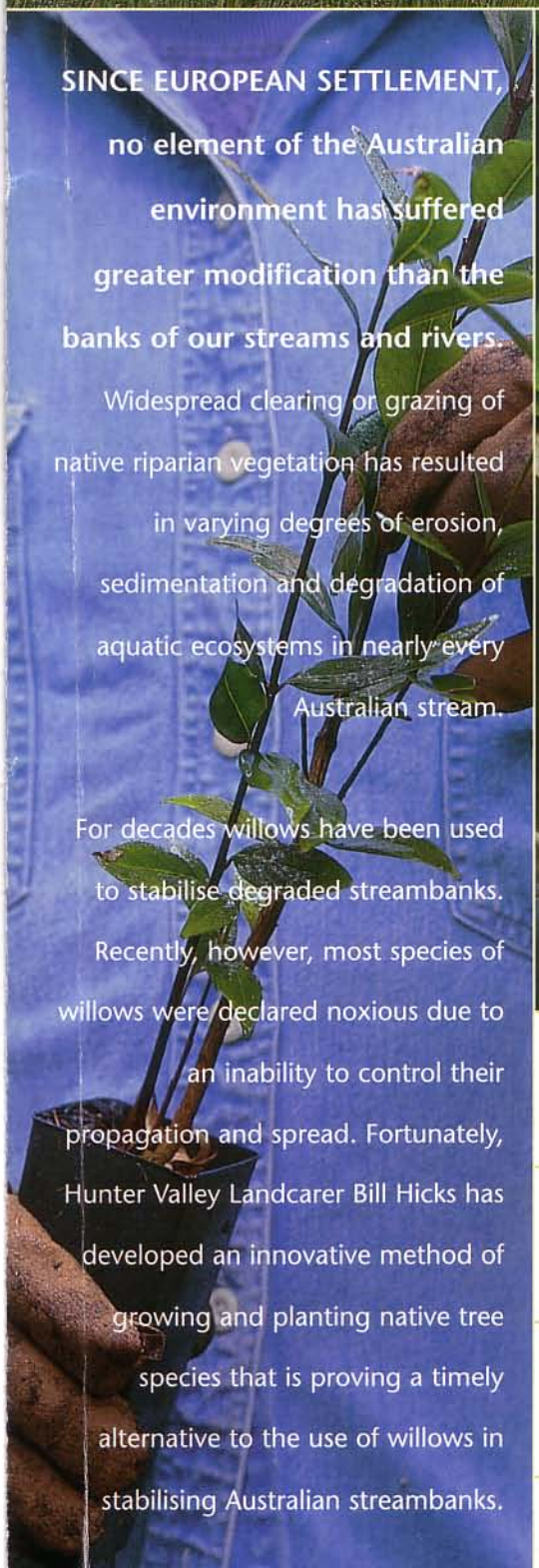
REHABILITATING AUSTRALIAN STREAMBANKS



SINCE EUROPEAN SETTLEMENT, no element of the Australian environment has suffered greater modification than the banks of our streams and rivers. Widespread clearing or grazing of native riparian vegetation has resulted in varying degrees of erosion, sedimentation and degradation of aquatic ecosystems in nearly every Australian stream.

For decades willows have been used to stabilise degraded streambanks. Recently, however, most species of willows were declared noxious due to an inability to control their propagation and spread. Fortunately, Hunter Valley Landcarer Bill Hicks has developed an innovative method of growing and planting native tree species that is proving a timely alternative to the use of willows in stabilising Australian streambanks.

with

LONGSTEM NATIVE TUBESTOCK

WILLOWS: FRIEND OR FOE?

Since the 1950s, willows (*Salix* sp.) have been used extensively to help stabilise many streambanks. Willows establish easily, grow rapidly, produce fine matted roots ideal for stabilising soils and require little attention after planting.

However, over time consistent use of willows, coupled with their habit of spreading by seed, has caused changes to the ecology and flows of rivers and streams. Willows have displaced native riparian species and colonised sand and gravel bars in streams, diverting floods and causing erosion on vulnerable banks.

The germination of more than two million willow seedlings in the Bega River in southern NSW in 1993, and recent evidence that willows are spreading by seed in rivers throughout NSW and Victoria, prompted the 1998 declaration of most willows species as noxious in NSW.

