Ecobuffers: Something from Nothing, Something for Everyone, Something that Lasts

The following factsheet describes what ecobuffers are and how they can be an important addition to your farm.

Something from Nothing
Take a moment to imagine a “nothing” area on your farm. A place that’s not really contributing to the success of your operation, is underperforming, or is downright neglected. It could be a fence line, a ditch, a patch of marginal soil, a steep area, along a road or trail, a wet area, or a pivot irrigation corner. Every farm seems to have at least a few.

The goal of what follows is to convince you that your nothing area is actually bursting with potential. This bold claim is based on the premise that this area can support life that is willing and able to help you out, if you give it a chance. There are species of plants, animals, and fungi out there that, under the right conditions, “want” to deliver “ecosystem services” for you, whether through sheltering your livestock, pollinating your crops, eating your pests, cycling nutrients, or providing some other function.

If your nothing area is relatively diverse and undisturbed, there’s a good chance that some of these species are already helping out without you even knowing. However, many of the ones you might want could be absent, particularly if the area is degraded. The good news is that they can be introduced or encouraged to move in.

Establishing an ecobuffer is a one way of doing just those things. Ecobuffers are planted communities of perennial species (i.e. trees, shrubs, and/or herbaceous plants) designed to provide specific ecosystem services. These services can be both diverse and long-lasting.

Something for Everyone
Although the concept of ecobuffers is relatively new, it evolved out of a century of researching and establishing shelterbelts. Shelterbelts or windbreaks are single or multiple rows of trees and shrubs planted primarily to reduce wind speed. When situated and structured appropriately, shelterbelts can provide a number of well-documented ecosystem services to a farm, such as shelter for livestock and farmyards, reduced wind erosion, and snow trapping.
Ecobuffers can be designed to act like shelterbelts, and thus provide these services as well - indeed, shelterbelts can be thought of as a simplified subset of ecobuffers. However, ecobuffers are characterized by their multifunctionality. Different ecobuffers can be designed to do completely different things, and most are designed to provide multiple services at once.

For example, you might consider designing your ecobuffer to provide **habitat for pollinators** such as wild bees, particularly if you have pollinator-dependent or benefiting crops nearby (e.g. alfalfa, sunflower, canola, and clover). This would involve considering the habitat requirements of wild bees in your design, which include diverse native flowering plants, water, nesting and overwintering sites. While doing so, you might also consider designing the ecobuffer to provide **habitat for pest suppressing invertebrates**, as many of these habitat requirements are shared with insects and spiders that parasitize or predate on pests. Research has shown that taking all of this into account in the design process can result in both increased pollination and pest suppression in cropland adjacent to the ecobuffer.

Other examples of potential services you might consider include **insectivorous bird habitat**, **water quality protection**, **groundwater recharge**, **carbon sequestration**, **biodiversity conservation**, and **provision of food, forage and fuel**. To give you an idea of the synergies possible between these different services, Table 1 outlines recommended species and design considerations. Remember that these are not the only possible services either – the number that can be provided by an ecobuffer is, in some ways, limited only by your imagination and understanding.

**Something that Lasts**

The ecosystem services that you might be interested in having on your farm are not exactly recently developed. Rather, a diversity of species has been sheltering, pollinating, sequestering carbon, filtering water, providing forage, and eating insects millions of years before we came along and called them services. Although ecobuffers cannot be expected to last millions of years, their design mimics natural plant and animal communities in a way that makes them largely self-sustaining.

How do ecobuffers mimic natural communities? By the fact that the species within them are selected and arranged not simply to provide direct services to the surrounding farm, but also so that they can mutually benefit each other. For example, hardy, fast-growing species such as Manitoba maple might be planted on the windward side of an ecobuffer to provide wind protection for other more shade tolerant but wind-sensitive species such as white spruce. In
other words, each species in an ecobuffer has a role or “ecological niche” in maintaining a service-providing system, reducing the need for you to do it for them.

This also makes it more difficult for weeds or undesirable species to take up residence. The more ecological niches that are designed into an ecobuffer, the less sunlight, moisture, nutrients, and room there is for species that aren’t helping to provide services. To ensure that niches are filled up quickly, some ecobuffers are planted quite densely, or planted with fast-spreading but non-competitive ground covers or shrubs.

