

KELSEY FOREST

Forest Management Plan

Colby-Sawyer College owns 85.61 acres of forest with a 1.6 mile long hiking trail which is open to students, faculty, staff, and community members. This area, known as Kelsey Forest, is approximately 42 percent of the total college area, and at the moment, is fairly underutilized. The Colby-Sawyer landscape is dominated by lawns and gardens, thus the presence of Kelsey Forest provides a diverse set of opportunities and environmental features. Kelsey Forest is an important recreational and educational asset to the college, however, its value and significance have been underutilized. While the college may not place much value on it as a timber resource, the forest can be effectively utilized for other activities. There are very few academic courses that currently utilize the forest as a learning tool, but if faculty could encourage students to do various research assignments and projects in the forest, design more courses associated with the forest, and utilize the forest as an outdoor classroom setting, it will be beneficial to both forest management and the education of students. Kelsey Forest will be an important asset to promote engaged learning and educational research at Colby-Sawyer.

There are multiple ways to promote increased use of Kelsey Forest. An innovative idea is establishing a mushroom farm in the forest to create potential individual and whole class projects, which would provide educational benefits for students and the surrounding area as well as food for the college and the local community. Another idea is to establish seating areas along the trail to create social gathering places for those who seek Kelsey Forest as a place to relax. The other important aspect of Kelsey Forest is that it can be used as a branding tool by the college as it is a unique element of the campus. The forest is also capable of generating financial offsets to construction costs through the sale of harvested timber from permanent openings created for the expansion of athletic and recreational areas. Lastly, Kelsey Forest is an important environmental asset as a carbon sink, and is currently playing an important role in helping the college move towards its goal of carbon neutrality.

GOALS

The main design concepts of this plan involve incorporating novel features into Kelsey Forest to promote educational opportunities, conserve the working forest landscape, and enhance the public benefits. The plan involves expansions such as a softball field, tennis courts, accessible parking, disc golf, mushroom farm, food farm, outdoor classroom, and trail improvements (see map on page 13 specific locations of each expansion).

The expansion of athletic surfaces was outlined in 2013 by the S.L.A.M. Collaborative, a landscape design company, and they prioritized the implementation of these surfaces as follows:

- Priority #1: Increase in Parking
- Priority #2: Tennis Courts
- Priority #3: Artificial Softball Field
- Priority #4: Track and Field Throwing Area

Additionally, the college has more conceptual goals that it wants to see met in the management of the forest. These goals are outlined and explained below.

Enhancing Student Engagement

In regards to student engagement and public use, this design will solve numerous on-campus issues in relation to the need for relocation of the tennis courts and the addition of an artificial softball field. Both the tennis courts and softball field would be open to students and the surrounding community. The disc golf course and improved trail accessibility would provide additional recreational opportunities for students, the community, and visitors, enhancing the college's extracurricular activities in areas that are currently underutilized. The mushroom farm would utilize Beech timber from the forest (the most desirable hardwood for mushroom production) to grow shiitake mushrooms which can be utilized as marketable produce. A mushroom farm can also provide educational opportunities to students about farming techniques. The addition of an outdoor classroom would provide another excellent setting for outdoor instruction. When not acting as a classroom, it would allow individuals to relax and enjoy the

beauty of the surrounding forest. The creation of a more established trailhead would better highlight the presence of the trail. There is also the potential for opening small patch cuts in the forest to create opportunities for the study of forest succession, pioneer species, and wildlife habitat. The timber from these temporary openings could also provide financial compensation to the college to fund the implementation of these designs. Signage highlighting natural and historical features within the forest would also satisfy the college goal and strategic theme of engaged learning.