LONGSTEMS: A VIABLE ALTERNATIVE TO WILLOWS

Long before the declaration of many willows species as noxious, Hunter Valley Landcarer Bill Hicks was concerned about the potential problems associated with the almost exclusive use of willows for streambank stabilisation.

In 1994, Bill began developing an innovative method for growing and planting native trees. His goal was to produce a native tubestock that could establish easily, grow rapidly, produce extensive roots and require little attention after planting — just like willows. By August 1997, Bill had developed his own alternative to willows — longstem native tubestock or 'longstems'.

Longstems differ from regular native tubestock in the way they are grown and planted. Longstems are grown for up to 18 months using a specific nutrient and storage regime. The result is a climate-hardened plant with thick, woody, elongated stems (up to 2 m long) with closely spaced growth nodes from which roots sprout once the longstem is planted.

At around 18 months the longstem is planted in the streambank with its root ball buried 0.5–1.5 m deep in the soil, leaving only the top 5–10 cm of the plant above the surface. Special water jets, similar to those used to plant willows, have been developed to plant longstems.

Longstems have been trialed throughout the Hunter region of NSW in a collaborative project between Bill Hicks and the Department of Land and Water Conservation, the Hunter Catchment Management Trust, and the Natural Heritage Trust. Following the success of these trials, river crews operating in the Hunter River and its tributaries are now planting thousands of longstems in place of willows.

Trial results show that longstems have the following advantages over regular native tubestock:

- Increased growth rates and better survival rates: planting at depth enables longstems to access sub-surface soil moisture and potentially lessens competition with weeds
- Root establishment at depth: longstems can withstand flooding; longstems can be planted in environments where previously only willows could be expected to have survived; and longstems achieve rapid erosion control
- Minimal follow-up care: follow-up watering and weeding is largely eliminated

An uprooted longstem showing root establishment along the stem.

Using longst

How do I plant?

Longstems are planted in a similar way to willows using a water lancing jet attached to a small high-pressure pump. The pressure of the water is used to drill a hole in the soil.

In most situations a standard water lancing jet can be used to plant longstems (see right). In addition, a special 'percussion jet' has been developed for planting longstems in more difficult substrates, such as gravel and cobbles. Further information about how to construct a standard or percussion water lancing jet can be obtained from your local Department of Land and Water Conservation Rivercare Officer (see contact details over).

The four-step process for planting longstems, shown to the right, uses a standard water lancing jet.

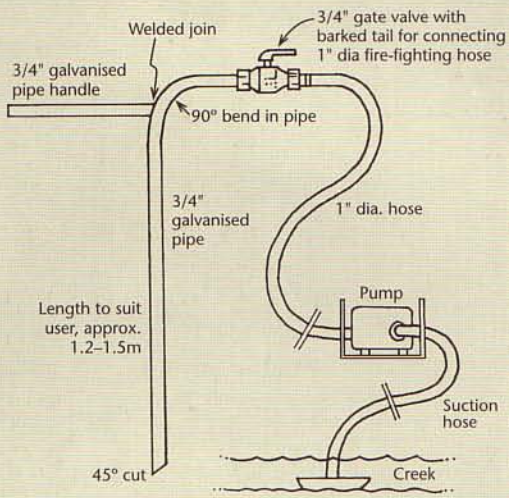
What do I plant?

Results of trials in the Hunter region of NSW indicate that many native species could potentially be grown and planted as longstems. Bill Hicks has successfully cultivated 27 species of native trees using the longstem method of which the following have been successfully field trialed: *Callistemon viminalis* (weeping bottlebrush); *Tristaniopsis laurina* (water gum); *Casuarina cunninghamiana* (river oak); *Waterhousea floribunda* (weeping myrtle); and *Eucalyptus camaldulensis* (river red gum). Other successful species have been *Acacia melanoxylon* (blackwood), *Melia azedarach* (white cedar), *Melaleuca linariifolia* (snow in summer), *M. styphelioides* (prickly paperbark), *Acmena smithii* (creek lilly pilly), *Leptospermum polygalifolium* (creek tea tree), *Eucalyptus grandis* (flooded gum), *E. saligna* (Sydney blue gum), *E. robusta* (swamp mahogany), and *E. tereticornis* (forest red gum).

