Design & Planning for erosion remediation

June 2015

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Background

- Misko Ivezich – waterway engineer and fluvial geomorphologist

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Plan for today's talk

- The impacts of stream erosion
- Why does stream erosion occur
- Options to reduce rates of stream erosion

The impacts of stream erosion

The impacts of stream erosion

The impacts of stream erosion

O’Connell River

Rocky Dam Creek

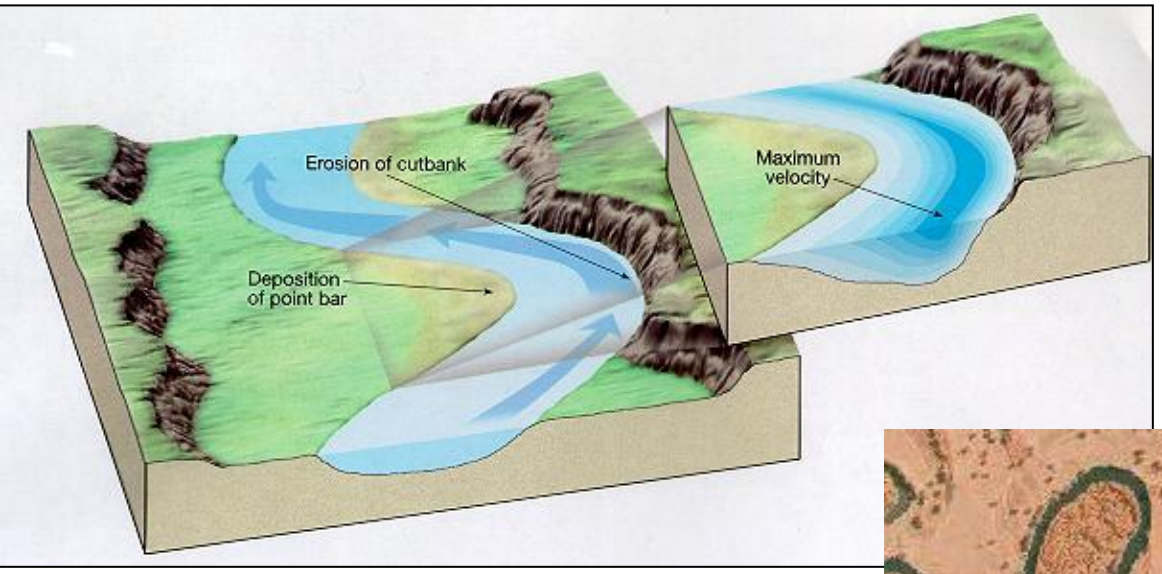

Fitzroy River

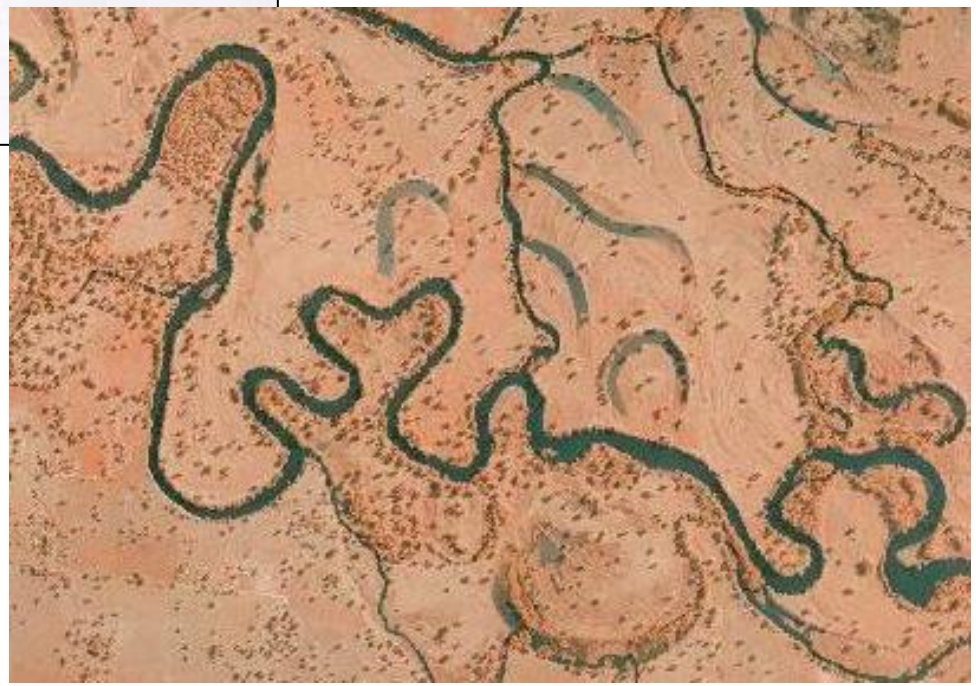

Mary River


Calliope River

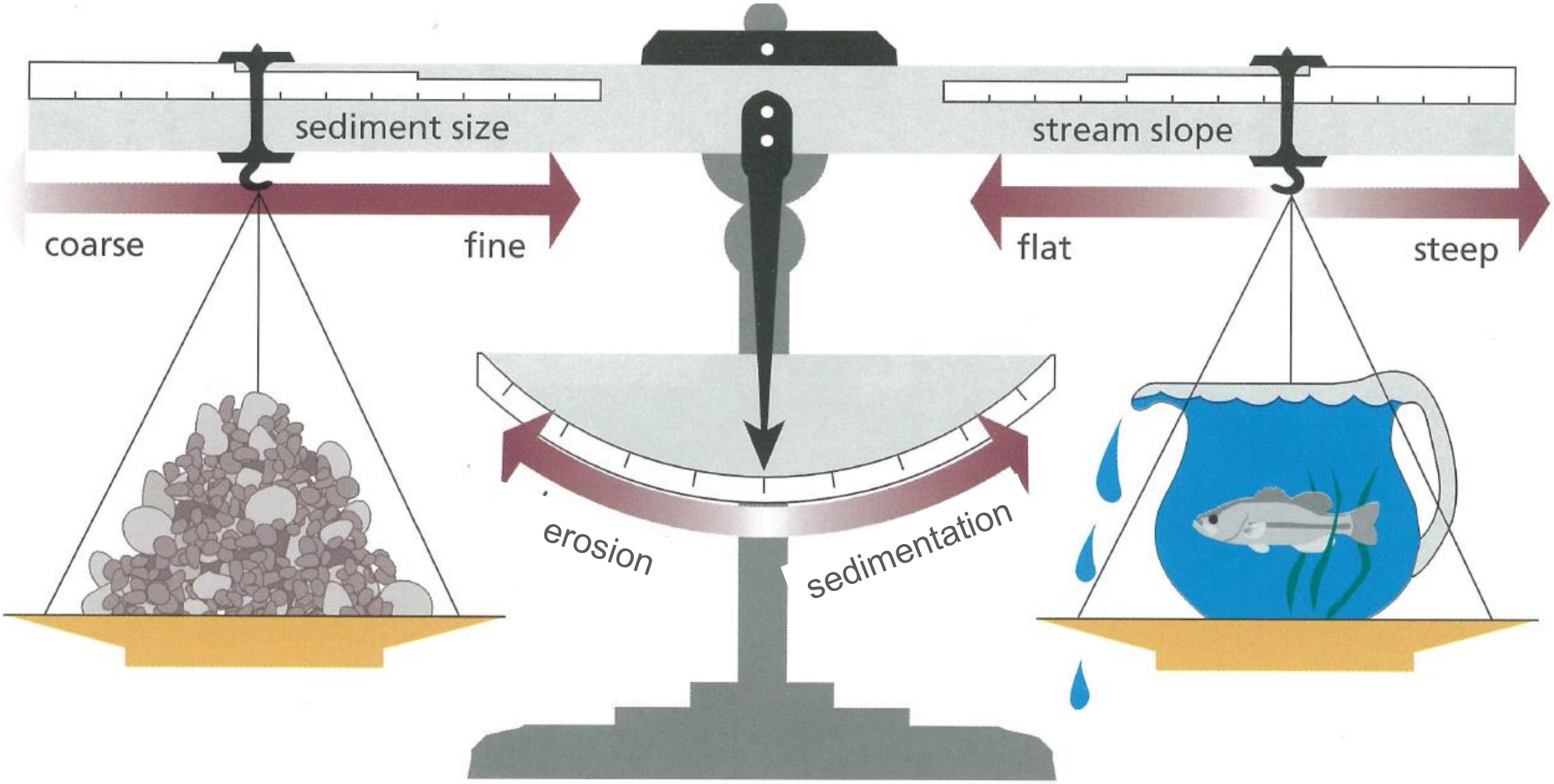

