

## **Windbreaks and Shelterbelts: Save money, increase productivity**

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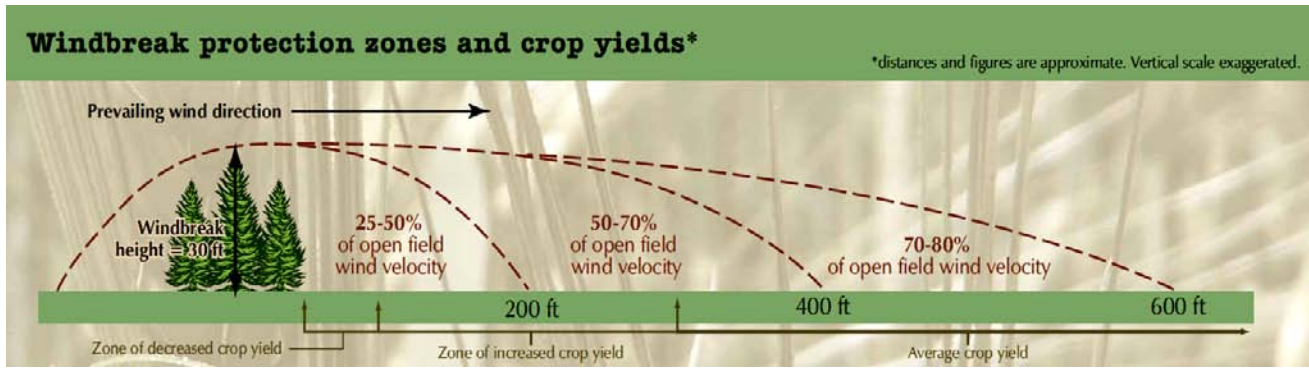
Windbreaks offer a relatively simple solution to several very expensive problems. Farm losses due to wind and water erosion add up to approximately \$697 million per year (Agriculture Canada, adjusted to CAD-2010). Clearing blowing snow accounts for close to 30% of municipalities' snow removal budget – about \$3,000 per rural two-lane kilometre per year. Unsheltered homes and barns can cost up to 30% more to heat in the winter, and in the summer one would need about 10 large air conditioners to provide the same cooling effect of one mature deciduous tree. The bottom line: it pays to break wind.

Research on windbreaks began in earnest during the dustbowl years, and since then has consistently shown that using windbreaks results in higher crop yields, earlier planting, faster germination, earlier flowering, better pollination and reduced pesticide spray-drift of up to 80%. Windbreaks work their magic by improving soil moisture as well as soil and air temperatures, and decreasing evaporation and wind speed. Their benefits are most critical to vegetable and specialty crops, which can be scoured by windblown soil. Livestock studies show windbreak benefits include reduced feeding costs, increased survival rates and higher milk production. Properly positioned tree windbreaks can also provide barns with better odor control.



*Windbreak and stream buffer, Kate Vanderzaag Potato Farm, 2011.*

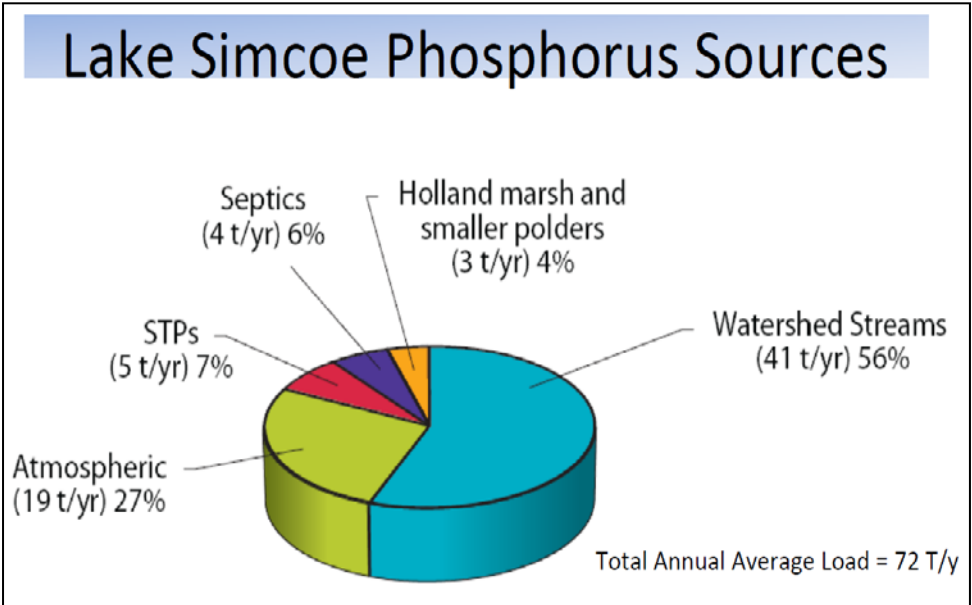
Windbreaks improve crop growth and yield, as shown repeatedly by more than 676 field-year studies done in 14 different countries. Yield increases range from 5-50%; for example, corn and soybeans show an average gain of about 12%. The zone of increased crop yield extends to many times the windbreak's height. This more than makes up for the small zone of competition next to the windbreak.



