Survival of Poplar and willow plantings: implications for erosion control

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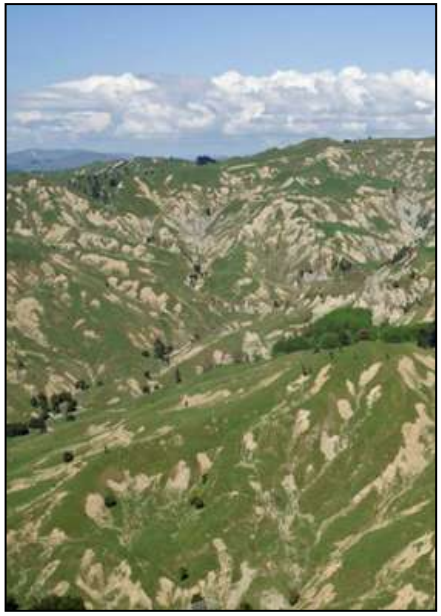
Outline

Context	What we did	What we found	What it means




Toitu he whenua, whatu ngarongaro he tangata

The land is permanent, man disappears

Context/Issue

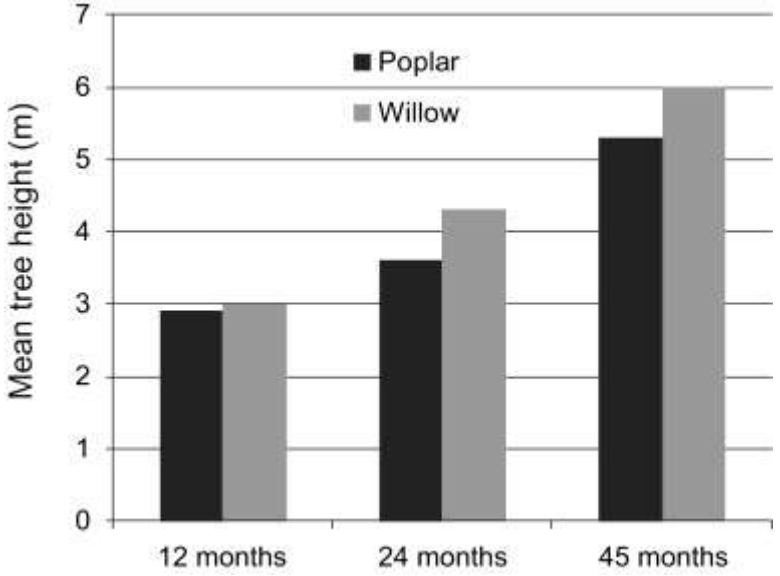
- Poplar and willow have long been the preferred soil conservation strategy for hill country in the East Coast region and elsewhere in New Zealand.
- For landowners in the east coast region a grant is available for pole establishment specifically targeted at controlling erosion on “the worst of the worst” eroding land (Land Overlay 3a).
- The combined Regional and District plan requires that all landowners with land designated as Land Overlay 3a to have “effective” tree cover by 2021.
- At the planting densities prescribed- the long term “effectiveness” of poplar and willow poles is highly dependent on their post–establishment survival rate.
- Surprisingly, almost no medium-long term post-establishment records of growth performance, survival rates or cause(s) of pole loss exist.
- A trial site was set up to measure pole growth and to assess pole survival/mortality of poplar and willow over a 45-month period
- We compare our pole survival data with that assessed by the Ministry of Primary Industries (MPI) for plantings established since 2004 with the aid of an East Coast Forestry Project (ECFP) grant
- Results from this analysis are compared with pole survival data from other North Island regions.

