

Redacted

Agroforestry Ideas:

This farm and their team, they are known for their delicious and well loved ice cream made with milk produced from a small herd of grass-fed dairy cows, a CSA that brings together products from diverse producers for customers in the area, and an incredible farm store in a bucolic setting in central VT. Despite being a relatively remote location, *redacted* has attracted customers near and far to engage with their operation, their products, and other producers. They are surrounded by trees, and in considering agroforestry plans, are primarily interested in using woody shrubs to enhance resilience on their farm through managing water concerns, and enhancing their farm as a place that customers and community members can gather to engage in their local food scene.

Objectives:

Multi story, diverse windbreak next to the market garden plot will:

- **Control wind pressure for vegetable crops.**
- **Mitigate runoff in early spring or other high precipitation events to market garden plots.** Currently, water concerns make it more difficult to access the garden early in the season. Deep rooted perennial species can help mitigate flooding concerns
- **Increase pollinator habitat:** Perennial plantings and (potentially) native wildflower seeding will increase pollinator habitat throughout the winter (winter shelter for beneficial insects in woody shrubs), and increase pollination (diverse flowering plants).
- **Create interactive food forest for customers who visit farm stands:** Diverse woody crops can act as a pick your own for CSA members and farm store patrons of beloved and novel crops that can all be grown locally.

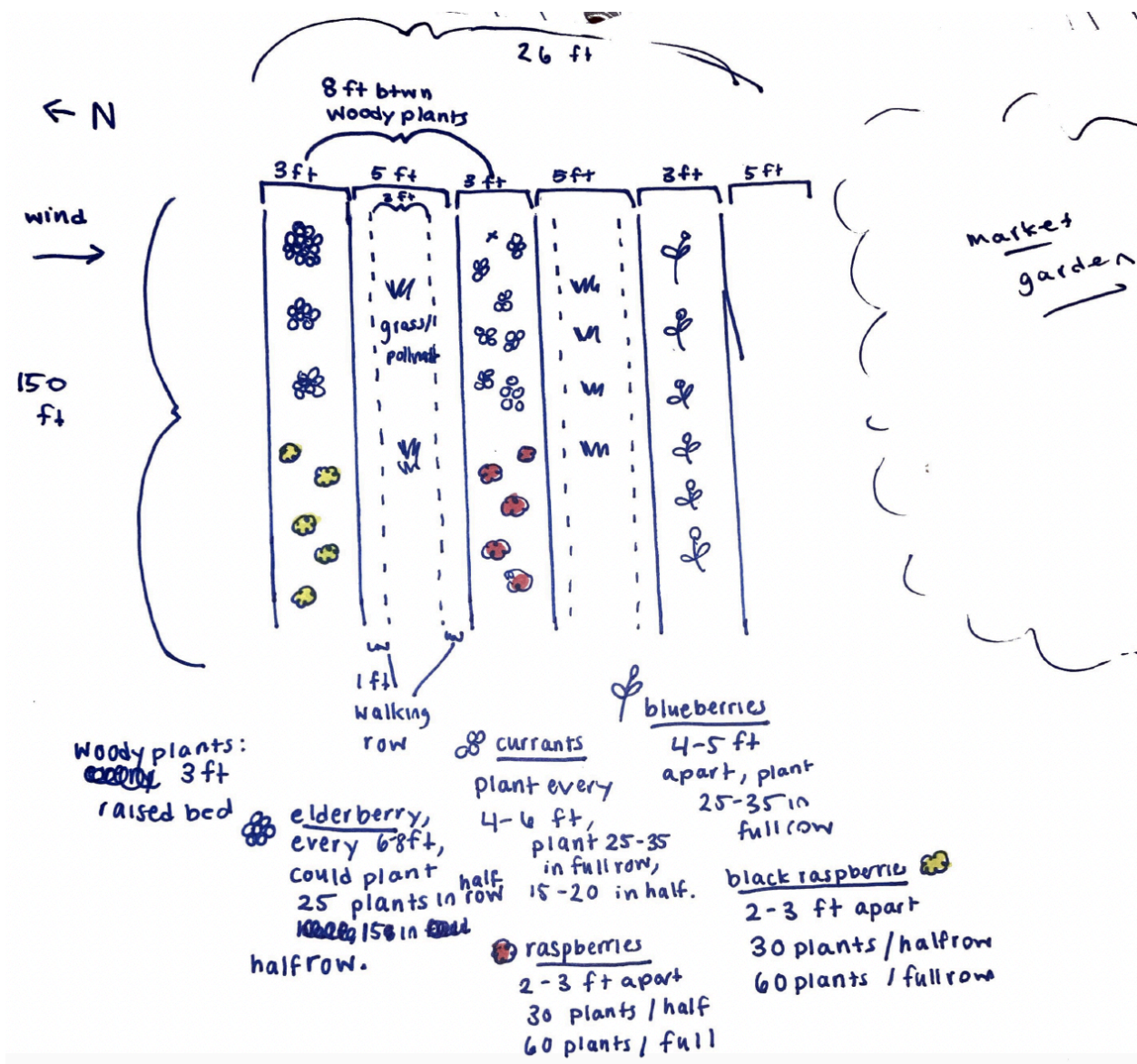
Planting Design:

