

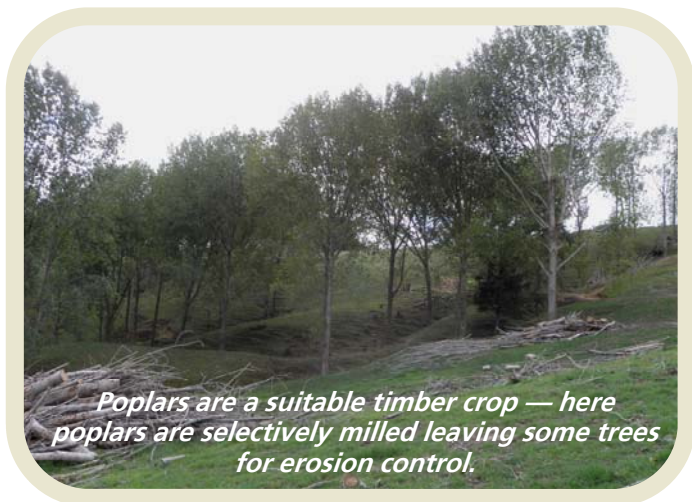
Poplars and willows for soil conservation

Sustainable land management

Poplars and willows are highly versatile and valuable trees and are ideal to help prevent or control erosion. Specially developed for soil conservation, their extensive root systems help to bind soil on streams and hillsides.

Poplars are not out of place on any farm and some varieties are excellent for shelter, stock-feed, bioremediation – a natural process that removes harmful toxins from the soil – and for timber.

This guide provides information for Northlanders about the two species and what to consider when you get your plants – site selection, planting and maintenance. This is by no means an extensive guide. If you have further questions, please contact a Northland Regional Council Land Management Advisor on **0800 002 004**.



Why plant poplars and willows instead of native tree species?

Poplars and willows are exotic northern hemisphere species so why choose them over natives?

They grow and can provide land and stream-side stability far more quickly than any native species can. However, if you are keen on planting natives for erosion control it's a good idea to consider inter-planting with poplar or willow.

Poplars and willows have a shelf life of up to 35 years so inter-planting will allow quick stabilisation as well as a cover crop for the natives. After the natives have established – which will take between seven and 10 years – the poplar or willows can be removed allowing the natives to take over the erosion-control function.

The benefits of poplars and willows...

- Extensive root systems — the key to stabilising eroding soils;
- Excellent shade trees for livestock in summer but they lose their leaves in winter, allowing light through to pastures;
- Can be grown easily from cuttings, known as stakes, wands or poles;
- Some varieties are excellent for timber, which can fetch good returns;
- Can be used as bioremediation — extracting harmful toxins from contaminated sites;
- Excellent stock-fodder, which can be used as a 'reserve' during droughts;
- If maintained correctly they are attractive, well-formed trees; and
- They are excellent for quickly accumulating carbon.

Planting — what you should consider

Selecting the right tree for the job

If you want poplars or willows for erosion control make sure the plant material is from a specialist nursery or at least cuttings from a known quality clone. These trees have been specifically developed over decades for soil conservation and do not have the characteristics of invasive species while some species – such as crack willow, pussy willow and silver poplar – spread easily and are considered pest plants.

A number of clones or hybrids that have been used historically are now deemed unsuitable, as they are intolerant of climatic conditions, susceptible to pests and diseases or palatable to possums and goats.

There are a number of varieties available today that are suitable for different sites, purposes and conditions. The table (over page) lists a number of common clones and hybrids and their suitability for various conditions and use.

Make sure you choose the appropriate tree for your situation – if in doubt, phone the regional council for advice.

Putting Northland first

Tree varieties and their uses

Variety		Tolerances						Uses				Height
Common Name	Botanical name	Dry	Wet	Clay	Wind	Frost	Possums	Erosion control	Shade	Shelter	Timber	
'Argyle' poplar (NZ5095)	<i>Populus euramericana</i>		✓	✓	✓	✓	2	✓✓	✓✓	✓✓	✓	30m
'Kawa' poplar (NZ 5006)	<i>Populus x deltoids x yunnanensis</i>		✓	✓			1	✓✓	✓✓	✓✓	✓✓	30m
'Toa' poplar (NZ5007)	<i>Populus euramericana</i>		✓	✓			1	✓✓	✓✓	✓	✓	30m
'Crows nest' Poplar (NZ5010)	<i>Populus x deltoids x P. nigra x P. nigra</i>	✓		✓	✓✓		2	✓		✓✓		30m
Veronese (PN 870)		✓			✓		2	✓✓		✓	✓	30m
Margarita (NZ5014)		✓					2					30m
Matsudana Willow (PN 227)	<i>Salix matsudana</i>	✓	✓✓	✓✓			2	✓✓		✓		15m
Matsudana Hybrids (PN69,4)	<i>Salix matsudana x alba sp.</i>						2	✓✓				15-20m
Purple Osier (PN249)	<i>Salix purpurea</i>						2	✓✓				8m
'Kinuyanagi'	<i>Salix schwerinii</i>		✓✓	✓			2	✓✓				6m

KEY: Possums 1= Not browsed 2= Browsed 3= Devastated ✓ = The tree is well suited to this tolerance (more ticks = more tolerance)

Delivery and planting

1. Pole care during transport

Care should be taken when transporting poles. Make sure the bark is not bruised or damaged as this makes the pole susceptible to disease and drying out. Poles are usually delivered in bundles of five, tied with string rather than wire to avoid damage.

2. Post delivery and care

Once delivered poles should be soaked in clean running water or a daily application of water from a sprinkler can be used for one to two weeks as soon as they arrive. This allows the pole to build up a reserve of water which it requires for root growth. Be careful not to over soak, conversely poles left in the sun for several days will have little chance of survival.

