communities. A query of the database did not indicate any known records for rare plants or plant communities on the Walker Pond Lots. This does not mean they are not present, but simply that no official records exist in the vicinity of this ownership. A closer evaluation of the Beaverdam Brook flowage south of the pond may indicated the presence of unique aquatic plants.

The Walker Pond lots are characterized by diverse habitat for a wide range of game and non-game wildlife species. The combination of upland oak forest, dense softwood stands of hemlock and pine, pond frontage, wetlands, and vernal pools throughout and diverse topography make this tract rich in habitat values. The 2015 NH Wildlife Action Plan developed by the NH Fish and Game Department has mapped the entire state for its importance for wildlife habitat, using a variety of criteria to score lands based upon their importance. Figure 4 shows much of the area of the Walker Pond lots in the supporting landscape ranked habitat importance in New Hampshire (buff color). Some highest ranking habitat value (magenta) can be found along the Beaverdam Brook outflow, associated with the wetland complex here.

Figure 4. Mapping of high-ranking wildlife habitat from 2015 NH Wildlife Action Plan. Walker Pond Lots are cross-hatched. Map courtesy of NH Fish and Game Department.



Diverse habitats, including upland hardwood, dense softwood, wetlands and open water provide habitat for game species such as moose, bear, deer, wild turkey, ruffed grouse, eastern coyote, fisher, and a wide range of non-game species such as bobcat, porcupine, interior nesting songbirds, great blue heron, raptors, small mammals, and a wide range of other species. Loons are known to nest on Walker Pond though the location of their nest(s) are uncertain. The protection of these habitats and their perpetuation and enhancement through careful management practices is a priority.

Access and Recreational Use

The only direct recreational access from a public way to 45/78 is off Chadwick Hill Road, a Class VI road, near the Webster town line. 45/78 has evidence of infrequently used trails that mostly follow skid roads from the 2011-2012 harvest. A main skid trail is actively maintained, possibly for snowmobile use, although it is not part of the designated trail system. Access to 45/74 is off the paved portion of Chadwick Hill Road just below the junction with Water Street. There are no discernable trails on 45/74. A primitive public boat access site and ramp exists on 45/74. A six horsepower motor limit restricts access to small power boats and unpowered watercraft such as canoes and kayaks.

Boundary Lines

It is important to any land ownership to have clear and unambiguous boundary lines easily identifiable to both the owner and abutters. Boundary lines over much of the Walker Pond Lots either follow stone walls or water courses. All lines not defined by water were blazed and painted (blue) approximately 25-30 years ago, which are generally easy to follow; however, these boundaries need re-blazing and painting, especially where lines do not follow stone walls.

Forest Inventory

The timber inventory summarized in this report was conducted using a two-stage sampling strategy utilizing a 20 basal area factor prism to tally trees for sawtimber, acceptable growing stock, unacceptable growing stock, and cavity trees, and an 80 basal area factor prism to tally a smaller number of trees for diameter, merchantable height, and product classification. Product classification included sawlogs, pulpwood (softwood) and cordwood (hardwood). Only trees >5" diameter breast height (DBH) were tallied.

A total of 54 sample points were deemed sufficient to provide acceptable statistical precision on this 92 acre property given its relative homogeneity and small size. Sample point locations were laid out on a paced 250' x 250' grid emanating from the first sample point in each tract (45/74 and 45/78), which was established randomly. Field work was conducted over four days in December 2021 and January 2022.

Analysis of resulting sample data was prepared using **Fox DS Cruiser** software developed by former State of NH Forest Management Bureau Chief Ken Desmarais. This sampling methodology and software is highly respected, widely utilized by professional foresters, and made available without charge by the NH Division of Forests and Lands.

Standing Timber Volume and Value

The inventory showed total standing sawtimber volume of **646,663 board feet** for all species, **368 tons of softwood pulp (pine and hemlock), and 522 cords of hardwood firewood** (Table 3). Volumes had a sampling error of +/-11.8%. The average number of trees per acre is 147 and average basal area (a measure of stand density) is 108 square feet per acre, indicating a forest of slightly above average stocking. (Table 4). Stocking is significantly higher on 45/74 than on 45/78 due to the considerable volume removed in the 2011-2012 harvest. That harvest removed 178,000 bf of sawtimber, mostly white pine and oak, 173 tons of hardwood pulp, and 110 cords of firewood.

The total volume removed was approximately 13 cords per acre on the 40 acres that were harvested, or about 35% of stocking at the time. Acceptable growing stock averages 71% of volume over both tracts, indicating generally good quality growing stock.

Table 2. Total sawtimber, pulpwood and firewood volumes on the Walker Pond Lots.