Spacing: We measured out an area for this system that was 150 feet long and 30 feet wide. Woody shrubs can be planted in 3 foot wide raised beds (see planting plan). Most desired plants need about 8 feet between the center of rows as they grow (more details for species below). In between rows, we talked about several options.

- **Option 1: Grass:** You can keep them as grass to easily mow. If this seems like a more viable plan, we'll want to make sure that the mower could fit down those rows (5 ft).
- **Option 2: Pollinator friendly flowers:** Alternatively, we discussed creating walking rows next to the raised beds. These can be mulched to keep down weed pressure and for easy walking. For this option, we discussed how the 3 feet in between planted rows and walking paths can either be used to expand the vegetable garden, planting crops that might do better with some very dappled shade in the summer heat (lettuces, brassicas), or planting a pollinator friendly perennial mix of flowers that CSA members and others can pick from.

Orientation: Since planting as a windbreak, planting the larger shrubs (elderberry) on the far side will protect the other crops. Larger trees/shrubs serve as the primary barrier to block the strong prevailing winds. By planting the largest trees on the side where the wind enters, you create a strong initial windbreak to slow down and deflect the wind. These trees help break up the wind and create turbulence, which gradually reduces wind speed as it moves through the layers of the windbreak. Shrubs and lower vegetation can be planted closer to the crops, especially on the leeward side of the windbreak. These lower plants help further disperse and slow the wind and provide additional protection to the crops.

However, since taller shrubs (elderberry) will produce more shading since they are on the far north side as opposed to the south side, as the system matures, you will have some shading in the system. To still have productive crops where the shading occurs, in the second row, we discussed plant shade tolerating crops like currants or raspberries. Also, elderberries won't be too crazy tall.



Plants we considered:

Here are some details about the species we discussed (fruiting age and height at maturity, considerations for planting, varieties, and pruning needs). We can certainly discuss more species as well.

Blueberries

Fruiting age and height: Highbush blueberries mature to 4-6 feet. They will generally fruit beginning at 3 years and be most productive at years 5-6.

Planting: They do much better planting plugs than trying to vegetatively propagate. Dormant plants should be planted in early spring, as soon as ground can be dug. But potted shrubs with foliage should not be planted until after the danger of frost has passed. Blueberries should be planted in rows with 8 feet between row centers. Berries can be planted 4-5 feet apart. They need an acidic soil (PH 4.5 - 5.5) and prefer a well drained site with good fungal activity. Amend soil with sulfur, peat moss, compost, and mulch. Though they will tolerate some shade, fruit production improves dramatically with full sun. Blueberries are somewhat self-fertile but fruit are larger and more abundant with a few different varieties.

Varieties: Blueberries will differ in the time that they ripen, so you could consider planting a few different varieties that will ripen at different times to extend pick your own.

- *Blueray:* Large berries with excellent flavor. Consistent producer. Spectacular red fall color. Early-mid season ripening.
- *Berkeley:* Berkeley produces dense clusters of very large sweet and firm berries on a 5-6 ft plant. Great for cooking, freezing and fresh eating. Mid to late season.
- *Jersey:* One of the oldest blueberry varieties. Easy to grow, producing heavy crops of very sweet fruit. Good for baking. Excellent for home gardeners. Late season.
- *Patriot:* Excellent flavor on an open vigorous plant. Slightly squat, very large berries. An old variety popular in Vermont. Fruit ripens early.
- *Reka:* Vigorous and adaptable to heavier soil types. Heavy yields of dark berries with excellent flavor. Early-mid season ripening.

