

FACTSHEET: Grow Agriculturally Productive Buffers

Every river needs a riparian buffer: a section of forest and vegetation along a river's banks helps control floods, stabilize riverbanks, maintain water quality, cool waters to create fish habitat, and provide wildlife habitat. Buffers are ecologically productive.

The problem is producers are often forced to choose to sacrifice valuable productive land to build riparian buffers.

One solution is an “agriculturally productive riparian buffer.” This buffer cleans the water, holds banks in place, provides wildlife habitat – and grows a profitable food, fuel, or forage crop.

This guide aims to help producers and landowners learn how:

- growing crops in buffers can protect our natural resources and provide income;
- to choose crops for your buffer; and
- to grow crops in the buffer.

1. Meeting Your Resource Needs

Planting an agriculturally productive buffer helps you take care of the land and your bottom line.

Any riparian buffer is helpful, but the most effective buffers include a combination of trees, shrubs, and grasses. Agriculturally productive buffers include all three, and you don't have to give up prime agricultural land. You can generate income from the buffer by growing fruit and nut trees, berry bushes, hay, and other perennial crops.

You may even be able to secure funding for planting an agriculturally productive buffer. It's expensive to transition from annual crops to perennials, and a paycheck for planting a buffer can help offset the cost of establishing perennial crops. See the “Economics” section for information on groups that are working with producers to plant agriculturally productive buffers.

2. Designing Your Buffer for Conservation and Economic Goals

Agriculturally productive buffers follow the USDA Center for Agroforestry's three-zone buffer design, with perennial crops in Zones 2 and 3 (Figure 1). If you're going to grow agriculturally productive buffers, you will want to understand how each zone works, and what types of crops fit each zone.

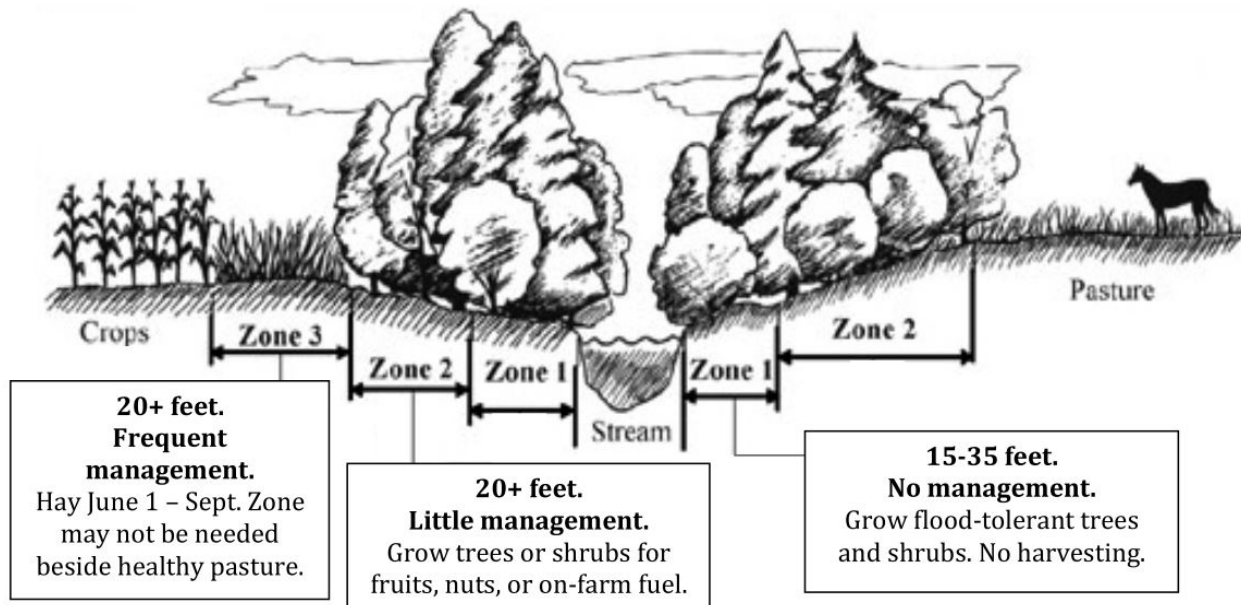


Figure 1. Agriculturally productive buffers grow perennial crops in Zones 2 and 3 of the buffer. Adapted from the Association for Temperate Agroforestry.

