

Site Visit with ____
December 1, 2022

Site sizes and delineation

1-2 (Red): .5 acres, 75x35 m

1-1(Yellow): 330 m in length, variable width



Source: Google Earth

Past site history: Cultivation for veggies and corn and likely has been in cultivation for a very long time given prime floodplain location.

Hardiness zone: 4b

Soil type (click on links for more details; this is meant to give a broad overview since soils have been modified)

Zone 1: Agawam fine sandy loam, 0 to 3 percent slopes:

Zones 2: Windsor loamy sand, 25 to 60 percent slopes, well drained slope

Substrate: Not rocky, loamy sand

Orientation: West facing slope (orchard site)

Existing vegetation

- **Zone 1:** Existing hayfield
- **Zones 2:** Sumac, boxelder, dogwood, locust, cranberry, etc. Early successional woody forested areas.
- Proximity to other other forested areas: Parcel adjacent to riparian area
- Pests (large and small): bear pressure noted

Moisture retention test:

Zone 1: 8:32 minutes

Zone 2: 6:12

Primary project discussed: Riparian buffer, orchard, some multipurpose/alley cropping in fields, windbreak

1. Riparian buffer

Some objectives for this project include creating a functioning buffer for stream/river events, maintaining structure and complexity to maximize co-benefits (nutrient retention, pollination, wildlife habitat).

As we had discussed in our last session, restoring a riparian buffer can be more complex than planting a new row of trees because there are already multiple interacting components of the system which can be great to work with (existing desired trees, shrubs, etc. that can help facilitate growth of newly planted tree species), but also difficult (introduced species like honeysuckle can be difficult to eradicate from the landscape).

Luckily, riparian buffers have been valued at a policy level for roughly the past fifty years and there are multiple existing programs that can benefit you in the planting. One is the Conservation Reserve Program CRP (found at the link : <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/>) through the Farm Service Agency. This program is nice because it offers you a rental payment for 10-15 years of the program's establishment, though it is not a lot of money and will tie up the buffer for that amount of time.

This program is underutilized in Vermont (so a great bet), but there are also complaints that it is difficult to manage due to bureaucratic hurdles. Luckily, the White River Partnership will work with you to bring a project to fruition and therefore avoid some of the bureaucratic hangups and ensure that the project is implemented without any sudden costs. Another issue is that the program provides funding for initial planting, but not for follow up if trees planted in the buffer fail. Therefore, setting up the planting for success is really important to get the most out of the time investment.

Some important considerations:

- Leave existing species that provide structure. Studies show that with riparian buffers (along with many other types of forest communities), having established trees can help facilitate the establishment of new trees.

- Since introduced species (namely honeysuckle) are present in your riparian buffer, try establishing trees that will occupy that same role after removal (low growing shrub). These might include more high bush cranberry, serviceberry, viburnum, dogwoods, elderberry, willow etc. These will establish quicker than some of the slow growing trees in the buffer and provide short and long term benefits as the buffer establishes.
- Lobby to have trees that will stay in your buffer 40-50 years, and beyond, in the future. Plantings may focus on early successional species, but since you already have some trees established, make sure that some older trees that do well in buffers (red maple (already present in the buffer), pin oaks, sycamores, hackberries) can be established as well to hold up as the riparian matures.
- As sampling this summer showed, there is a lot of diversity in your understory already (queen anne's lace, soapwort, helianthus). These are great species to have due to the pollination benefits and complexity they lend to filtration. Even if more heavy management interventions occur in establishment, these plants will remain in your seedbank and you can facilitate greater establishment through seeding a native wildflower mix.

2. Orchard

Site prep: This seems like a really great place for an orchard if you'd like to establish one! The site is well drained, and sloping. The soils tests will give you a good idea of the acidity of the site to determine if you need to modify the pH prior to planting. Since the area is mowed, it won't likely require much site prep for it to be suitable for trees to be planted into.

Vegetation Control: Mulching around trees using radial woodchips available for free from many local arborists or landscaping companies helps keep vegetation down. You can combine this with compost to fertilize trees as they establish. A mound of mulch a couple of inches thick 4 feet in diameter should be sufficient depending on the size of the tree. You will still need to mow this area, twice a season, as trees establish in order to keep down competition from grasses for them to grow most effectively.