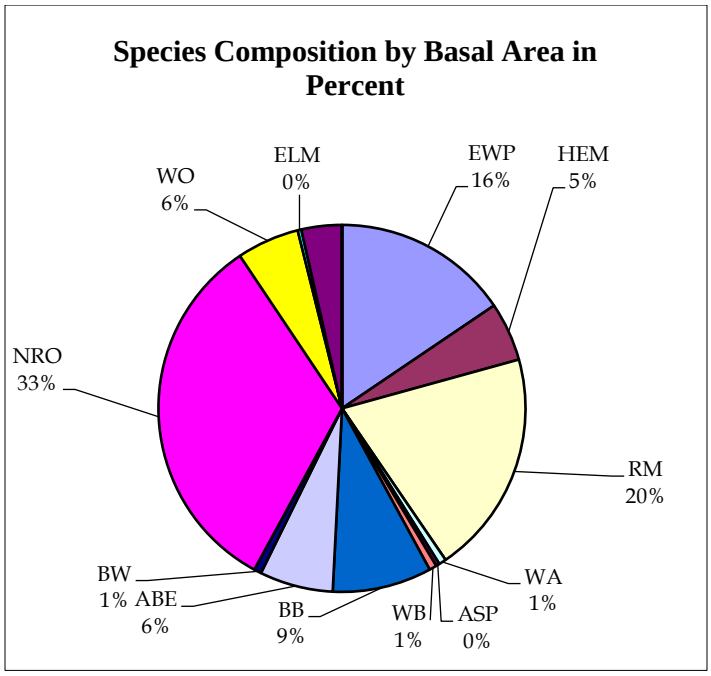
Spp	Sawtimber Bf/Acre	Total Pulp Cords	Sawtimber Mean Ht (logs)	Total Bf Sawtimber	Total Cords
EWP	2,583	236	2.5	237,610	
HEM	473	132	2.3	43,553	
RM	147		1.4	13,503	88
WA	66		3.0	6,043	19
ASP	49		2.0	4,489	23
WB					7
BB	257		1.0	23,673	60
ABE	29		1.0	2,685	43
BW					9
NRO	3,030		1.5	278,738	184
WO	227		1.2	20,870	52
ELM					3
BO	168		1.0	15,499	34
Total	7,029	368		646,663	522

Table 3. Basal area, total trees per acre, relative density of stocking, and percent acceptable growing stock (AGS) on Walker Pond Lots.

Spp	Total Trees/Acre	Total BA/Acre	% BA/ac by Spp	Rel Density	% AGS
EWP	10.8	16.8	16%	5.9	90%
HEM	5.1	5.6	5%	2.6	69%
RM	45.6	21.4	20%	18.0	39%
WA	0.4	0.7	1%	0.5	50%
ASP	0.2	0.4	0%	0.2	100%
WB		0.7	1%	0.0	50%
BB	17.9	9.5	9%	7.8	70%
ABE	15.1	7.0	6%	5.9	25%
BW	0.7	0.7	1%	0.4	50%
NRO	38.1	35.4	33%	31.4	90%
WO	8.1	6.0	6%	5.0	71%
ELM	0.6	0.4	0%	0.2	100%
BO	4.2	3.9	4%	3.2	73%
Total	146.9	108.4	100%	81	71%

Northern red oak/black oak, red maple, and white pine comprise 73.6% of basal area, with the majority of commercially important volume in red oak and white pine (Figure 5).

Figure 5. Species composition by basal area in percent on the Walker Pond Lots.



slightly more than half of total volume, with 51% (75% of total sawtimber volume) in the commercially valuable species of white pine (39% of total sawtimber), and red oak (36%). Additional sawtimber volume is supplied by hemlock, white oak, black oak, sweet birch and red maple.

By applying conservative estimates of current market pricing for sawtimber stumpage value, we calculate an estimate of total sawtimber, pulpwood and firewood capital value of approximately $171,566. This is presented in Table 5. This does not include timber capital value of biomass fuel chips or other low value products, and so represents a conservative estimate of the value of the timber resource on the Walker Pond Lots.

Table 5. Estimate of total capital timber liquidation value using conservative estimates of current market pricing for sawtimber, pulpwood and firewood stumpage

Species/Product	Sawtimber Volume (1,000 bf)	Stumpage Value*	Total Capital Value
HEM eastern hemlock	43.5	$50	$2,175
WO white oak	20.9	$250	$5,225
RM red maple	13.5	$200	$2,700
RO/BO red/black oak	293.2	$350	$102,670
WA white ash	6.0	$250	$1,500
EWP white pine	237.6	$175	$41,580
SB sweet (black) birch	23.7	$250	$5,925
ABE American beech	2.7	$200	$540
ASP Aspen	4.5	$50	$225
Softwood pulp (pine and hemlock; volume in tons)	368	$2	$736
Firewood (volume in cords)	522	$15	$7,830
TOTAL			***$171,106***

Note: Average stumpage values from NHTOA quarterly market report, 3rd quarter, 2021; values reflect combination of all sawtimber products: veneer, logs, pallet.

Recommended Conservation, Timber, Wildlife Habitat, and Recreation Management Practices

The Boscawen Conservation Commission is responsible for the stewardship of the Walker Pond Lots for the citizens of the town to meet multiple objectives. These include:

- Recreational use by diverse stakeholders including hunters, hikers, bird watchers, snowmobilers and nature lovers.
- Protection of natural ecosystems and biological diversity.
- Protection and management of habitat for both game and non-game species of wildlife.
- Management of the productive capacity of the forest to produce forest products and generate income to offset management expenses and support strategic acquisition of parcels that complement the town's forest ownership and conservation.

