



Green Expectations

A REGULAR FEATURE LOOKING AT ENVIRONMENTAL CHALLENGES FACING FARMERS AND THE SOLUTIONS TO MEET THEM

The transformation of Washington Creek

The Oxford County creek is seeing the benefits from buffer research



BY RAY FORD

The writer farms near Powassan
rif@onlink.net

Back in 1985, sections of Washington Creek wouldn't have been your top choice for a scenic picnic spot.

The Oxford County stream meandered through hard-working pasture and tilled fields. Its banks were collapsing. Its waters were muddy and filled with sediment. The "crick", according to a team of scientists, was "an excellent example of a degraded agricultural stream".

Now, more than 30 years later, parts of the once-dowdy Washington have had a makeover. Researchers say trees, grass and shrubs have made the water cooler and cleaner. There are more birds and fish.

The spring-fed creek may only be nine kilometres long, but University of Guelph agroforestry specialist Naresh Thevathasan says it has become a long-term experiment probing the impact of riparian

buffers.

Along with cleaner water, more wildlife habitat, reduced soil erosion and nutrient loss, riparian plantings can buffer farm fields from the impact of climate change, says Thevathasan, an associate professor at Guelph's School of Environmental Sciences.

"We're confident that planting a riparian buffer contributes to enhanced sustainability in the rural landscape," he told a conservation workshop in North Bay last month.

Workshop organizer Dawn Lambe hopes some of these benefits can be transferred to northern Ontario's waterways. The payoff could be "diversified agricultural income opportunities, healthier creeks and rivers, and opportunities for economic development for municipalities and First Nations," said Lambe, executive director of the Biomass North Development Centre.

Washington Creek has been a living laboratory since 1985, when University of Guelph forest ecology and agroforestry professor Andrew Gordon planted alders and hybrid poplars to stabilize the banks.

Silver maples were added in 1986. Additional plantings included a grass buffer zone and shrubs. Meanwhile, native species and invasives sprouted from the seed bank, or from seed brought in by birds and animals.

As the roots took hold, the water became clearer. Shade from growing



Naresh Thevathasan

trees cooled the stream. Survey crews spotted brook trout in 1989 and measured steady declines in the stream's sediment load.

In the early years of the rehabilitation parts of the creek bed were covered by a layer of sediment up to 21 centimetres thick. By 2001 the layer was just 4.3 centimetres thick at the rehab site.

Because streamside plants suck up nutrients flowing from farm fields, there is less nitrogen and phosphorus to feed algae in the water. Shade from trees further reduced algal growth. Those water quality improvements alone have "a direct influence on human health," Thevathasan said.

Now researchers from the universities of Guelph and Waterloo are cataloguing climate benefits. Buffers take carbon out of the air, storing it in wood, roots, and the soil.

Based on Washington Creek, Thevathasan calculates a 10-metre wide buffer planted with hybrid poplars could lock away more than 13 tonnes of carbon per hectare—the equivalent of the emissions from 13,500 litres of diesel a year. Studies on the creek show deciduous trees, rather than evergreens, do the best job of storing carbon.

But the science of riparian buffers and greenhouse gas emissions is complex, and Thevathasan says more research needs to be done. The mix of moisture, nitrogen and phosphorus in riparian zones should be fueling the activities of soil microbes.

And as the soil becomes more active, the microbes pump out greenhouse gases including carbon dioxide, nitrous oxides, and methane. So far, Thevathasan says, emissions from the banks of the creek are surprisingly low—much lower than from nearby crop fields. But researchers continue to capture and measure gases coming from the soils.

Based on the research, Thevathasan sees tremendous potential for riparian buffers. In the Grand River Conservation Authority's area alone, there's 11,000 kilo-



Zero years.



15 years.



20 years.

metres of waterways. He would like to see farmers make riparian buffers an integral part of their farm businesses.

One bonus, he adds, is "you don't have to fertilize the (buffer) zone, because you're getting the fertilizer as runoff from the fields." The payoff is that trees and vegetation in the buffer grow more quickly.

Once the zone closest to the creek is stabilized with long-lived trees, farmers could plant an area where trees can be selectively harvested for firewood, or managed for lumber and veneer, nuts, fruit, or maple syrup, even berry crops or mushrooms. Finally, a grassed buffer between the trees and the adjacent field can be grazed or cut for hay.

Managing those riparian zones takes extra time and energy, though, and most farmers probably

already have their hand full looking after their existing crops. Area farmer Bryan Tew crops corn and soybeans alongside the Washington's buffer.

Not surprisingly, his focus is on the field, and the buffer is mostly a backdrop. He's concerned the zone could be a place where invasive weeds can gain a foothold. The short-lived hybrid poplars planted in the '80s can be a headache, too, because they die and topple into the creek or nearby field. "The odd one falls onto the field and I have to pull it away," he said in a telephone interview.

Thevathasan argues some of these problems can be fixed by working with landowners during the planning stage. There's no "cookie-cutter" design, he said. "We want the landowner to have ownership of what he is trying to design for his land."

Farmers' "agroforestry" know-how lagging, survey says

Ontario farmers' knowledge of agroforestry techniques, including creek-side buffers, windbreaks, and "alley cropping" (alternating crops and rows of trees) has scarcely grown in the past 20 years, according to a survey conducted by the private contracting firm Forest Environments Universal Inc. (FEU).

The online survey contacted farmers through the Ontario Soil and Crop Improvement Association's e-mail list. So far about 50 have responded. Most farmers told the survey they have a "fair" or "limited" knowledge of agroforestry—a response almost unchanged from a 1998 survey. Respondents said OMAFRA remains an important contact for farmers. About a third of those surveyed listed

the ministry as a key source of farming advice and new ideas.

Brent Coleman, a University of Guelph Ph.D. student working on the survey with FEU, argues landowners would benefit from a one-stop resource outlining tree-planting incentives, tree stock, tax exemptions and other programs supporting tree planting.

He points to the USDA's agroforestry program, which helped farmers establish over 336,000 acres of windbreaks, riparian buffers, alley cropping and silvopastures (pastures that include trees for fruit, nuts, lumber, veneer or firewood) in just five years. "I think we have the potential to significantly expand agroforestry within Ontario, and Canada more broadly," he said.