



# Willow Riparian Buffers



Riparian buffers can be used to manage agricultural runoff, preventing sedimentation and nutrient movement into rivers, creeks or other water bodies. Willow (*Salix* sp.) is an excellent plant choice for riparian buffers because it grows rapidly and can absorb a large amount of excess nutrients. Willow buffers act as a physical barrier: decreasing pollutant transport by making it easier for water to enter the soil, through slowing down water flow, and by the filtering effect of dense vegetation and roots. They also act as a biochemical barrier: absorbing and storing intercepted nutrients in their leaves, stems and roots. The harvested biomass can be used as a biofuel for heating as an added economic benefit.

Over three years, a one-hectare willow buffer can intercept 300 kg nitrogen (N) and 45 kg phosphorus (P)

## Buffer System Based on Field Research

Field trials in Prince Edward Island (2006 – 2012) led by Agriculture and Agri-Food Canada science team of Bill Schroeder and Brian Murray showed that regular harvest of willow biomass is an effective nutrient management tool for potato production systems. Harvested biomass exports intercepted nutrients from the riparian zone and helps sustain buffer function by restoring fast regrowth and promoting new nutrient uptake.

## Buffer Site Planning

**Soils:** Willows grow on most agricultural soils.

**Slope:** Plant on areas with less than 7% slope.

**Access:** Tractor access is important for biomass harvest.

**Site selection:** Plant on grassland or previously cropped land. Focus on areas with little or no natural riparian vegetation (Figure 1). Do not plant on natural riparian areas. Follow provincial regulations for minimum planting distance from water's edge.

## Site Preparation

**Timing:** Best time is the fall prior to planting.

**Tillage:** Uniform seedbed to 25 cm depth.

**Plastic mulch:** For within-row weed control, apply UV resistant 2.0 mil plastic mulch (1.1 m wide) using a mulch applicator on prepared planting rows (Figure 2).

## Plant Material

**Cultivars:** Select locally adapted willow cultivars such as: viminalis '5027', miyabeana 'Sx64' and 'Sx67', sachalinensis 'Sx61'.

**Cuttings:** Use 25 cm long hardwood cuttings.

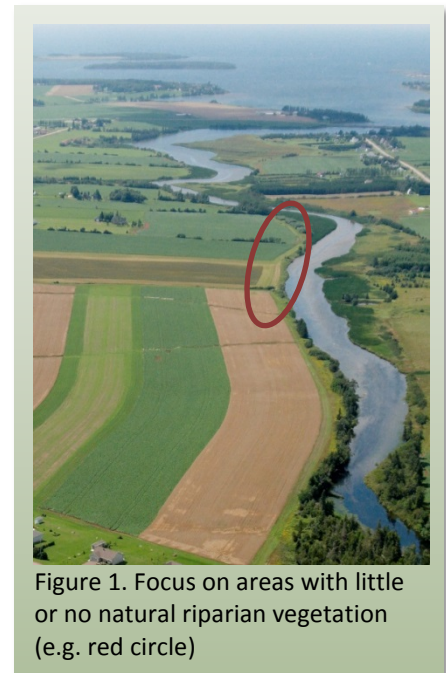


Figure 1. Focus on areas with little or no natural riparian vegetation (e.g. red circle)

## Planting

**Timing:** Late May to early June, while soil moisture is still high.

**Technique:** Hand plant into plastic mulch, 10 – 15 cm deep (Figure 3).

**Density:** 5,300 stem/ha.

**Spacing:** 0.75m between plants x 2.5m between rows (Figure 4).

**Number of rows:** Four or more.

## Willow Buffer Management

**Weed control:** Plastic mulch controls in-row weeds; mow vegetation between rows in years one and two.

**Coppice:** Cut back to 15 cm in the first fall to encourage increased stem production.

## Biomass Harvest

**Timing:** Harvest on a three-year cycle in late fall (after leaf drop). For maximum riparian protection, harvest biomass one year following potato production.

**Equipment:** Tractor and modified sugar cane harvester (Figure 5).

**Yield:** Willow riparian buffers in PEI can produce up to 18-20 oven-dry tonnes/ha/year.

## Acknowledgements

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Figure 2. Apply plastic mulch for in-row weed control



Figure 3. Hand-plant willow cuttings

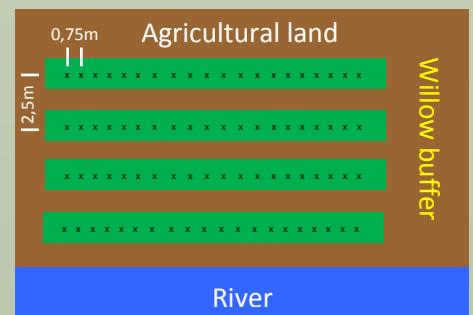


Figure 4. Willow buffer planting plan



Figure 5. Willow harvest with modified sugar cane harvester