Pruning needs: Highbush blueberry plants require annual dormant pruning. Pruning controls crop load, which increases fruit quality. It also invigorates the plant by stimulating new growth from the plant's base. Pruning is usually done toward the end of the dormant season (usually March) when fruit buds are easily recognizable. Pruning involves the removal of small, spindly branches and canes that are poorly positioned, balancing cane ages, and thinning of the centermost canes to increase light penetration to the interior of the plant.

Elderberries

Fruiting age and height: Elderberry is rapidly gaining popularity for its edible and medicinal qualities (of both flowers and fruits)! Plants should begin to produce two years after planting. Depending on the variety, elderberries grow five to ten feet tall

and wide and have gray barked stems with white pithy centers. Groups of stems emerge from the roots and develop an arching and spreading habit.

Planting: Not very picky! They thrive on moist (not saturated), fertile sites with good sun. Incorporate manure or compost before planting. Plant elderberries 6–8 feet apart in rows 8–10 feet apart. Plant 2 inches deeper than grown in the nursery. Best to plant trees with roots (though they can reproduce from cuttings).

Varieties: Number of varieties of black elderberries, which are preferred for their flavor. These include: Nova, Adams, Berry Hill.

Pruning needs: During the first two seasons, elderberry plants should be encouraged to grow vigorously with little to no pruning required. After the second year, pruning should be done annually in early spring. All dead, broken and weak canes should be removed.

Currants

Fruiting age and height: Red currant bushes typically start producing fruit when they are 2 to 3 years old. You can expect a moderate yield of fruit at this age, and the production will increase as the bush matures. Black currants tend to start fruiting at a slightly younger age, often around 1 to 2 years after planting. Currants will typically be 3–5 ft tall (black currants can be slightly larger).

Planting: Currants can be planted from cuttings or rooted cuttings. One of the only berries that will produce a crop in the shade, currants thrive in cooler spots, near trees or protected from hot late afternoon sun. They like fertile soils rich in organic matter. They like fertile soils rich in organic matter. Add compost and be sure to mulch. Plants are self-fertile, but may produce better crops with a pollinator. Plant 4–6 feet apart.

Varieties: Currants and gooseberries (ribes species) have long been popular in Europe, but following attempts at eradication due to fears of the white pine blister rust, they are hardly known here in the US. Native varieties can be found throughout the woods in Vermont. Named varieties have been chosen for fruit quality. Many have also been selected for resistance to the white pine blister rust. Black currants tend to be hardy and vigorous. The deep black berries are tart and flavorful. Okay for fresh eating when fully ripe but fantastic lightly sweetened for preserves, sauce or combined with other fruit. They suffer less pest and foliage issues than other ribes making them a good choice as an edible ornamental. Red currants produce bright red tart berries primarily

for jam or jelly celebrated across northern Europe.. They leaf out very early in the spring and foliage often looks raggy by the end of summer; don't fret, they will be shiny again in the spring.

- *Red: Gloire de sablon*: A French heirloom variety. Vigorous and disease resistant with sweet tart PINK berries good for fresh eating.
- *Red: Pink Champagne*: Perhaps the best tasting red currant for fresh eating. Vigorous, upright, and resistant to mildew and rust.
- *Black: Risager Black Currant* New high-yielding and highly disease-resistant variety. Reportedly excellent flavor. Resistant to white pine blister rust.
- *Black: Crandall Clove*: Not a true black currant. Yellow, clove scented flowers and glossy black berries. Sweet and good for fresh eating. Resistant to white pine blister rust.

Pruning needs: In the first year after planting currant bushes, it's a good idea to cut them back to encourage bushier growth. Prune the main stem down to a few inches above the ground. This will stimulate the development of strong, low-branching canes. Then, in subsequent years, focus on removing dead or diseased wood, thinning out unproductive wood, (up to $\frac{1}{3}$ of canes) and heading back (This means cutting back the tips of the canes to an outward-facing bud). This will stimulate branching and more fruiting wood.