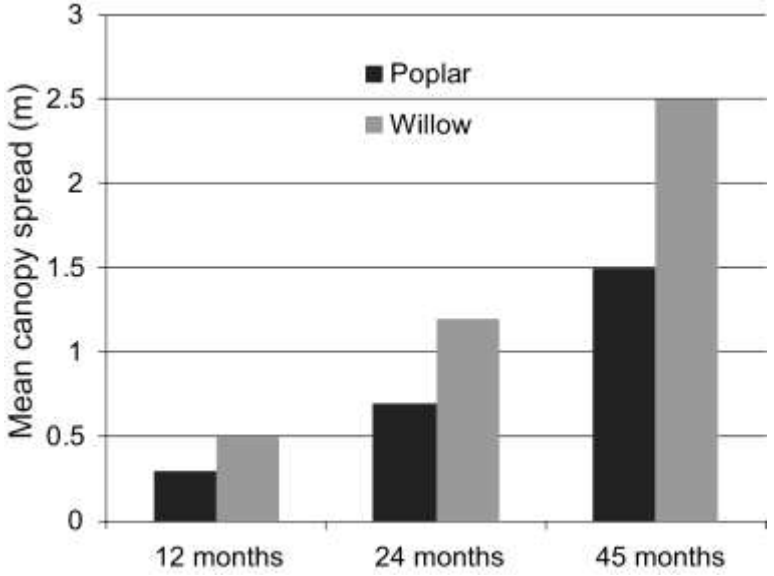
What we did

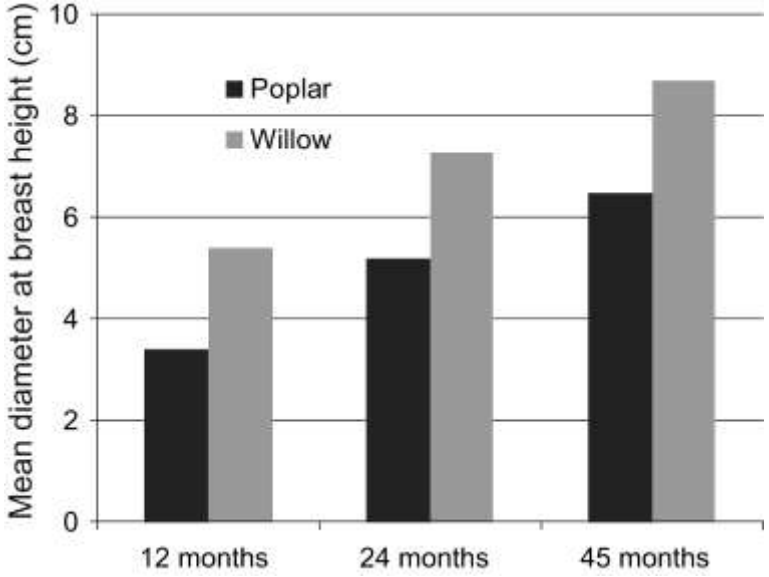
- As a ‘pilot’ study, we measured above-ground growth rates at 12-, 24- and 45-months after establishment
- Counted surviving poles (Veronese poplar and Moutere willow) and assessed likely causes of pole mortality at 24- and 45-months after establishment
- We compare our pole survival counts with data collected by MPI from other east coast sites and, by Councils, in other North Island regions