Functionality

This design provides an immense amount of recreational, educational, and economic benefits. However, it also has a minimal impact on the current forest structure and composition, and can be implemented and managed at a minimal cost. Trees would be cleared to create the parking lots and openings for tennis and softball, as well as for less intrusive design elements with the forest. These include a disc golf course, a mushroom farm, a forest farm, and an outdoor classroom. Native trees and plant micro-communities would be utilized to enhance the aesthetics and diversity of the forest community. Trees that are removed can be used at the school for benches, tables, signage, and trail markers, or sold locally if economically viable. The latter option would be most suitable for the areas that would be cleared for the parking and athletic expansions, as the money generated from the sale of this timber could help offset the cost of project. Trees will also be an important resource for the mushroom farm, which will require logs and branches as a growing medium. The forest is also an excellent resource to provide firewood for the maple sugaring operation that the college runs on campus. The main goal is to reuse what is taken from the forest in the design plan in any way possible to reduce construction expenses, preserve natural history, and create a unique sense of place at Colby-Sawyer. For instance, the disc golf course would weave around the current landscape, using current features as targets and the trail would weave around newly constructed features, minimizing the trampling effect and ensuring minimal habitat destruction.

Conserve Working Landscape

The main purpose of this design is to work within the current landscape and conserve the biodiversity of plant and animal species already present to encourage their dynamic and self-sustaining life cycles. Specifically, the forest farm would be free of chemical fertilizer and pesticides, produce a food source for both humans and animals, produce products (fiber, fuels, green manure, materials for crafts), and offer learning opportunities. As the forest farm matures it would rely heavily on polyculture – self-organizing plant communities comprised of several species – and would be created in guilds, which are interwoven groups of plants and animals that are beneficial to humans and create a habitat for other organisms.

Desired Elements

1. Softball field – Located on the northern end of the forest. Easy access to parking facilities. Recreational activity for students, staff, visitors, community.
2. Tennis court – Located on the southwest corner of the forest. Easy access to parking facilities. Recreational activity for students, staff, visitors, community.
3. Disc golf course – Located in the center of the forest. Weaves around current native tree and plant communities. Utilizes natural topography as course structure and scoring landmarks. As forest matures, will wildlife and ecological values, as well as wildlife viewing opportunities. Minimal - if any - tree removal required to implement this.
4. Mushroom farm – Located near road and parking facilities. Shiitake mushrooms can be farmed by utilizing logs and branches from local forest hardwoods, such as Beech. One log or tree can support five to ten years of mushroom growth. The farm can also act as a living classroom as well as opportunity for income, future projects, and forest expansion. Forest cultivation of shiitake mushrooms can diversify farm and forestry enterprises, add value to forestry by-products, and create opportunities for stand improvement. Also adds employment, income, and soil/farm research project and learning opportunities.
5. Forest farm – Located just west of the disc golf course and adjacent to the parking structure. Due to its easy accessibility from the road near the athletic fields, it will provide added diversity to the forest, act as a living classroom, offer opportunities for student involvement, and future projects. Things such as

berry producing bushes, nut trees, and root crops can be grown in this area amongst the existing forest species.

6. Outdoor classroom – Situated within the food forest along the trail. Located near parking for easy access. Customized benches, tables, and work areas for instruction, class sessions, relaxing, nature viewing, and future design modifications. Acts as a central location for entire Kelsey forest. Would promote higher learning, research opportunities, and future modifications.

7. Trail – Begins at parking area at south end of disc golf course. Meanders through disc golf course, by forest farm, mushroom farm, and outdoor classroom. Path also connects with existing trail at northeast end of disc golf course. Provides easy access opportunities for walking, running, classroom activities, scientific data collection, and continued education projects. Showcases the natural landscape, food and product production, and extra-curricular activities. Signage along the the trail would highlight natural and historical features, educating passby about the landscape.

KELSEY FOREST CURRENT & DESIRED CONDITION

The previous plan for Kelsey Forest delineated the forest into 13 stands. Following an inventory of the forest, those stands have been consolidated by type into 6 stands for this plan. Those stands are: Stand 1, Stand 2, Stand 3, Stand 4, Stand 5, Stand 6 (see map on pg 12 for the location of each stand). As part of the overall desired condition, there should not be any cutting or clearing within 50 feet of the edge of the parcel to avoid disturbing neighboring landowners.