Source: Grand River Conservation Authority. Well designed windbreaks can boast yields well beyond those lost to the windbreak area or the small zone of root-competition.

Windborne soil can damage crops and can also damage downwind lake ecosystems. One example is Lake Simcoe, where one research scientist has shown that over 27% of that lake’s annual phosphorus load (some 19 tonnes), is due to windblown soil from agriculture, unpaved roads, construction sites and pollen. Phosphorus reduction is critical to improving Lake Simcoe’s water quality and long-term ecosystem health.

Windbreaks, cover crops, residue and conservation tillage can help to reduce wind erosion on the farm. The bulk of airborne phosphorus comes from local, lost agricultural top soils, primarily to the northwest of the lake. It’s not good for the lake and it’s not good for farmers. Windbreaks can also act as living snow fences. They work best when set back 20-100 m from roads, and can provide the dual benefit of improving road



Source: Lake Simcoe Region Conservation Authority and Ministry of the Environment Data sets on phosphorus loading for 2002 to 2007.

safety and increasing agricultural productivity. A living snow fence will last from 50 to 70 years, whereas wood-slat fences usually break down in less than 10 years.

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) has provided funding from the Lake Simcoe Farm Stewardship program to the Nottawasaga Valley Conservation Authority to host multifunctional windbreak workshops, designed to connect interested farmers

with expert technical design, and create local farmer demonstration sites. The goal is to provide opportunities to farmers and extension professionals to combat soil erosion and non-point pollution using windbreaks. The upcoming workshop will have national, provincial and conservation authority experts presenting an overview of all aspects of windbreaks, including economic benefits, maintenance issues and pesticide drift concerns.

### **Windbreak Design**

Designing a good windbreak is an art and a science. Remember, every location is different, and one design will not be effective for all situations. The following guidelines can help in a wide range of cases, but you can contact your local Conservation Authority or OMAFRA for technical advice.

1. **Height:** The downwind influence of a windbreak is about 10 times the height.
2. **Length:** Long and perpendicular to the wind to protect larger areas of cropland.
3. **Spacing:** Plant 2-3 meters apart in spring or fall. Stagger rows. Thin and prune. Fill in gaps when trees are lost.
4. **Location:** 20-100m back from roads, drives, barns or homes, to let the snow settle.
5. **Porosity:** The windbreak shouldn't be a solid wall. Aim for about 20-30% porosity. A row of deciduous trees has about 30% coverage; a conifer row about 50-60%.
6. **Species:** Consider moisture preference, longevity, and salt tolerance.
  - o **Conifers:** White cedar, spruces and red juniper
  - o **Hardwoods:** Red oaks, aspens/poplars, maples and white ash
  - o **Shrubs:** Add berry-producing shrubs, like highbush cranberry, raspberries and dogwoods, for extra biodiversity and song-bird appeal

If you are interested in learning more about windbreaks in Ontario, finding out if there are any supporting grant programs, or have other feedback or ideas for articles please contact the Shannon Stephens at the Nottawasaga Valley Conservation Authority 705-424-1479 ext 239.

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