Planting orientation and diversity: Upper and mid slopes will be more suitable for early flowering fruit trees so frost from the spring will not settle in (see species below). Midslopes are generally best for apples. You could consider interplanting another species like blueberries (prefer high light as systems develop) or currants, which are shade tolerant (even prefer shade) and are commonly interplanted with apples in alley cropping systems. This will generally give you a quicker fruit (5-8 years

for blueberries; 1-3 years for currants,) than tree crops will. It is important to plant multiple varieties and be sure to know if trees have male and female flowers on the same plant (monoecious) or have only one type of flower on the plant (diecious) so you can make sure that fertilization occurs in order to produce fruits.

For many fruit trees, you can generally find varieties that are highly prized for pollination if not fruit production (ex: apples, many use crabapples). These are helpful to plant at the edge of rows or in rows of the same species to ensure pollination.

Pest control: Deer and rodents will be likely predators of an establishing orchard. Even if you have not had much deer pressure, they will be excited to browse on fruit trees in late winter, though the proximity to the road may help deter them. You can consider individually fencing trees with wire or plastic mesh, or using a deer repellent while you assess the extent of potential deer damage. Rodents may girdle trees which can be prevented by tree tubes—it helps immensely to keep grasses low.

Pruning : Annual pruning may help with fruit production and long-term form depending on the species you plant. This is a good resource for pruning: <https://extension.unh.edu/blog/2021/02/its-pruning-season>.

Good sites to visit:

- East Hill Tree Farm is a good first spot to check in for a smaller parcel of land in diversified tree production. It can help inform species selection and maintenance needs.

3. Windbreak

This is a really nice resource for considering a windbreak or hedgerow on your farm if you would like to dive further into it: <https://centerforagroforestry.org/wp-content/uploads/2021/09/Chapter-6-Windbreaks-UMCA-AF-Training-Manual.pdf>

Some main considerations are density (60-80% ideal, involving conifers), height, and species. There are a number of trees that you can select for a windbreak/ hedgerow along the road. In Vermont, one of the main concerns is salt tolerance as well as tolerance of other pollutants and chemicals.

Species successful in windbreaks to consider include:

- Eastern red cedar
- Arborvitae
- Norway spruce
- Black Walnut, drop edible nuts
- Horse Chestnut, drop inedible nuts
- Honey Locust, drop seed pods
- Black Locust (fragrant flowers seen around the area in the spring)

Funding: EQIP

(<https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/vermont/vermont-environmental-quality>) is a great resource to get some funding to cover majority costs of establishing a windbreak/hedgerow. You can contact your technical service provider at NRCS directly or go through NRCD to get some different funding options (<https://sites.google.com/view/whiterivernrcd/services/farm-teams>)

NH state nursery can be a great place to get cheap, locally sourced evergreens too: <https://www.nh.gov/nhnursery/seedlings/index.htm>

4. Alley cropping/ multi-use species in fields:

Species selection: There are many different options for alley cropping systems all based on what you would like to have in your field. If trees are being intercropped with other annual or perennial crops, consider species interactions including competition for light, space and resources and allelopathy.

Considerations:

- Tree species that have deep tap roots as opposed to fibrous roots close to the surface of the soil (willows, apples, serviceberry) will require less management in an alley cropping system to ensure that they don't compete with other crops. Otherwise, some amount of root pruning may be necessary to prevent competition as your system matures.
- Smaller trees or shrubs will lessen shading extent, but increase shade density close to the crop. Trees that have smaller leaves will shade less. For a crop like asparagus that prefers high light, there may be some yield decrease on the margins as trees mature. To get a crop out of this buffer area in the long term, planting a more shade tolerant species like black currants or even rotating in some lettuces or leafy brassicas that could do well under shade conditions could be useful.