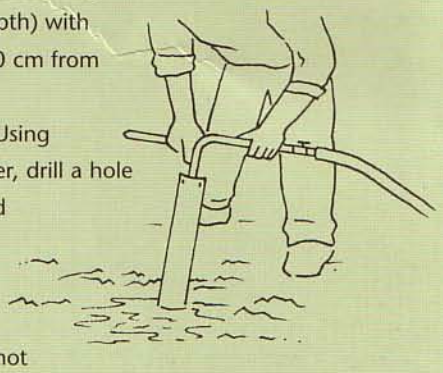
Most species which occur naturally along streams are considered to be suitable for longstem development due to their tolerance to sediment build-up around the stem, although it is always a good idea to trial any untested species before mass plantings take place.

ems for riparian repair

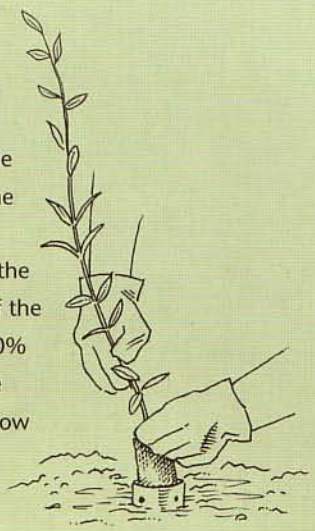
Standard water lancing jet



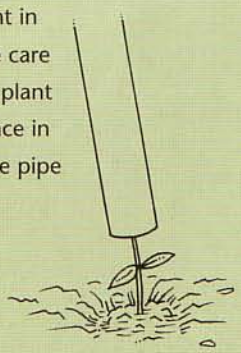
1 Place the jet inside an appropriate length of plastic pipe (usually 300 mm longer than the desired planting depth) with holes drilled about 5–10 cm from the top of the pipe to allow water to escape. Using the pressure of the water, drill a hole in the soil to the desired planting depth (depending on the length of the longstem). The pipe is not required for cohesive soils such as silts and clay loams.



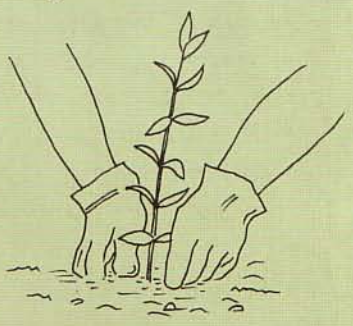
2 Remove the jet from the pipe and feed the longstem (minus the plastic tube) into the pipe. If necessary use a stick to push the plant to the base of the hole. Around 70–90% of the length of the plant should be below the soil surface.



3 Withdraw the plastic pipe leaving the longstem plant in the hole. Take care to ensure the plant remains in place in the hole as the pipe is removed.



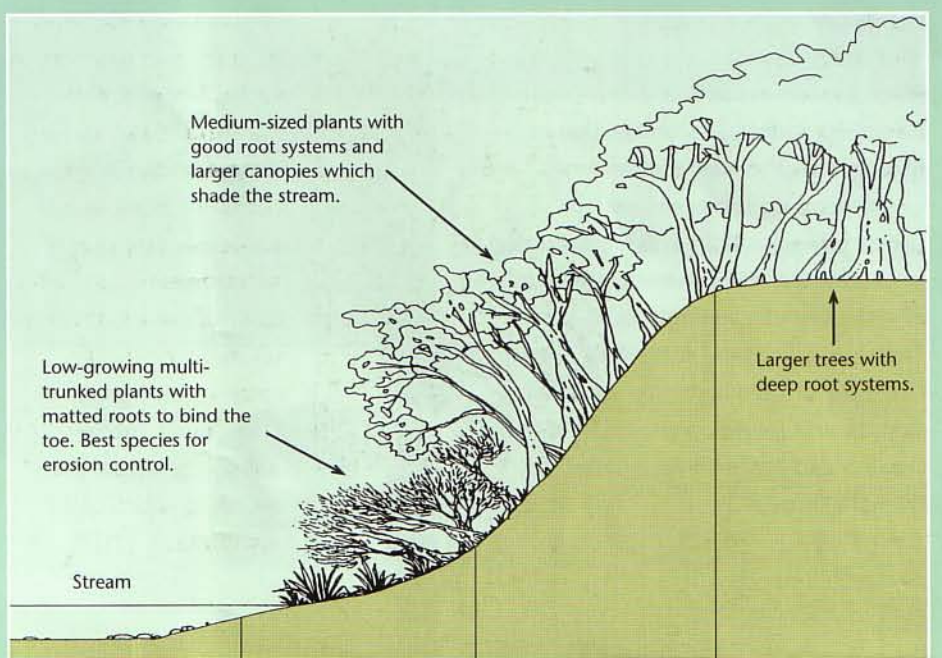
4 Backfill the hole around the plant with soil, making sure that no air spaces remain as they retard root growth.