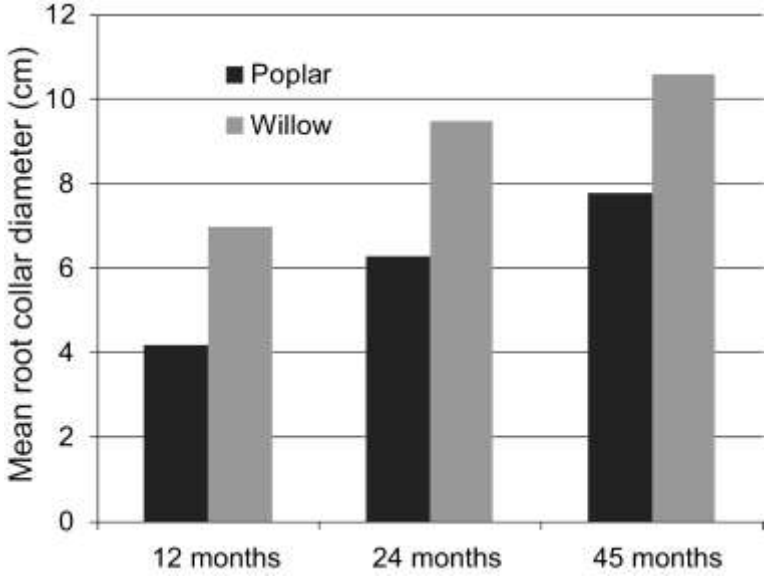
Pilot study site

What we found: growth parameters at pilot study site

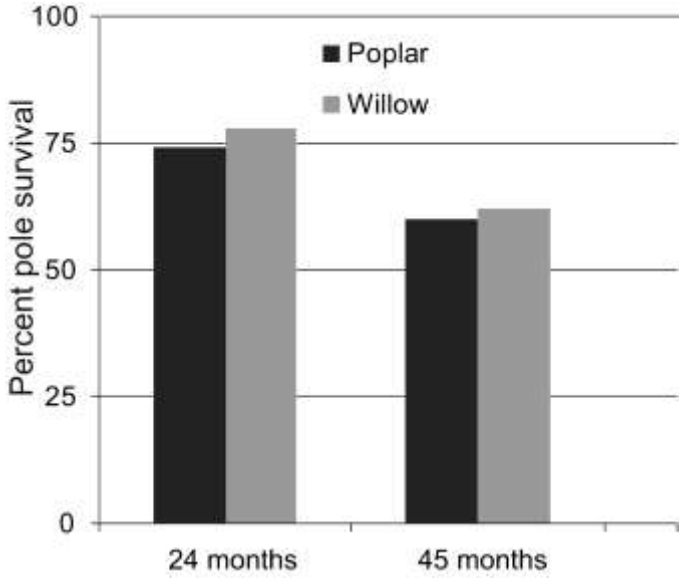


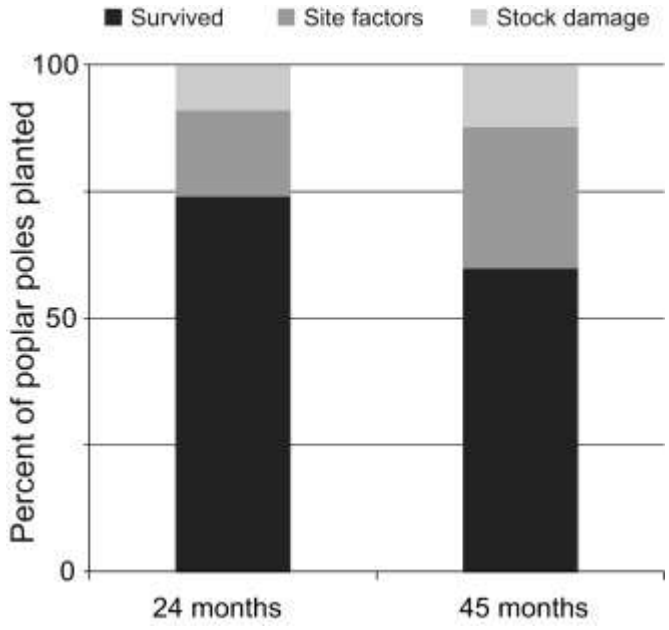


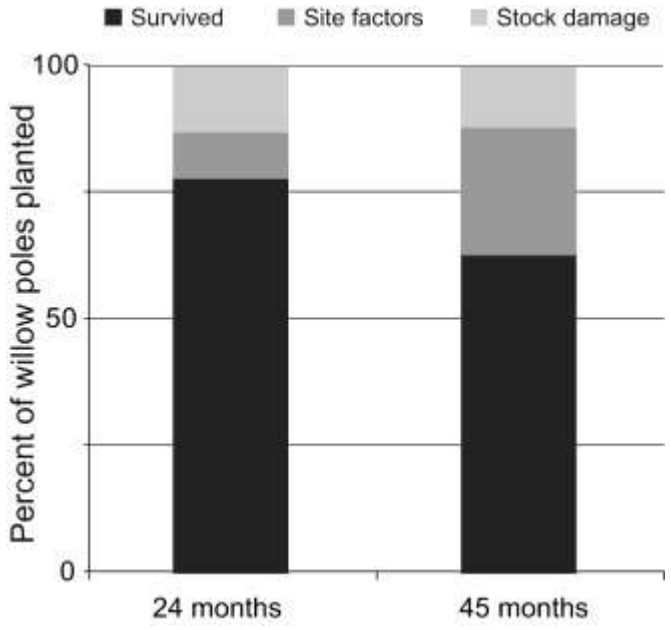




Main causes of pole loss: pilot study site

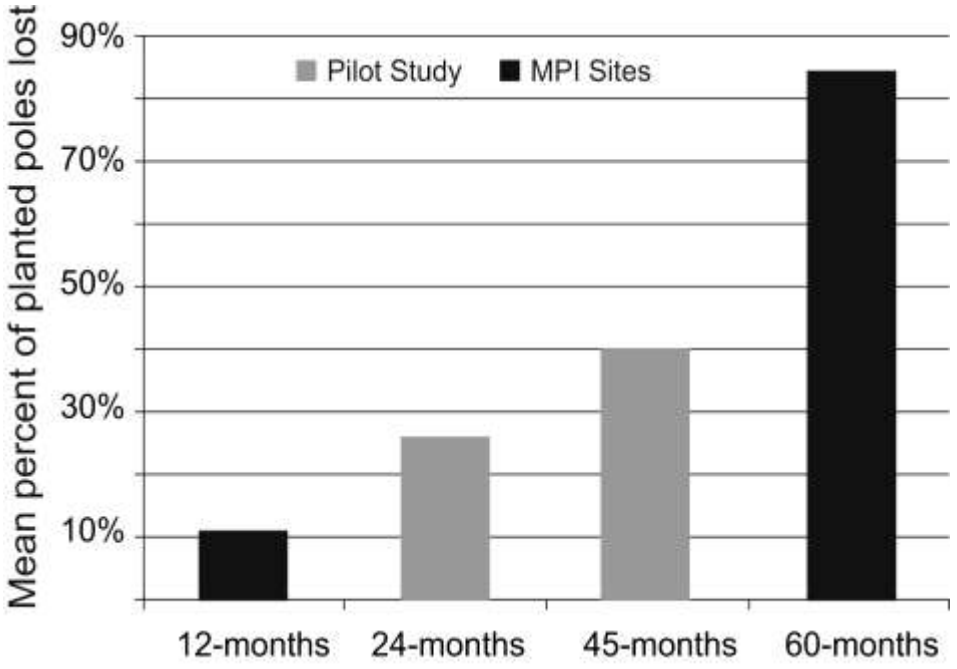






Comparison of pole losses with MPI database

- Majority of poles survive the first year only to perish in later years
- 86% of poles planted between 2004-2007 perished within 5-yrs
- 48% of 2009 plantings perished within 5-years
- 25% of 2010 plantings perished within 3-years
- Largest losses occur between 3 and 5-years after establishment



Example of high pole losses

Cattle damage

Other Regions

- Results of pole assessments undertaken 1-6yrs after planting indicate that survival of between 80-100% is the norm dropping to 50% in drought years.
- Poles not often prescribed on class VII land
- Small-scale plantings on specific erosion features
- Plantings undertaken over a number of years
- Financial support for new plantings is based on assessment of performance and management of previous years plantings

Common causes of pole loss across regions

- Poor pre-treatment and handling
- Poor site selection by inexperienced planters contributing to early pole mortality
- Poles too thin
- Wrong species for site
- Stock browsing (cattle and deer) listed as the most damaging
- Earth movement
- Drought
- Thin soils near top of slope
- Socketing caused by wind and/or stock rubbing
- Salt burn
- unknown

Common causes of pole loss across regions:continued

Conclusions

- Of ~28, 000 poles planted since 2004 and recounted as alive 5-years after establishment ~ 78%, that is, 22, 000 poles have perished
- High pole losses indicate that the desired erosion control outcome(s) will not be achieved at many locations designated as 'Land Overlay 3a' unless the poles are replaced (blanked).