- Trees in the juglans family are most commonly used in alley cropping systems (black walnut, butternut, pecan, etc). Black walnut has a deep taproot, is high value wood and high value nuts. However it is allelopathic, and can kill or harm plants nearby it. This impacts plant families differently, very highly impacting nightshades and other high consumers.
- You'll definitely want to prune trees to keep them manageable and they have funky growth form (fruit trees) given the importance of shade management here.
- Chestnuts have been more frequently used in alley cropping systems because they are a high value, high producing crop with a deep taproot. Blight is a big concern, but there are more resistant chinese cross varieties available which also tend to be smaller, bushier trees that grow relatively quickly. Seeds can be pricey but there are good options (particularly if you know someone who can collect them for free from the CT Agricultural Research Center).
- Fruit trees can be really nice as well, as the generally will not get too big and as long as planted far enough away, will not be too competitive with crops despite more fibrous rooting structures. Hazelnuts are also more fibrous but are a nice shrub and generally get to 8-10 feet tall.

Examples of alley cropping nearby:

- Jono Neiger (chestnut):
 - <https://www.regenerativedesigngroup.com/growing-chestnut-agroforestry/>
 - <https://www.recorder.com/my-turn-Kelly-Neiger-Celebrating-Arbor-Day-with-The-Chestnut-Tree-Farm-46192535>
 - Jono is a great resource for markets for chestnuts as well if you wanted to eventually expand to sell non-locally.

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(<https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/vermont/vermont-environmental-quality>) is a great resource to get some funding to cover majority costs of establishing an alley cropping system. You can contact your technical service provider at NRCS directly or go through NRCD to get some different funding options (<https://sites.google.com/view/whiterivernrcd/services/farm-teams>)

Nursery examples:

- [East Hill Tree Farm](#)
- [Yellow Bud Farm](#) (You missed this class but a great resource! Jesse's contact info is in the drive)

- [Twisted Tree Farm \(this is the one that sells out in 24 hours!\)](#)

Species

Cider apples: I won't get too into the weeds on cider apples because there are some really great guides on varieties for Vermont (this is one is a bit *dry* but helpful:

https://www.uvm.edu/~orchard/fruit/pubs/18Bradshaw_ISHS_CiderApple_CvrEvaluation_2PrePub.pdf) Stephen Wood of Farnham Ciders at Poverty Lanes would be a good person to get in touch with if you're interested in selling some of your apples to a local distributor. Nicko of East Hill is a great person to talk to about variety and rootstock.

Red currants: As you may know, currants were banned in the United States due to their (incorrect) association with white pine blister rust. Although the laws have been rescinded, interest in planting currants has not recovered although they are commonly cultivated in Europe and are considered a fruit staple. They can be used in a variety of sweet and savory value added products and some are valued for fresh eating.

The main three species that are used for breeding red and white currants are *Ribes rubrum*, *Ribes sativum*, and *Ribes patreum*. White currants are considered to be a natural mutation of red currants where red fruits have lost most for their pigmentation. Mature plants range from 4-6 feet high and can become dense, multi-stemmed shrubs. As such, they should be planted 3-5 feet apart. They are self-fertile.

Currants prefer cool areas that get consistent moisture and will produce good amounts of fruit in part shade environments—in fact they tend to prefer this and are prone to getting burned if grown in direct sunlight. Therefore, they are an ideal species to plant in a multi strata system, as they can do well below establishing taller trees or shrubs. They are commonly interplanted in orchards.

Currants prefer more basic soils generally (6-7). Currants have shallow rooting systems so they will benefit from mulch to keep their roots cool. Additionally, if you are planting them next to other species (particularly nursery stock) you may consider doing some root pruning with a sharp spade.

Currants are produced on grape-like clusters called strings. Most will begin white and ripen to red, and are best picked after three weeks of displaying their suitable color. Currants are well suited for value added products (jams, drink additives, etc.) Currants generally wane after four years of bearing fruit, but you can prune around the base of the plant to encourage new growth to keep the plant productive.

Main pests include currant aphids, currant borers, currant worms. Generally not too large of a concern. Birds can be the greatest concern, and netting during the three weeks of ripened fruit can be vital to ensure a crop. This can be achieved effectively and cheaply by essentially creating a long clothesline across the area that you can secure down with stables and clothespins quickly.