Raspberries, black raspberries, blackberries:

Fruiting age and height: Raspberries, black raspberries, blackberries all take roughly two years to fruit.

- *Raspberries*: Raspberries are quick to start bearing (usually the year after planting) and highly productive. They sucker profusely, making it easy to expand a patch. Can bear in summer or fall. Plants typically grow to a height of 4 to 6 feet when fully mature.
- *Black raspberry*: Generally bear in early summer. Often found growing wild along old stone walls or abandoned edges of the yard. Selected cultivars are far more productive with larger fruit. The canes grow wildly and need support. Plants typically grow to a height of 3 to 6 feet when fully mature.
- *Blackberries*: In fertile soil with sun blackberries will grow, spread, and produce huge crops. Plants are thorny and vigorous. The berries are best by the handful right off the plant. Crops may suffer following winter temperatures below -25 degrees. On average, blackberry plants can reach a height of 3 to 6 feet.

Planting: Raspberries prefer full sun, but can tolerate some degree of partial shade, especially if the shading is not too severe and the growing conditions are favorable. Incorporate compost into the soil. For red raspberries, space the canes 2-3 feet apart, and for black raspberries, space them 3-4 feet apart in rows. You may want to consider installing a trellis for raspberry systems. Row centers should be at least 6.5 to 8 feet apart.

Varieties:

- *Raspberries: Prelude (Earliest), Boyne(Early), Encore (late summer/fall), Nova(early fall),*
- *Black raspberries: Bristol black is the one I know of best, but there are more.*

Pruning: Red raspberries and some blackberries typically produce fruit on floricanes, which are canes that grow one year and bear fruit the following year. Here are the key pruning considerations for red raspberries. In late winter or early spring, remove any canes that didn't produce fruit the previous year. These canes are easy to identify as they are typically brown and woody. To promote good air circulation and light penetration, thin the remaining canes, leaving 4-5 of the healthiest canes per linear foot of row. Trim the lateral branches of the canes to around 12-18 inches in length. This helps encourage more fruit production and prevents the canes from becoming too crowded.

Black raspberries and some blackberries can produce fruit on both primocanes (first-year canes) and floricanes. This type of raspberry is commonly known as "primocane-fruiting" raspberry. In the late winter or early spring, prune all canes (both primocanes and floricanes) down to the ground. This is often called a "cane renewal" pruning method. By cutting all canes back, you remove the old floricanes that fruited the previous year and encourage the primocanes to produce fruit in the coming season.

Other models to consider/ farmers to talk to:

There are many farms in the area that have diversified fruits on their farm. One that comes to mind immediately is Chuck Wooster at Sunrise Farm, who has a pick your own fruit component of his farm that he tags on as an option for his CSA. He has blueberries, raspberries, and elderberries.

Long term considerations:

Mulching: Keeping raised beds mulched with compost and woodchips will keep in water and reduce weed pressure. Plan to apply mulch every fall, and once in the spring.

Weeding: Mulching will be really helpful to prevent weed pressure, but for early season, plan to weed 3-4x a season. When shrubs have established 2x a season (spring and before fall mulching) should do the trick.

Deer fencing: You will want to extend your deer protection for the garden to these plots.

Bird/ bug protection: In years two and as berries ripen, you'll likely want some sort of netting to try to prevent fly and bird damage. A simple post and wire system works, where you can set up two posts and thread a wire through them and then lay netting over them and stapling to the ground (below). Pro-Tek is a great option. This also acts as a trellising system for raspberries.

Irrigation: Drip lines set up down the rows are likely the best way to be able to ensure these plants are getting adequate water, especially for the first and second year.



Materials and funding:

Programs available:

- The Regional Conservation Partnership Program (RCPP): Applied with Lyle
- American Farmland Trust (AFT): Due Nov 21
- Dartmouth: Can some supply trees (list found [here](#))

Applicability to Project:

- **Plants:** (Dartmouth/AFT) We can give you currants, elderberries, we'll have to source the blueberries and raspberries elsewhere.
- **Raised beds** (NRCS RCPP)
- **Mulching** (NRCS RCPP)
- **Trellising/ Netting equipment** (AFT)
- **Amendments** (sulfur for blueberries) (AFT)
- **Drip irrigation lines** (AFT)