- Poor stock management, unstable terrain and lack of aftercare appear to be the principal, but not the only, reasons for high pole mortality particularly during the period 3-5 years after establishment
- Conversely, acceptable rates of pole survival are being achieved on hill country in other North Island regions
- Better pre-treatment planning, supervision and after-care management (ramming, blanking, stock management) of pole plantings are the key to their survival and are a pre-requisite to achieving a successful erosion control outcome
- Financial implications of the loss of ~22,000 poles ~$16-20 / pole (~$400k to date) should be of concern to MPI, Council and the landowner.

Recommendations

- MPI change the payment structure to better compensate grantees who achieve (as a minimum requirement) 100% survival of the prescribed plantings at year-5.
- MPI, Council soil conservators and farm managers become more involved in all phases of project planning, implementation and after-care.
- Grantees are regularly informed of their obligation to achieve a successful erosion control outcome on land identified as Land Overlay 3a as required by the Combined Regional and District Plan
- Council's consider auditing pole plantings more frequently so as to record survival rates over time, to better establish factors contributing to pole mortality and on which a cost/benefit analysis of erosion control 'effectiveness' outcomes might be possible.

Acknowledgements

- Ministry of Primary Industries (MPI) for permitting access to their pole planting and survival data base on plantings established with grant assistance through the East Coast Forestry Project(ECFP).
- Greater Wellington, Horizons and, Hawkes Bay Regional Councils for providing pole assessment data
- Gisborne District Council for financial support and MBIE for funding through SLURI

"Big things from small beginnings"
a 34-month-old Veronese poplar tree

Ehara taku toa i te toa takitahi engari he toa takitini