Stand 1

Current Condition

Stand Area: 27.6 acres (largest)

Soil types: 559B- Skerry fine sandy loam, 3 to 8 percent slopes, very stony

57 C- Becket fine sandy loam, 8 to 15 percent slopes, very stony

Forest type: It is dominated by American Beech

Basal Area: 114.4 square feet per acre with 103.3 square feet AGS and 11.1 square feet UGS

Total sawtimber: 168,496 board feet

Total pulp timber: 500 cords and 18 cords/acre

Total Biomass: 2645.45 tons

Total Carbon Storage: 1513.3 tons

Invasive Species: No record of invasive species

Design Concepts/ Desired Condition

The main short-term priority in this stand will be to reroute the trail to keep it on the college property as well as keep it within the 50-foot buffer laid out in the Kelsey Forest Educational Expansions map (see map on pg 13). This stand has one long-term priority in the form of part of a research area. This will consist of a small patch cut to research pioneer species and succession. Some of the American Beech that dominates this stand can be cut to provide growing medium for the mushroom farm in Stand 4. Due to minimal cutting in this area, it will remain primarily as undisturbed forest.

Stand 2

Current Condition

Stand Area: 25.4 acres

Soil Type: 559B- Skerry fine sandy loam, 3 to 8 percent slopes, very stony

380C- Tunbridge-Lyman-Becket complex, 8 to 15 percent slopes, very stony

379B- Dixfield fine sandy loam, 3 to 8 percent slopes, very stony

Forest Type: This stand is dominated by Red Maple

Basal Area: 93.8 square feet per acre with 85 square feet AGS and 8.8 square feet UGS

Total Sawtimber: 101, 397 board feet

Total pulp timber: 381 cords

Total Biomass: 1909.1 tons

Total Carbon Storage: 1061.2 tons

Invasive Species: No record of invasive species

Design Concepts/ Desired Condition

The main short-term priority in this stand would be better trail maintenance and improved access to the trail system. This stand has a large amount of long-term priorities in the form of parking, athletic, and recreation expansions. In particular a parking expansion is designed to allow for a paved access road with marked parking spots to better accommodate spectator parking for athletic events. An athletic expansion is also designed in the form of an artificial softball field. While there is currently no varsity softball program at Colby-Sawyer, the field design is included as a plan if the athletic department decides to recognize softball as a varsity sport. A recreation expansion is designed in the form of a forest disc golf course. Some understory clearing may be necessary to allow for the disc golf course to be installed and maintained.

Stand 3

Current Condition

Stand area: 11 acres

Soil Type: 57 C- Becket fine sandy loam, 8 to 15 percent slopes, very stony.

379 B - Dixfield fine sandy loam, 3 to 8 percent slopes, very stony

379 C - Dixfield fine sandy loam, 8 to 15 percent slopes, very stony

378 B - Dixfield fine sandy loam, 3 to 8 percent slopes

Forest Type: This stand is dominated by Sugar Maple

Basal Area: 137.4 square feet per acre with 123.3 square feet AGS and 13.3 square feet UGS

Total Sawtimber: 83,347 board feet

Total pulp timber: 187 cords

Total Biomass: 1339.3 tons

Total Carbon Storage: 670.7 tons

Invasive Species: No record of invasive species

Design Concepts/ Desired Condition

The main short-term priority in this stand would be better trail maintenance and ease of access as this stand includes a main access point to the trail system. This stand has two long-term expansions in the form of a trail and an athletic expansion. The trail expansion would allow for easier access to the trail system; the access is inconveniently located behind the baseball diamond. The athletic expansion would be a relocation of the track and field throwing events to allow for all track and field events to take place in the same location. This is an area that would pose a problem for equipment access to harvest timber as it is located very close to abutting private residencies and does not include much valuable timber. The athletic expansion would also require very minimal cutting as the area is currently a meadow.

Stand 4

Current Condition

Stand Area: 16.1 acres.