Burnett River

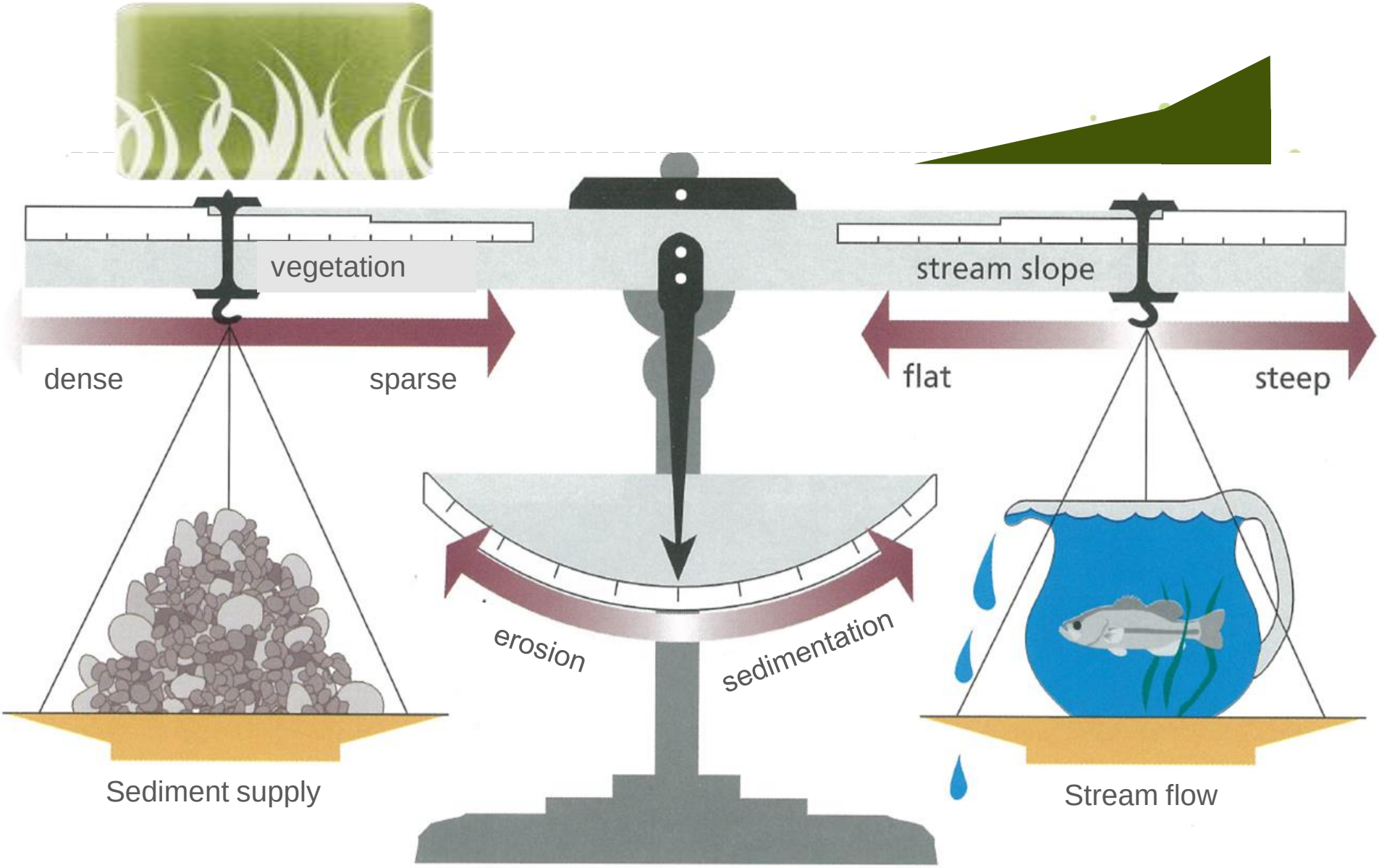
Why does stream erosion occur





The fluvial system



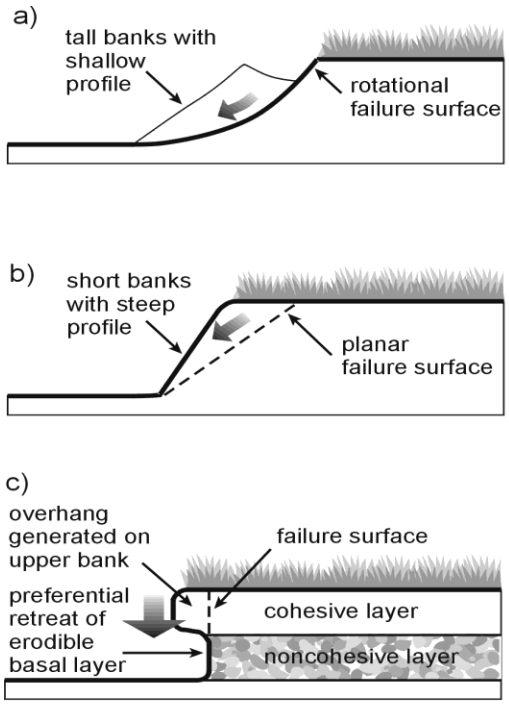

vegetation
stream slope
dense
sparse
flat
steep
erosion
sedimentation
Sediment supply
Stream flow

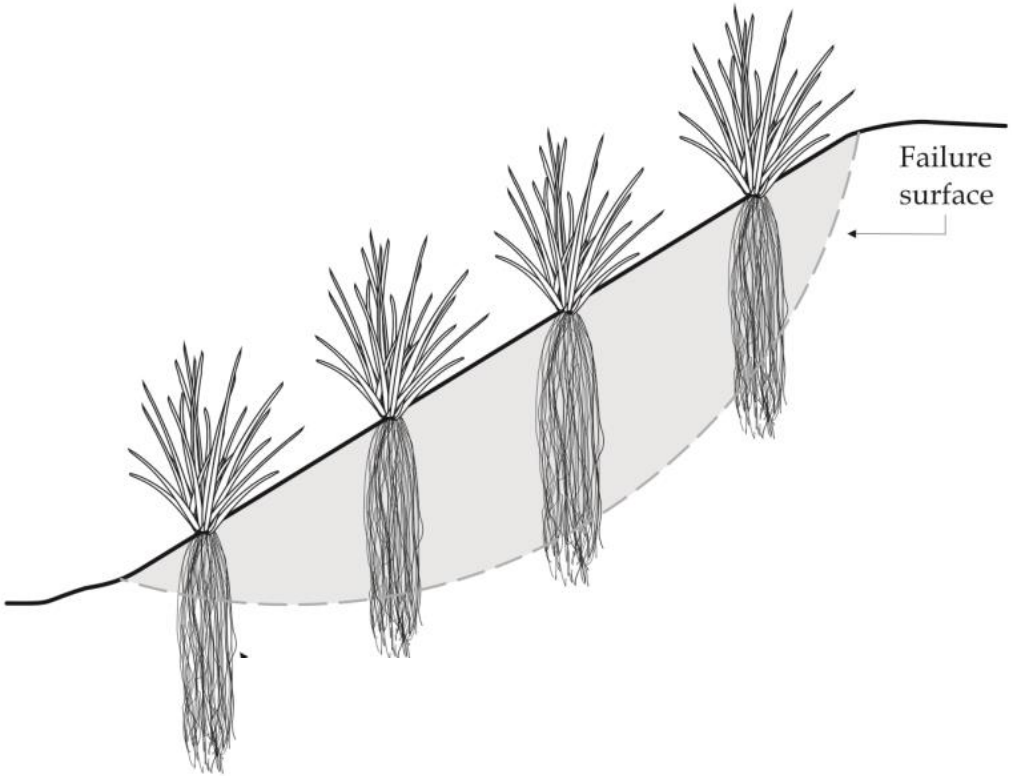
Vegetation - scour

- Why does it work?
  - Hydraulic (frictional) resistance slows water down and reduces force on bank
  - Grasses and ground cover species can armour the underlying soils from fast flowing water

Vegetation – mass failure

- Why does it work?
  - Structural protection from vegetation roots increases strength of stream bank soil