- Zone 1:** Native trees' deep roots stabilize the bank, and they re-grow quickly when they are covered by sediment, bent over by a flood or ice, or damaged in a storm. The trees in Zone 1 soak up floodwater and send it back into the atmosphere. Their thick trunks catch large debris from floods, and keep it out of farm fields. Finally, they provide wildlife habitat and keep waters cool for fish populations. Plant a diversity of native, flood-tolerant trees and shrubs, based on the site's soils and natural vegetation. Specific tree and shrub varieties are shown in Figure 2.
- Zone 2:** Fast-growing trees and shrubs hold the stream bank in place with large, deep roots. They absorb nutrients with fine, shallow roots, and their trunks can catch flood debris. This zone can also produce viable crops, including nuts, fruits, and fuels. You can interplant with native vegetation, or grow in clusters or rows. Plant flood-tolerant crops with fruits or nuts that grow above typical flood height.
- Zone 3:** Hay forms a hardy network of above- and below-ground growth that traps sediment and slows down runoff. When a heavy rain falls on a cultivated field, much water doesn't filter down into the soil – it "runs off" over land, downhill, and into the nearest stream or river. The hay crop is a physical barrier to the water's movement, and it slows down runoff. Slower moving water can filter into the soil. The soil can absorb and retain the water, or just delay it temporarily. Either way, floods are less powerful: if only part of the water from a storm event reaches the river, or if some of that water is delayed, the amount of water that is moved downstream at any one time decreases. Less water and less power means that a flood will be less destructive. The grasses and legumes in Zone 3 also absorb excess nutrients that run off of farm fields. Plant whatever perennial hay mix you grow on the rest of your property (for ease of planning and logistics). If you do not already grow hay, select a sod-building mixture of cool season perennial grasses and legumes. The hay mix should be flood tolerant, with dense, stiff above ground growth.

3. Choosing Crops

A range of food and fuel crops can make sense in Massachusetts' floodplains; some of the most common are shown in Figure 2. Growing guides for these crops are available through UMass Extension. Buffers can also provide floral products and materials for creating baskets, dyes, furniture, cordage, and more.

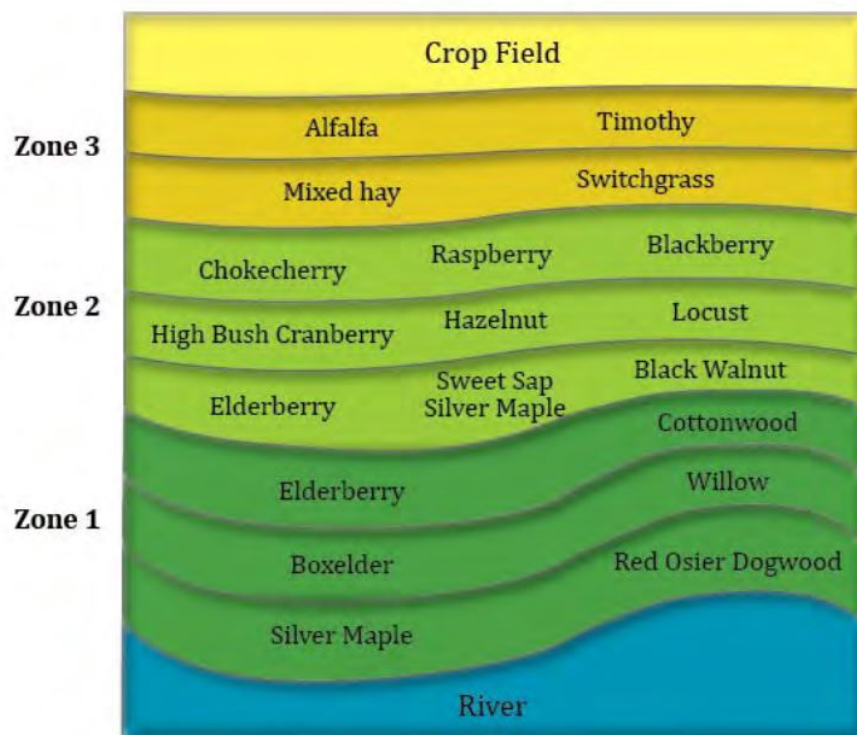


Figure 2. Examples of crops that can grow in Massachusetts' buffers.