This plan proposes recommended management practices that best balance these objectives to inform the Boscawen Conservation Commission's stewardship of the Walker Pond Lots for the next 15 years, through 2037. This plan proposes a longer planning time horizon than is typical for a management plan because no timber harvest is proposed for at least the next 10-12 years on 45/78 due to the extensive

harvest that occurred on this tract just 9 years ago. This plan does not propose harvest on 45/74 where a majority of the higher value stocking (on a per acre basis) is found, due to the difficult access through forested wetlands, and because its highest and best value may be to designate the tract as a no harvest natural area to allow trees to achieve an old age and to minimize expansion of invasive plants from adjacent ownerships.

Recommendations are summarized in Table 5 and include:

1) **administrative measures** to affirm the town's perpetual commitment to the permanent conservation of these lands and to potentially expand and consolidate the Walker Pond Lots to include adjacent unfragmented and undeveloped forestlands working with willing sellers;
2) **management activities** to improve forest health and productivity, enhance wildlife habitat, and generate income, implemented through carefully designed timber harvests; and
3) **outdoor recreation measures** to address infrastructure and other needs to increase access to the Walker Pond Lots for diverse activities, where appropriate.

Table 5. Recommended administrative, forest & habitat management, and recreation measures on the Walker Pond Lots for the next 15 years.

Category	Recommendation	Comments	Schedule
Administrative	Review, revision and approval of management plan by Boscawen Conservation Commission	Draft presented January 2022	2022
	Boundary verification and maintenance	Engage town forester and/or volunteers to re-blaze and paint all boundaries.	2022-2023
	Public discussion with residents of Boscawen about potential future use of Walker Pond Lots	Sponsor hikes/paddles on and to Walker Pond Lots to discuss future public use of the tracts, to inform planning	2022 and beyond
	Designation as Town Forest under NH RSA 31:110, and designation as certified Tree Farm	Present Town Forest warrant article for consideration at 2023 town meeting, following discussion with Board of Selectmen. Pursue Tree Farm certification following Town Forest designation.	2023
	Acquisition and conservation of adjacent undeveloped parcels to consolidate Creaser Lot ownership	Work with willing sellers of certain adjacent lots to acquire lands for addition to Walker Pond Lots, pending availability of funds	2022 and beyond
	Permanent protection as conservation land by conveyance of easement to qualified land trust	Consider permanent conservation easement to ensure protection as conservation land in perpetuity.	2023 and beyond
Forest and Wildlife Habitat Management	Designate 45/74 as unmanaged natural area	45/74 contains old forest with no evidence of harvesting in modern times. Mature timber here is difficult to access due to extensive forested wetlands that would have to be crossed. The shape of the lots hugs the	2023

		shoreline and any harvesting would be highly visible from Walker Pond. It is recommended that these 29 acres be retained in their natural condition as an unmanaged natural area.	
	Timber sale on 45/78 to improve residual stand quality, enhance wildlife habitat, and generate income to support other management activities	An improvement harvest can be considered on 45/78 approximately 12-15 years from now. No near-term forest management activity is proposed in this plan. This will give current stocking an opportunity to add growth and value and allow regeneration from the 2011-2012 harvest to reach small pole stage. Access would be from the Webster side of Chadwick Hill Road, as was the case in 2011. This assumes that the existing steel and timber bridge across Beaverdam Brook is still safe to cross with heavy equipment and log trucks. Alternative access could be developed with a right-of-way agreement through the abutting ownership off Chadwick Hill Road from the Boscawen side. However, this would require a significant upgrade to Chadwick Hill Road, a Class VI road.	2035-2037
Recreation Measures	Trail right of way discussion with abutting landowners to 45/78	This would allow non-motorized access off Chadwick Hill Road from Boscawen side, with parking at boat launch.	2023-2024
	Identify and develop new non-motorized trails to interesting areas of both Walker Pond Lots	There are many interesting land features in the Walker Pond Lots that are partially accessible by existing trails and skid roads. A loop trail of approximately 1.5 miles could be developed on 45/78 that includes Chadwick Hill Road. This loop could include a waterfowl viewing station along the Beaverdam Brook flowage. An “out and back” new trail of about 1 mile total distance to a picnic site could be developed on 45/74 with access from the asphalt section of Chadwick Hill Road and parking at the old pump house site. There are some beautiful spots in mature forest at the pond edge for picnic sites (with tables) that could also be accessed by boat.	2023-2025
	Work to improve boat launch infrastructure. Develop signage, trailhead parking (6-8 vehicles) and map kiosk at boat launch or old pump house	This plan does not discuss the boat launch infrastructure needs in any detail, as they are beyond the scope of the plan. However, the boat launch or at the old pump house are logical locations for development of parking infrastructure.	2023-2025