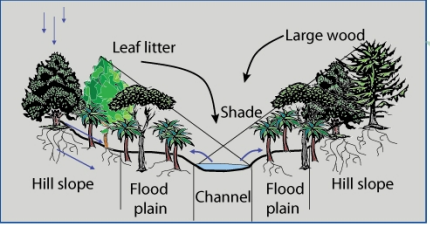


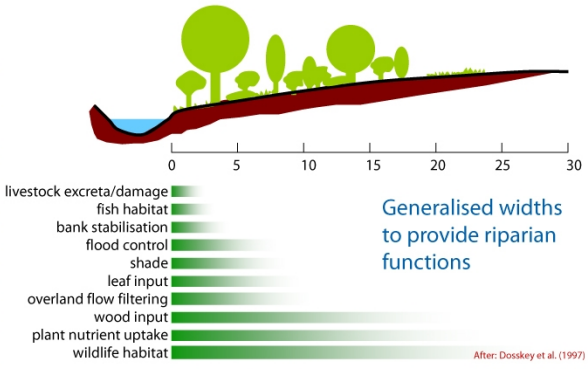
Riparian Zones

Areas of direct interaction between land & surface water
- large influence on water for area occupied
- quality and habitat

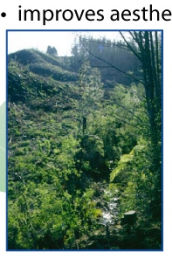
NIWA
Taihoro Nukurangi

Riparian buffers

- protect streams from land use effects
- benefit farm
  - improves pasture management
  - reduces stock losses, erosion, drain management
  - improves aesthetics, biodiversity, stock shelter



Generalised widths to provide riparian functions



Range of riparian management options

- E fence – exclude cows
- Bank-stabilising trees
- 5-8 wire fence – exclude all stock
- Managed/production grass filter strip
- Wetland protection/construction
- Production trees and combinations

Match options to values & flowpaths (& land owner willingness/resources) e.g.,
- for sediment control, target hot spots for runoff & bank erosion and match plants to bank height
- for native fish, target tidal area for whitebait spawning and headwater shade for banded kokopu

Buffers & logging impacts - Coromandel

Livestock exclusion fencing

Maths: dairy cow faeces/urine inputs
- 0.3 kg P/ha/y (20% Toenepi yield)
- 4 kg N/ha/y (13% Toenepi yield)
- 50 kg SS/ha/y (30% Toenepi yield)
- 10 billion E coli/ha/y input

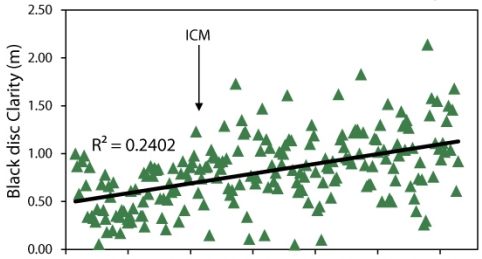
Plus
- Bank erosion, vegetation damage
- Sediment re-entrainment

5 Catchment studies – before and after exclusion
- SS loads 30–90% red. (mostly erosion)
- *E. coli* conc. 30–65% reductions
- nutrients variable

Filter strips trap sediment

- up to 80% removal if >5 m wide
- work by
  - causing ponding that settles sediment
  - trapping particles on surface
  - increasing infilteration into soil

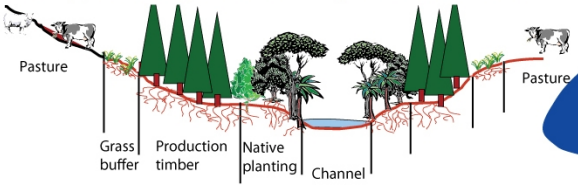
Whatawhata ICM site 1995 to 2012: 30% pines + riparian cattle exclusion and poplar planting

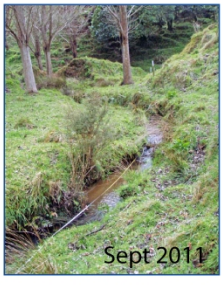


Riparian Management

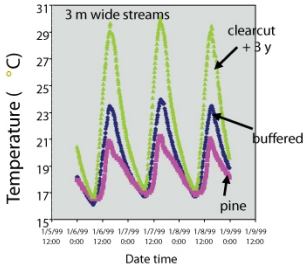
John Quinn

An optimal pastoral riparian buffer





Rip shade benefits temperature



Managing shade for instream nutrient uptake

- Maintain >50% of open lighting
- Limits other shade functions
- Apply when key aim = low downstream nutrients at baseflow

Acknowledgements: MSI (Aquatic Rehabilitation programme), Bob Wilcock, Lucy McKergow and Ian Boothroyd.

For more info: www.niwa.co.nz/our-science/freshwater/tools/riparian-management-classification

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