Soil Type: 379 B- Dixfield fine sandy loam, 3 to 8 percent slopes, very stony

Forest Type: This stand is dominated by Eastern White Pine

Basal Area: 100 square feet per acre with 90 square feet AGS and 10 square feet UGS

Total Sawtimber: 161,081 board feet

Total pulp timber: 161 cords

Total Biomass: 1281.4 tons

Total Carbon Storage: 699.4 tons

Invasive Species: No record of invasive species

Design Concepts/ Desired Condition

This stand contains numerous design elements given it's relatively level terrain and close proximity to Seamans Road and the trailhead. Major features located in this stand will be the forest farm and the outdoor classroom. The food forest will contain planted edible plants, including fruit and nut bearing trees and shrubs. The outdoor classroom will consist of bench seating located on a level site adjacent to the trail. Benches in the classroom could be made of rough-sawn timber from trees cut to create an opening for the classroom and for parts of the forest farm. A mushroom farm will be located in a shady, moist area of the stand behind the maintenance shed. Here mushrooms will be grown on American Beech logs cut from Stand 2. There will also be an additional trailhead leaving the roadside parking near the athletic fields. Three intermittent streams flow through this parcel, including through the proposed site for the forest farm, so any cutting that will be required for the farm would be located in places that would not upset these wet areas.

Stand 5

Current Condition

Stand Area: 5.3 acres

Soil type: 379 B- Dixfield fine sandy loam, 3 to 8 percent slopes, very stony

Forest Type: This stand is dominated by Eastern White Pine

Basal Area: 80 square feet per acre, all AGS no UGS

Total Sawtimber: 48,447 board feet

Total pulp timber: 42 cords

Total Biomass: 295 tons

Total Carbon Storage: 181 tons

Invasive Species: No record of invasive species

Design Concepts/ Desired Condition

The western section of this divided stand will likely be cleared to make room for an expansion of parking for athletic events that take place at the fields in the center of the parcel. This stand contains some of the most valuable white pine sawlogs found in the forest, and would be sold to help offset the cost of installation of the lot. This section of this stand will also contain the trailhead for the Kelsey Forest trail.

The eastern section of this stand will be entirely within the boundary of the disc golf course. As such, there will be some understory clearing in this stand for the creation and maintenance of the course. Small-diameter wood from this understory clearing will be chipped and used as in gardens elsewhere on campus or used to fuel the maple sugaring operation on campus.

Stand 6

Current Condition

Stand Area: 9.3 acres (located adjacent to Kelsey Forest and stands alone as an individual stand)

Soil Type: **647 B-** Pillsbury sandy loam, 3 to 8 percent slopes, very stony

378 B- Dixfield fine sandy loam, 3 to 8 percent slopes

Forest Type: This stand is dominated by Quaking Aspen (relatively young)

Basal Area: 63.3 square feet per acre with 60 square feet AGS and 3.3 square feet UGS

Total Sawtimber: 8,761 board feet

Total pulpwood: 56 cords

Total Biomass: 303.3 tons

Total Carbon Storage: 151.7 tons

Invasive Species: Japanese Barberry, Oriental Bittersweet, Multiflora Rose

General Recommendations: Remove invasive species.

Design Concepts/ Desired Condition

The main short-term priority in this stand would be the removal of invasive species. While at the moment there are no designs or plans for recreational activities, this stand may be considered at some point in the future (perhaps beyond the scope of this plan), as a location for an expansion of parking facilities. As this is an area of the forest with low timber value as well as low species diversity and carbon sequestration, this stand is a good candidate for such development.

2015 Revised Kelsey Forest Stands





Colby Sawyer
College



Map prepared for Kelsey Forest Management Plan 11/2015.
Stands data gathered from field observation.
Imagery obtained from NH Grant.