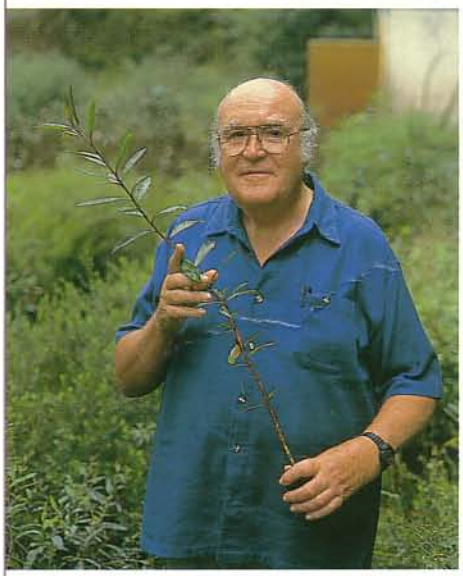
Where do I plant?

Longstems can potentially be planted in the riparian zones of most Australian streams. It is important to select species of plants that naturally grow in riverine environments in your local area.

Use well-vegetated local riparian areas as a guide for planting layouts. The form of the grown plants should guide selection of a planting position on the streambank as illustrated in the diagram to the right.



ABOUT BILL HICKS



After a lifetime of collecting, propagating and growing native plants Bill Hicks was convinced that native species could replace willows on streambanks if they could be encouraged to 'act like willows'.

After retiring to the Wollombi Valley north of Sydney more than a decade ago, Bill set about developing a method of producing long-growing, mature native plants in a small tube with well-developed, non-distorted root systems. He reasoned that when this tubestock was planted, it would not only have a well-developed root ball, but would simulate a willow cutting by sprouting roots along the length of the stem.

Bill was right. After eight years of persistent research and hard work his 'long-growing plants' — longstem native tubestock — represent one of the most innovative developments in streambank stabilisation in Australia.

In 1999, Bill's efforts were recognised when he was awarded the 'Diamond Award' for Individual Contribution to RiverCare by the NSW Government.

Developing longstem native tubestock is not Bill's only contribution to our natural environment. He was also the founding chairman of the Society for Growing Australian Plants, chairman of the Nature Conservation Council and founding chairman of the David Stead Research Foundation (National Trust).

How do I grow longstems?

Bill Hicks spent five years refining the longstem growing process that uses specific nutrient, watering and storage regimes. The key factors of this process are:

- 100% organic growing media to maximise moisture retention and area for plant root development
- addition of a specific slow-release trace element compound to the original planting media
- addition of iron to the original planting media
- a specially developed regime of fertiliser application
- above-ground storage of tubes to promote air pruning of roots
- heavy watering particularly during the early growth period
- maximum exposure to light and weather to promote hardiness

A video titled 'Longstem native tubestock — the alternative to willows for streambank erosion control' details growing and planting methods for longstems; copies can be obtained by contacting Bill Hicks (see contact details below).

Where can I get longstems?

Supplies of longstems are currently limited, however, commercial production is being encouraged through regional workshops and education.

For information on local longstem suppliers contact the Rivercare Officer at your local office of the Department of Land and Water Conservation (see contact details below).

Where can I get more information?

For more information on planting and obtaining longstem native tubestock in Sydney contact Hawkesbury–Nepean Catchment Management Trust:

Phone (02) 4577 4243

Or contact the Rivercare Officer, Department of Land and Water Conservation:

Sydney/South Coast Region
Phone (02) 4226 8563

Far West Region
Phone (02) 6883 3000

Hunter Region
Phone (02) 4929 4346

Central West Region
Phone (02) 6360 8278

North Coast Region
Phone (02) 6640 2000

Murrumbidgee Region
Phone (02) 6297 6477

Barwon Region
Phone (02) 6764 5900

Murray Region
Phone (03) 5881 2122

To obtain a copy of the video on longstems contact:

Bill Hicks
Norkhil Technologies
Phone (02) 4998 8387
Fax (02) 4998 8364

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