3. Timing and planting time frames

In Northland, the best time of year to plant poplar and willow poles are in the winter months of **June, July, and early August**. Remember to plan ahead and allow a few months to order and for delivery and a site plan.

It's best to plant poplars/stakes or wands before any erosion occurs – as the saying goes 'prevention is better than cure'. After an erosion event it can take up to 20 years for an area to recover, but never to the level of pre-erosion. A little foresight can save a lot of time and effort not to mention lost production, so be proactive and tackle that slip, movement or gully before it happens.

4. Tackling land forms

Planting stream-sides

Poplar and willow plantings can be used to help stabilise stream-banks. Their fibrous root systems help knit and bind stream-banks. When planting along water-ways it is important to remember they can develop into large trees so placement is the key. If they are planted too close to the stream (with the exception of shrubby willow) they can, over time, become too heavy and collapse, causing further erosion. A good rule of thumb is to set planting back at least three metres, and for poplars a little further back from the bank itself.

Think before you plant!

While there are no specific rules in Northland for planting poplar next to streams, remember they will develop into large trees that could potentially become a problem in 25-30 years time. If you are unsure contact a Regional Council Land Management Advisor.

Planting hill slopes

Poplars are perhaps the best species for stabilising unstable hillsides and slips. It's best to tackle erosion control early however if erosion has occurred follow these tips:

- Gentle slopes – space plants at 10-12 metre spacings, on steeper slopes 5-6 metre spacings.
- Earthflows, slumps and slips – plant poles at 5-10 metre spacings, using closer spacings at the toe of the slope with wider spacings towards the head.
- General hill side stabilisation – avoid planting on ridges or high spots. Choose the best site for each pole – look for depressions and low spots, small channels where water flows or pools as these are spots where erosion is likely to occur and where poles will thrive.
- Avoid exposed windy sites, plant part way down the slope at 8-10 metre spacings. If the hill is steep, steer clear of high banks, angle the poles out from the vertical – this helps to ensure new growth isn't eaten by cattle.

Gully planting

To control gully erosion it's best to plant poplar or willows in pairs. Willows are perhaps best for controlling gullies but poplars also have their place. It really depends on the type and size of gully erosion you are trying to control. Pair planting causes the trees' root systems to overlap across the gully, preventing further down-cutting of the gully bottom and slumping of the sides.

Planting the pole

Use of protective sleeves

These should be put on the pole before planting/ramming

Protective sleeves increase the survival rate of poplar and willow poles and make it difficult for possums to climb them. Made from recycled plastics, they also protect the poles from stock damage and reduce moisture loss. There are a couple of options available for use. Talk to a land management advisor about how to obtain these.

On a three metre pole slide the sleeve on at the butt end and make sure the bottom of the sleeve is 60-70cm from the butt end. Some sleeves are designed to split and fall away as the tree grows – if this does not happen, remove sleeves carefully when they become too tight.

Cattle should be excluded from planted areas for at least 12-18 months as this allows time for root development. Cattle rubbing or scratching up against the poles will cause root damage and the likely death of your pole.

Ramming

The correct method and key to ensuring the survival of poles is to plant them firmly and deeply into the ground. The most effective way to achieve this is to ram them in. A pole rammer (fence post rammer or similar) or pole bar can be used to drive the pole in as tightly as possible, approximately a third into the ground for a three metre pole (60-70cms).

As the ground expands and contracts poles may become loose. Loose poles may require re-ramming – try ramming the ground inwards, towards the pole. Alternatively, sand or fine soil can be poured down cracks to help fill in spaces.

'Blanking' (replanting)

It's rare to get a 100 percent strike rate for plantings, due to a number of factors and the environmental conditions experienced after planting. A 90 percent survival rate is considered an excellent strike rate. Where mortality is greater – over 50 percent – you should look to replant the following winter.

Maintenance

Trees require some maintenance to ensure their survival particularly if you're hoping to get reasonable timber from your poplar poles. Initial form pruning can be done by anyone who can wield a chainsaw, following simple instructions. If you're growing the trees for harvest then a reasonable knowledge of silviculture is an advantage – courses are available if you'd like to learn more.

Thinning may also be required where plant densities are high. To do this, choose trees that have good form and vigour and specimens that are still carrying out their intended purpose. For further information on techniques contact a Regional Council Land Management Advisor.

The Northland Regional Council would like to thank the following organisations for providing information used in the preparation of the Sustainable Land Management fact sheets:

- HortResearch, Palmerston North
- Environment Waikato
- Bay of Plenty Regional Council
- Hawkes Bay Regional Council
- Taranaki Regional Council
- Ministry of Agricultural and Fisheries (MAF)
- Ministry for the Environment (MfE).

Pests and diseases

Some poplar and willow species are susceptible to leaf spot and rust diseases which cause partial defoliation – leaf loss – and reduced vigour but rarely result in death. Willows are also susceptible to the systemic fungus known as silver leaf (*Chondrostereum purpurea*) which enters plants through pruning wounds and is most commonly found in pole nurseries. A spray containing 3% solutions of the fungicides Captan and Euparen® can be used on freshly cut stumps to protect against this disease. Field pruning under dry conditions – in autumn – generally avoids infection.

There are also two species of saw fly which attack willows. Symptoms include reddish galls on the foliage of certain tree willows in mid summer. This only has a minor effect in tree health/vigour. The other species eat the leaves causing significant but temporary defoliation.

Possoms will also try to eat poplars or willows with some trees more palatable than others. Adequate pest control should be carried out on a regular basis.

The Northland Regional Council can help by providing FREE advice – from sourcing plant material, to species selection, site plans and post-planting care.

In some cases, funding assistance is available towards the cost of erosion control through our Environment Fund. For more information please contact the Land Management team.

Contacts

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