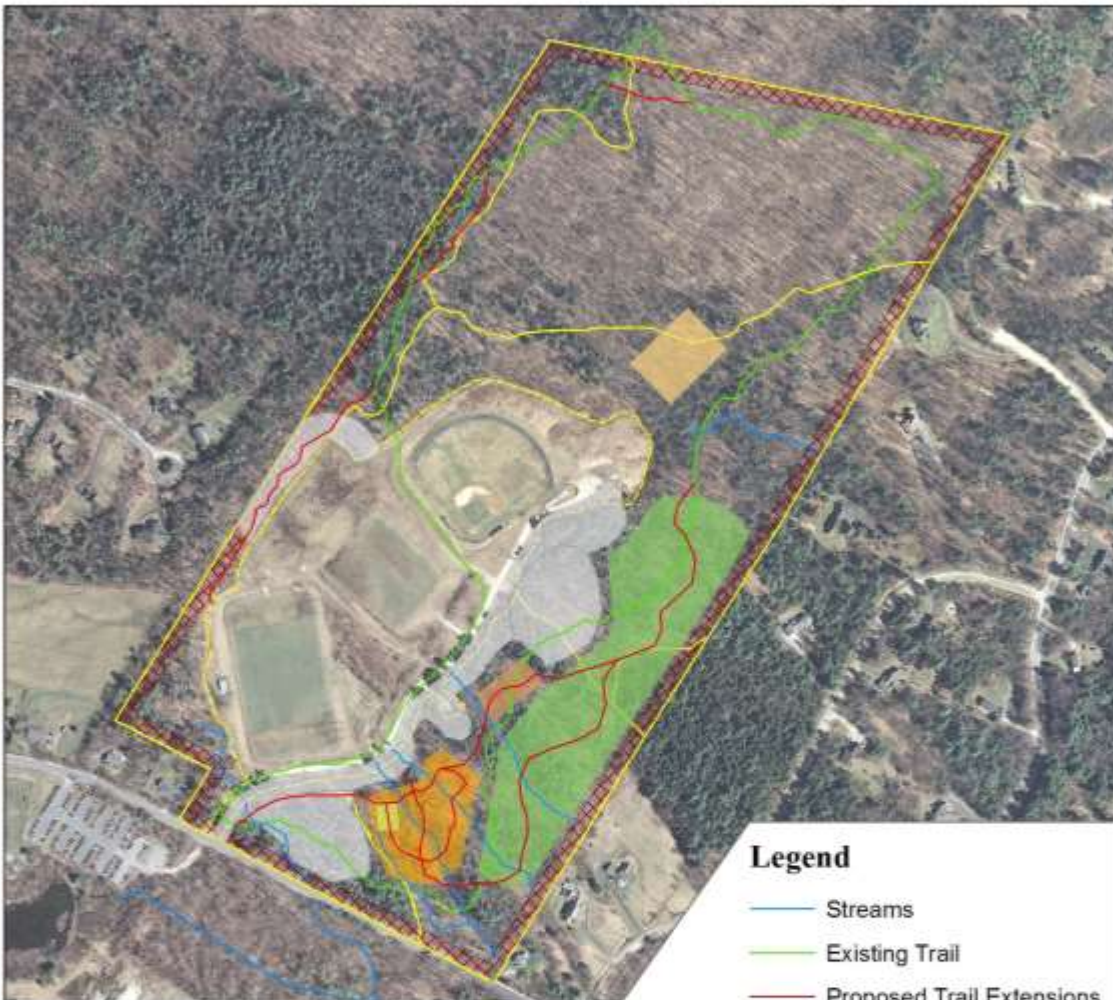
Map Prepared by Owen Krol

Legend

-  Sample Points
-  New Stands



Kelsey Forest Educational Expansions



Map prepared for NH SFI/SIC Quarterly Meeting
SLAM Expansions obtained from 2012 SLAM Collaborative Presentation
Imagery obtained from NH Granit
Map prepared by Jacob Conroy and Kenny Wilson



Colby-Sawyer
College



Legend

- Streams
- Existing Trail
- Proposed Trail Extensions
- Stands
- Outdoor Classroom
- Forest Farm
- Mushroom Farm
- Research Area
- Disc Golf
- SLAM Expansions
- 50 Ft. Boundary Buffer
- Parcel Boundary