Propagation: Hardwood cuttings, 5-7 inches in length (pencil size in diameter)

Varieties:

- *Pink champagne:* pomegranate taste, best variety for fresh eating.
- *Red Lake:* developed at UMinn, abundant crops of flavorful fruit
- *Blanka:* White currant, delicious!

Good sites to visit and/or help with pruning to get stock for propagation:

Milton Currants: <https://www.facebook.com/vermontcurrant/>

Cherry Hill Farm, Springfield VT: <https://www.facebook.com/cherryhillfarm/>

Mark Krawczyk of New Haven, Vermont

Hazelnuts: American hazelnuts can grow well in zone 4b! They are moderately fast growing deciduous multi-suckering shrubs that can reach 8 feet tall and can grow up to twenty feet tall if they hybridize with European variety (generally you will find American, European, filberts and many crosses). As plants get older, the root sections will send out new suckers in a circle. It is suggested to plant them about 12-15 feet apart from one another.

Hazelnuts have both male and female flowers on the same plant and catkins will be on branches all winter until small flowers open up in the early spring. They are wind pollinated, so often benefit from being planted in groups. As such, in spring, if temperatures are projected to drop below 20 degrees (F), you may want to cover the plants. As hazelnut branches age they eventually stop yielding nuts. These can be cut back to the ground to stimulate new growth.

American hazelnuts grow very well in many different soil types, including the wetter soils at your site—they actually prefer it and do well with lots of organic matter and will prefer compost as opposed to other fertilizers. They do best in moderately acidic soils, so if your soils are at 5.6 or below, applying lime will bring them to a more suitable acidity level. Some European varieties of hazelnuts carry Eastern filbert blight, but it's not a big problem for this area.

Hazelberts (mix between hazelnuts and filberts) are promoted in Vermont. They are generally ready to be harvested late August to early October.

Good Sites to visit:

Yellowbud Farm, WRJ

East Hill Tree Farm, Plainfield

Elmore Nursery, outside Montpelier

Plums: Plums grow well in Vermont. They are beautiful flowering trees and many varieties start soon after planting. Most varieties will grow to about 15 ft. Late frost sometimes damages spring flowers, reducing crops. Most hardy plums are crosses between American and Japanese plums. The Toka plum or seedling American plums are the best pollinators for these varieties. Although plums are monoecious with male and female flowers, pollination can be difficult for plums; for best results plant 3 or more varieties close to one another (8-15 feet). Coating developing fruit with kaolin clay (surround spray) just after petal drop can dramatically reduce fruit loss to the pest plum curculio. Otherwise, fertilizing with compost in the spring and fall will help them happily produce. Nicko Rubin has a catalog of a bunch of different delicious varieties with great guidance on what to plant

Plums prefer slightly acid soil (pH 6.0-6.8) and thrive in lightweight loamy, well-draining soil. Plum trees grow and produce the best fruit in well-drained but moist fertile soil that is rich in organic matter, but tolerate a wide range of soils as long as water and nutrients are not limiting and soil pH is adequate.

Good place to find plums:

- Champlain orchards
- King Blossom Farms

There are many other hardy species you could consider intercropping into your alley rows that will have a similar growth form and do well wet conditions. Let us know if you have any questions about others or theses following:

Elderberry:

A very comprehensive guide to growing elderberries can be found here:
uvm.edu/sites/default/files/media/ElderberryGuideComplete.pdf

But here are some tips:

Can be hardy to zone 3! All green parts of the plant are toxic and if more than a few berries are eaten raw, they can also make you feel very sick despite being very nutrient rich when prepared correctly. American elder is a very tough and adaptable plant. Its fruit is delicious used in drinks, elixirs, and baked goods and its flowers are used in a number of cordials.

Large suckering shrub, 6-15 feet tall (there can be great variation) that will grow from old stems as they die out. Elderberry is self fertile. Adapted to grow in many conditions except for those that are dry.

Some varieties include Adams, popular vigorous growing bush with large berries; Bob Godon, high yielding; Nova, commonly found here; Wyldewood, big berries.

Easy to propagate, will grow from seeds or from hardwood cuttings. You'll often get volunteer plants since birds love them and they can require some netting to prevent bird consumption.

Thank you.



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