Black Range Creek – paired sites

Barwidgee Creek # 1 - paired sites

Example - Genoa River

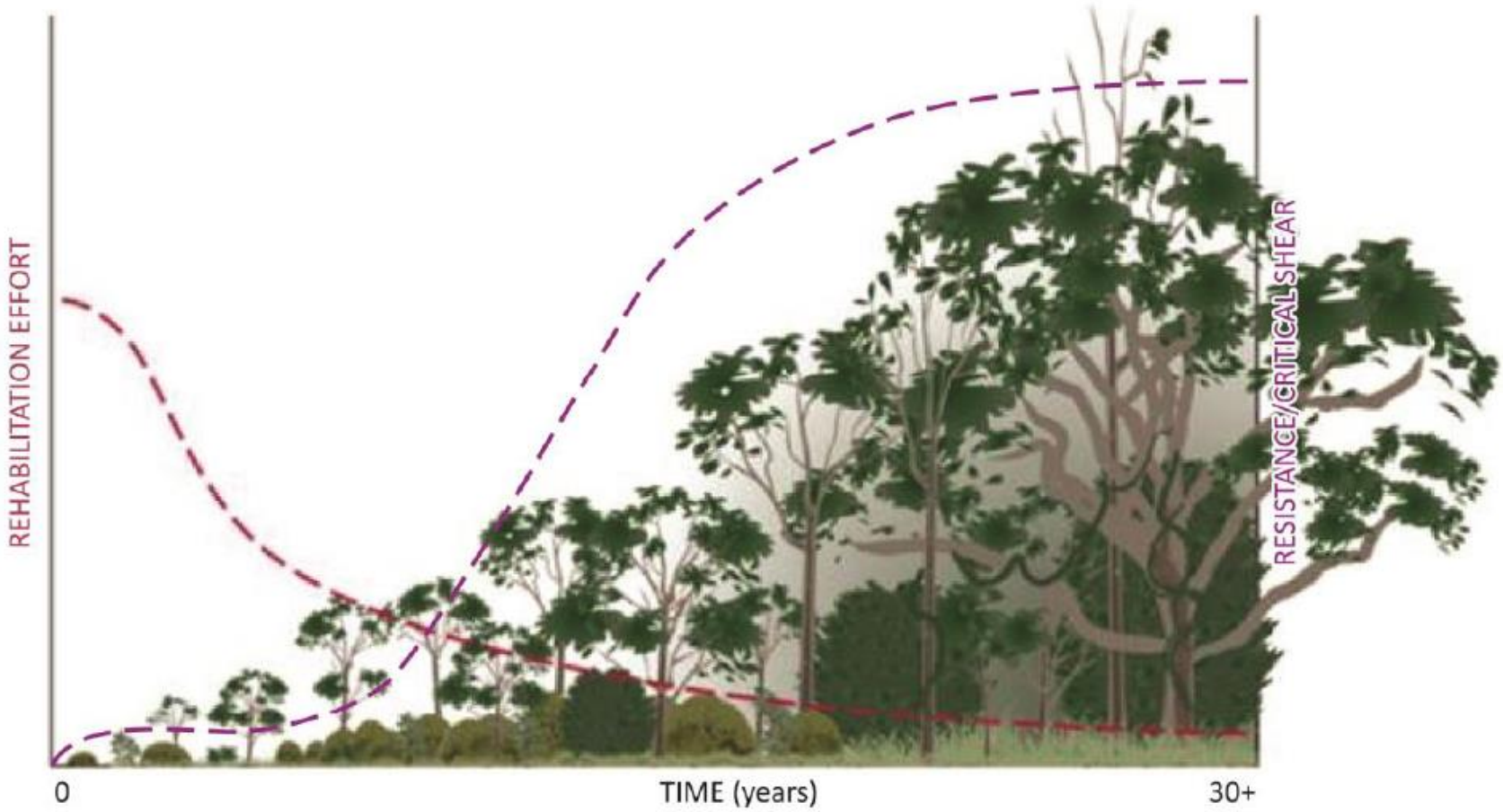
Unvegetated (1986)

Revegetated (2011)