Although self-sustaining, ecobuffers – like anything in nature – are dynamic, evolving as the plants within them seed, grow and decay. This is not necessarily a bad thing, as it opens up possibilities for them to provide different or additional services to the ones you originally wanted. You might be able to take advantage of these other services if you notice them, increasing the overall value of the ecobuffer. For example, a farmer in Camrose County recently observed that the caragana shelterbelt his family had originally planted to shelter their farmyard also provided cover and a source of food for his chickens, which prompted him to graze them in the area. Generally, the more functions you initially design into an ecobuffer, the better you will be able to adapt it to the changing needs of your farm and yourself.

**Conclusion**

Ecobuffers are a promising and innovative way to make something multifunctional and lasting out of “nothing”. Given that there is no set way for an ecobuffer to look, there is room for constant experimentation and revision. If you are considering developing an ecobuffer, check out the resources we’ve listed below, or contact us and we’d be happy to help you get started.
<table>
<thead>
<tr>
<th>Function</th>
<th>Recommended species</th>
<th>Recommended structure and location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelter for livestock or farmyards</td>
<td>Deciduous and coniferous trees and shrubs.</td>
<td>Plant species to achieve 30% porosity evenly distributed throughout height. Orient perpendicular to prevailing winds. Height should be approximately 10% of downwind protected area width. For wind and snow control, plant smaller shrubs on windward side.</td>
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<tr>
<td>Wind erosion reduction for downwind fields</td>
<td>Deciduous and coniferous trees and shrubs.</td>
<td>Plant species to achieve 30% porosity evenly distributed throughout height. Orient perpendicular to prevailing winds. Height should be approximately 10% of the downwind field width.</td>
</tr>
<tr>
<td>Snow trapping to increase moisture on downwind crops</td>
<td>Deciduous and coniferous trees and shrubs.</td>
<td>Plant species to achieve 30% porosity evenly distributed throughout height. Orient perpendicular to prevailing winds. Height should be approximately 10% of the downwind field width.</td>
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<tr>
<td>Water quality protection and groundwater recharge</td>
<td>Trees and shrubs with diverse rooting depths. Include salt tolerant species.</td>
<td>Plant densely to prevent rain landing on bare soil. Plant near riparian areas where possible.</td>
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<td>Pollinator habitat</td>
<td>Diverse native trees, shrubs and forbs with overlapping flowering periods. Hollow-stemmed plants. Decadent trees and shrubs. Bunch grasses.</td>
<td>Orient to maximize sun exposure. Clump flowering species together (3-5 individuals per clump). Locate near existing habitat and within 150m of pollinator-dependent crops. Plant sheltering species on north or west side.</td>
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<tr>
<td>Pest suppressing invertebrate habitat</td>
<td>Diverse native trees, shrubs and forbs with overlapping flowering periods. Hollow-stemmed plants. Decadent trees and shrubs. Bunch grasses.</td>
<td>Plant sheltering species on north or west side. Locate near existing habitat and benefiting crops.</td>
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<tr>
<td>Insect-eating bird habitat.</td>
<td>Fruit and nut-bearing shrubs. Thick, many-stemmed shrubs. Coniferous species to provide winter cover.</td>
<td>Plant sheltering species on north or west side. Plant densely to ensure continuous cover. Locate near benefiting crops.</td>
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<td>Nutrient cycling</td>
<td>Diverse native trees and shrubs. Favour those that associate with mycorrhizal fungi, and/or fix nitrogen.</td>
<td>Locate near benefiting crops.</td>
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<tr>
<td>Food, forage and fuel provision</td>
<td>Species that produce desired products. Nitrogen fixing and sheltering species can also be included.</td>
<td>Place species where they can be easily harvested or foraged. Place sheltering species on north or west side, and nitrogen fixing species near to provisioning species to enhance their productivity.</td>
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<tr>
<td>Wildlife habitat</td>
<td>Diverse, native woody and herbaceous species.</td>
<td>Locate near existing natural habitat, and mimic its design.</td>
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<td>Carbon sequestration</td>
<td>Fast growing and long-lived trees and shrubs.</td>
<td>Can be integrated easily into other ecosystem services.</td>
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</table>
Useful References

On General Ecosystem Services

On Pollinators and Pest Suppressing Insects and Spiders


On Shelterbelts and Associated Services

US Department of Agriculture, National Agroforestry Centre Documents on Windbreaks. http://nac.unl.edu/practices/windbreaks.htm

On Water Quality Protection
Alberta Agriculture and Forestry Department. Planning Your Riparian Planting Project in Alberta. file:///C:/Users/owner/Downloads/293-riparian_planting.pdf


On Food Provisioning

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For more information on ecobuffers please contact:

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