4. Growing Crops in the Buffer

Farming in buffers will look and feel different than a typical farm field or forest. Because the crops are close to the river, your farming practices have to take the river into account. If you work with a conservation organization, they may require these or similar practices, depending on your agreement or contract. In general, the following should be considered when growing crops in a buffer:

- Grow a diversity of perennial crops.
- If you amend soils, do so based on soil tests.
- Do not apply manure within the buffer.
- Limit application of chemicals to crops.
- Limit equipment use for planting, maintenance, and harvest.

5. Building Your Buffer

Transitioning your riverfront from annuals to perennials is no small task. These tips may help.

- Finding Root Stock: Nurseries around Massachusetts and New England sell rootstock of fruit and nut trees, berry bushes, and other perennials.
- Finding Funding and Support: Some Massachusetts conservation groups are putting money and energy into agriculturally productive buffers. Several groups help fund

planting trees in Zone 1 (no harvest), and let you plant the rest of the buffer with perennial crops. Others are exploring more complete funding.

- c. Using Volunteers to Help with Buffer Plantings: Volunteers are excited to help care for the land and the water, and their labor can dramatically reduce the cost of planting an agriculturally productive buffer. Potential volunteers are all around you: local watershed groups, high school clubs, and beyond. Conservation groups may also be able to help find volunteers to plant your buffer.

6. Designing and Managing Your Buffer

The following points provide tips that may help you design and manage your buffer.

- Let the river meander.
- Follow the USDA's three-zone buffer design.
- Allow your buffer's boundaries to "float," or move when the river changes.
- Do not protect plantings from the river's natural movement with riprap or other methods.
- Leave banks in their natural state (State Regulation).
- Limit trampling and equipment damage on banks.
- Do not develop roads within the buffer.
- If trees or shrubs are already growing along your river, leave them in place, and plant crops in openings.

7. Thinking Critically About the Economics

Should every buffer be agriculturally productive? Absolutely not. This type of buffer management is an option when the river is stable and you want to keep the land in agricultural production.

Are buffer crops really economically viable? At what scale?

We're still learning. Producers in other parts of the region are growing crops in their buffers at backyard and commercial scales. We'll know more about yields, costs, and markets for buffer crops in Massachusetts as more pioneering producers plant in their buffers. We encourage you to talk with us (UMass Extension) and other producers who are growing crops in their buffers. Together, we can provide resources about what crops make sense along your floodplains as well as the economics of these crops.

Can agriculturally productive buffers qualify for conservation funding?

Sometimes. Energy is building around the idea of agriculturally productive buffers, and several local groups are funding buffers that include crops (see next question). Federal programs (including NRCS) do not typically pay for planting crops in buffers, or allow for harvest in riparian areas.

Is anyone planting agriculturally productive buffers in the region? Who's funding these plantings?

Yes. Several farmers have planted agriculturally productive buffers, and nonprofits are helping fund their work. The Friends of the Mad River helped plant elderberry for a commercial grower near Waitsfield, VT. Trees for Streams helped plant Zone 1 of a buffer at a tree nursery near Johnson, VT. Because they paid for planting the native buffer, the farmer could afford to plant crop trees in Zone 2, including hazelnuts (nuts), black locust (timber), plums (fruit), apples

(fruit), and more. The White River Partnership helped producers plant homestead-scale fruits and berries in Royalton, VT.

8. Resources for Learning More

- Establishing and Managing Riparian Forest Buffers (University of Missouri Center for Agroforestry) provides a comprehensive guide to planning agriculturally productive buffers.
- Riparian Forest Buffer Design, Establishment, and Maintenance (Maryland Cooperative Extension, 1998) explains the three-zone concept and covers planning and planting options.