Options to reduce rates of stream erosion

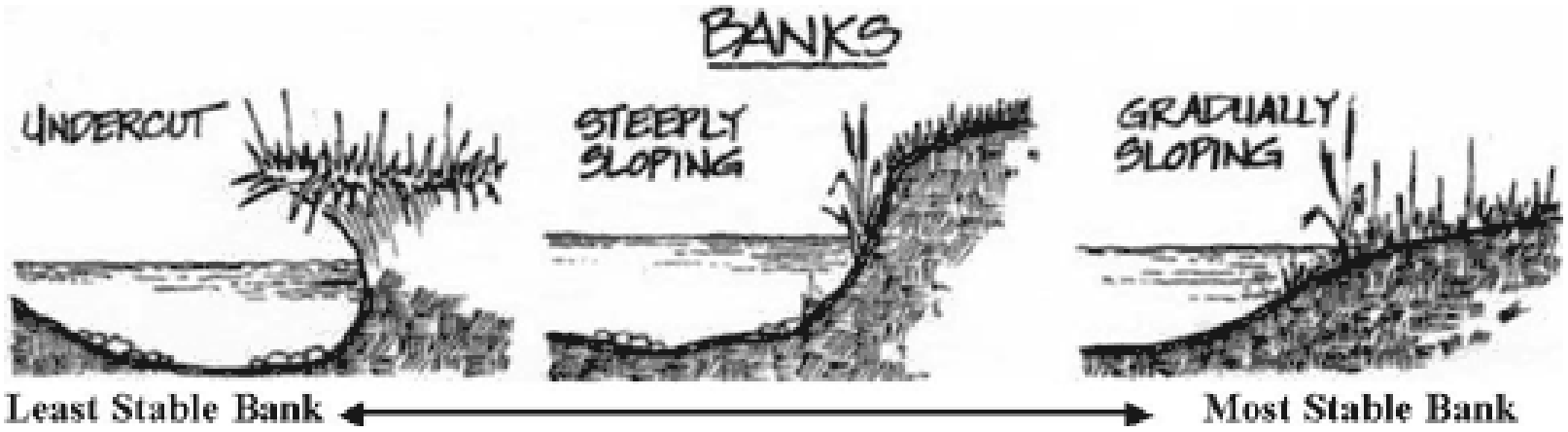
- Clearing of vegetation has increased rates of erosion
  - Increase flow in the stream
  - Increased velocity in the stream
  - Reduced the strength of the banks

