MARCH 2013

FACT SHEET 01

THE NEW ZEALAND
POPLAR & WILLOW RESEARCH TRUST

Why plant poplars and willows on farms?

Because they can contribute significantly to water quality.

SUMMARY

The protection of water quality is a major environmental problem. Non-point source agricultural pollution is an important contributor to decline in water quality in New Zealand rivers and streams.

Soil erosion and farm runoff occur widely on NZ pastoral land and in addition to obvious costs such as, damage to farm infrastructure and loss of productive soils. They result in nutrient loss into waterways having an adverse effect on water quality. Nitrogen, Phosphorus, sediment and animal faecal matter are the pollutants of major concern.

Planting of poplars and willows plays an important role in reducing nutrient loss and in reducing water pollution.

SOIL EROSION MOVES SEDIMENT AND PLANT NUTRIENTS

Soil erosion on pastoral land can occur in any location where the soil is not bound and so exposed to erosive factors notably gravity, stock action, wind and water. Erosion moves soil from upper to lower slopes, buries topsoil, exposes subsoil, adds sediment to waterways, and redistributes plant nutrients. The plant nutrients shifted by erosion can be lost to pastures through leaching, overland flow, microbial oxidation and in sediments moving into waterways. Nutrients lost to the pastures need to be replaced.

WILLOWS, POPLARS AND WATERWAY BUFFERS

Waterway margins form an important buffer zone between land and water. Once stock is excluded from waterways, waterway margins can act as barriers, preventing excess nutrients and dirty runoff from entering the waterway.

Willows and poplars planted as waterway buffers

- stabilise the stream or drain bank
- trap sediment entering the buffer zone
- intercept nutrients and sediment from overland flow or erosion
- shade the stream and cool the water
- provide a handy shade and fodder source for stock
- intercept N from subterranean flow

The trees should be planted back from the stream edge, leaving the edge for herbaceous plants such as Carex grasses. Other shade options should be provided for stock to prevent camp sites forming near to the riparian buffer.

Willows (and poplars) can act as nurse plants for an understorey of native shrubs, trees, grasses and ferns. The native seedlings arrive in bird droppings or can be intentionally planted. The willows can then be removed progressively as the native vegetation becomes established (see photos).

WHAT WILLOW FOR RIPARIAN BUFFER ZONES?

Get advice from your local regional council about the appropriate willow to use rather than collecting and planting unidentified willow material from any location. Crack willows and grey willows spread and can choke up waterways. They must not be planted along waterways.

THIS IS ONE OF A SERIES OF FACT SHEETS PRODUCED BY THE NEW ZEALAND POPLAR AND WILLOW RESEARCH TRUST

Read other fact sheets on the Trust website at www.poplarandwillow.org.nz

STOCK ACCESS AND STREAM BANK EROSION

When livestock have direct access to waterways, they pollute more directly with urine and faecal material, and add sediment by breaking down stream banks. Stream bank erosion can typically contribute 50 to 90% of the streams sediment and phosphorus load.

Excluding stock from streams has been shown to reduce stream bank soil and phosphorus loss by 97%. If riparian tree buffers are included this phosphorus loss can be further reduced. Excluding stock and planting riparian buffers will produce a negative erosion rate in some years, i.e. the stream banks are built up.

REDUCE STOCK LOSSES

How many stock have you lost this year to unfenced streams, rivers or wet areas? The loss of a cow worth $1200 in a waterway is equivalent to the cost of fencing about 650 metres of stream edge with a single wire electric fence.

By fencing wet areas and keeping stock out, you'll save money in the long-run and benefit from:

- reduced stock losses in waterways or other wet areas
- healthier stock – reticulated water is better for stock health
- improved stock and grazing management.

POPLARS AND PHOSPHORUS

Poplars and willows take up inorganic forms of P (from applied fertiliser or as mineralised P in the soil) and return P in organic forms at leaf fall and through root death. They do not store P but recycle it, since most P is used in the leaves. By reducing the rate of runoff and increasing infiltration these trees reduce the overland flow and loss of P into waterways.

HOW PHOSPHORUS AFFECTS WATERWAYS

Farming activities can lead to the run-off and leaching of nutrients into rivers, streams, estuaries and underground water. The four pollutants of greatest concern are nitrogen, phosphorus, sediment and animal faecal matter. These typically enter waterways as run-off and leaching from farm paddocks.

Phosphorus and nitrogen are usually limiting in stream and river systems in New Zealand.

Phosphorus behaves very differently to nitrogen. It binds with soil and only dissolves slowly in water over time. Although it doesn't readily leach into ground water, phosphorus can pollute waterways via:

- erosion
- farm runoff.

During soil erosion, valuable soil and phosphorus can be lost from a farm. They often end up in waterways where they reduce water quality. Dirty runoff going into waterways contains soil particles and phosphorus. Phosphorus is found at very low levels in the natural environment, so small increases in the amount of phosphorus going into waterways can have a big effect.

FOR MORE INFORMATION ON USE OF POPLARS & WILLOWS

The New Zealand Poplar & Willow Research Trust: www.poplarandwillow.org.nz

Bay of Plenty Regional Council: http://www.boprc.govt.nz/media/29173/LandManagement-090526-Factsheet21.pdf
http://www.boprc.govt.nz/media/29176/LandManagement-090526-Factsheet22.pdf

Environment Canterbury: http://ecan.govt.nz/publications/General/PlantingPoplarWillow.pdf

Environment Southland: http://www.es.govt.nz/environment/land/climate/drought-mitigation-strategies/

Hawkes Bay Regional Council: http://www.hbrc.govt.nz

Northland Regional Council: http://www.nrc.govt.nz/Environment/Land/Poplars-for-erosion-control/

Taranaki Regional Council: http://www.trc.govt.nz/assets/Publications/information-sheets-and-newsletters/land-management-information-sheets/soil-conservation-information-sheets/35poplarwillowavailable.pdf

Growing Poplar and Willow Trees on Farms: http://maxa.maf.govt.nz/sff/about-projects/search/04-089/growing-poplar-and-willow-trees-on-farms.pdf