Takes time to grow



Increase likelihood of success

- Bank toe protection (rock or timber)
- Reduce the bank slope



Toe protection

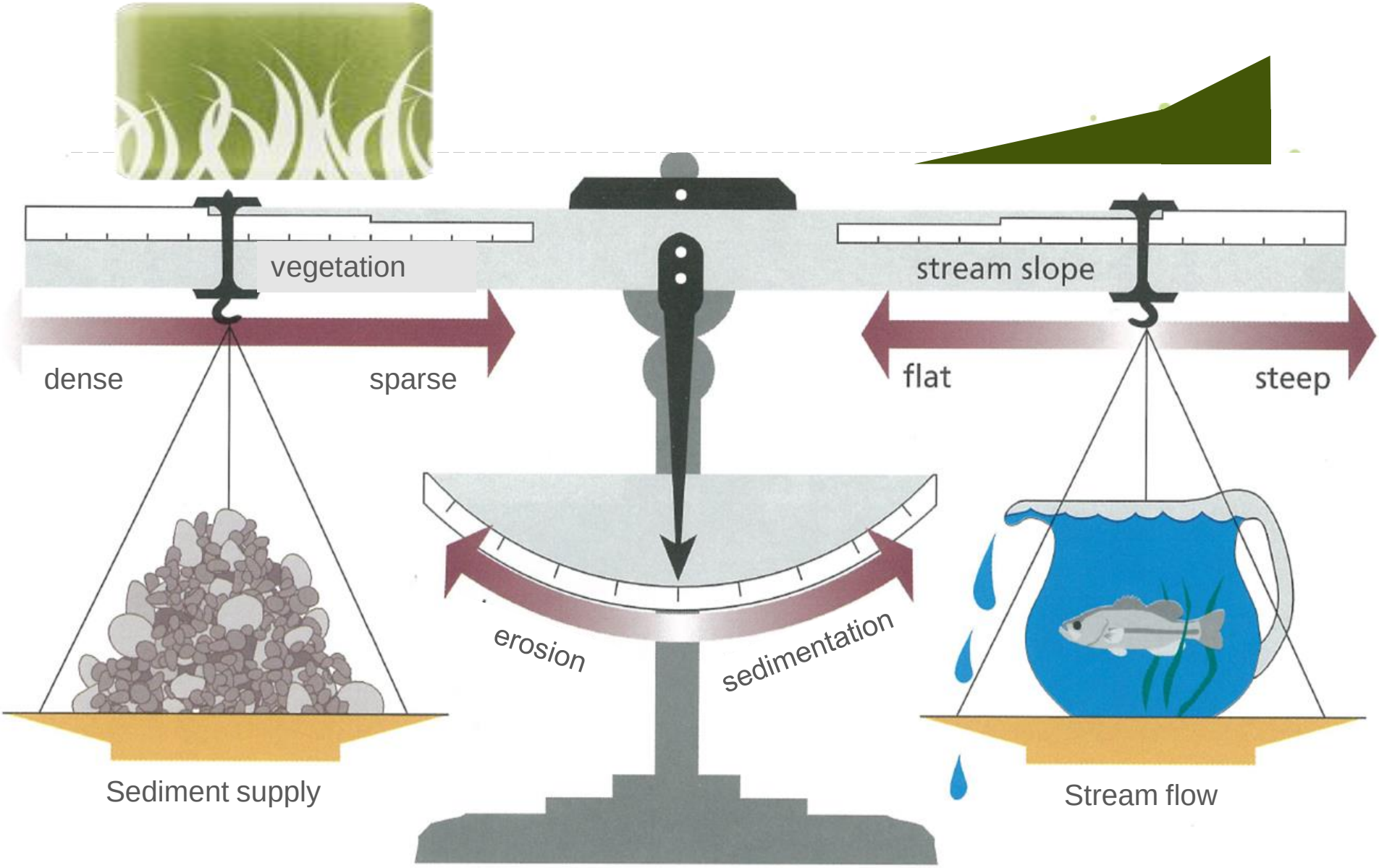
Toe protection


Rapid outer bank
erosion in 1996


3. 10.

Toe protection

Gully stabilisation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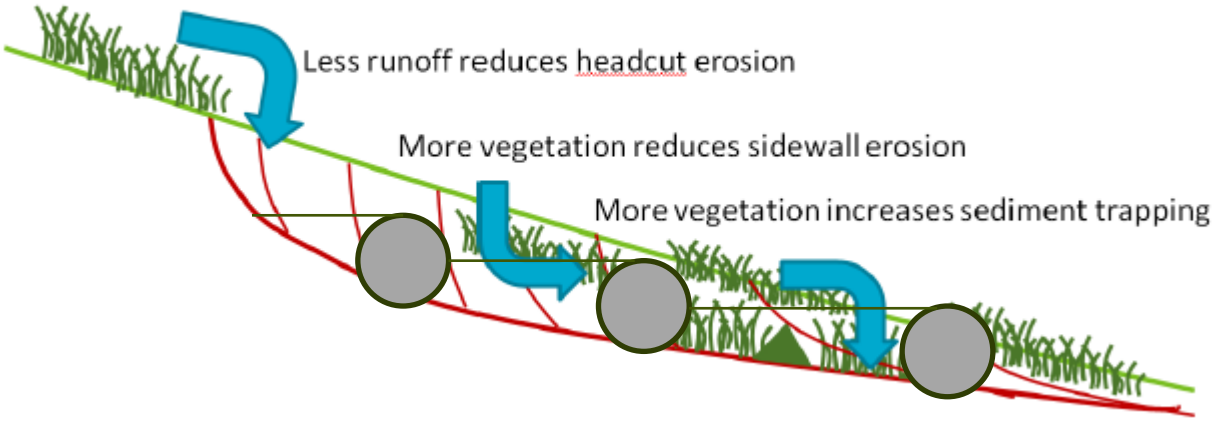
Gully stabilisation



(from CSIRO manual -Wilkinson *et al.*, 2013b).

Gully stabilisation

Summary

- Streams are in a state of balance (slope, flow, sediment, vegetation)
- Riparian vegetation has a major role in stream stability
- Key to stream bank stabilisation
  - Protect the toe (with rock or timber)
  - Reduce the bank slope