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Riparian functions, types & benefits

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Outline

- Context
- Progress to date – report back
- Riparian functions - overview
- Riparian typology – results
- Benefits of riparian management
- How to use the typology
- Riparian vegetation assessment

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Context

- Catchment condition – stream health
- Consensus of preferred condition
- What's there?
- What's the condition?
- What are the functions?
- Can we do anything about it?
- What would we do, and where?
- What would the benefits be?

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Progress to date

- Riparian plant trial – yr 3-4
- **Riparian typology**
- **Riparian vegetation assessment**
- Cow crossings
- Hyper-rheic investigations
- Ecology of turbid streams
- Linkages to stream productivity & health

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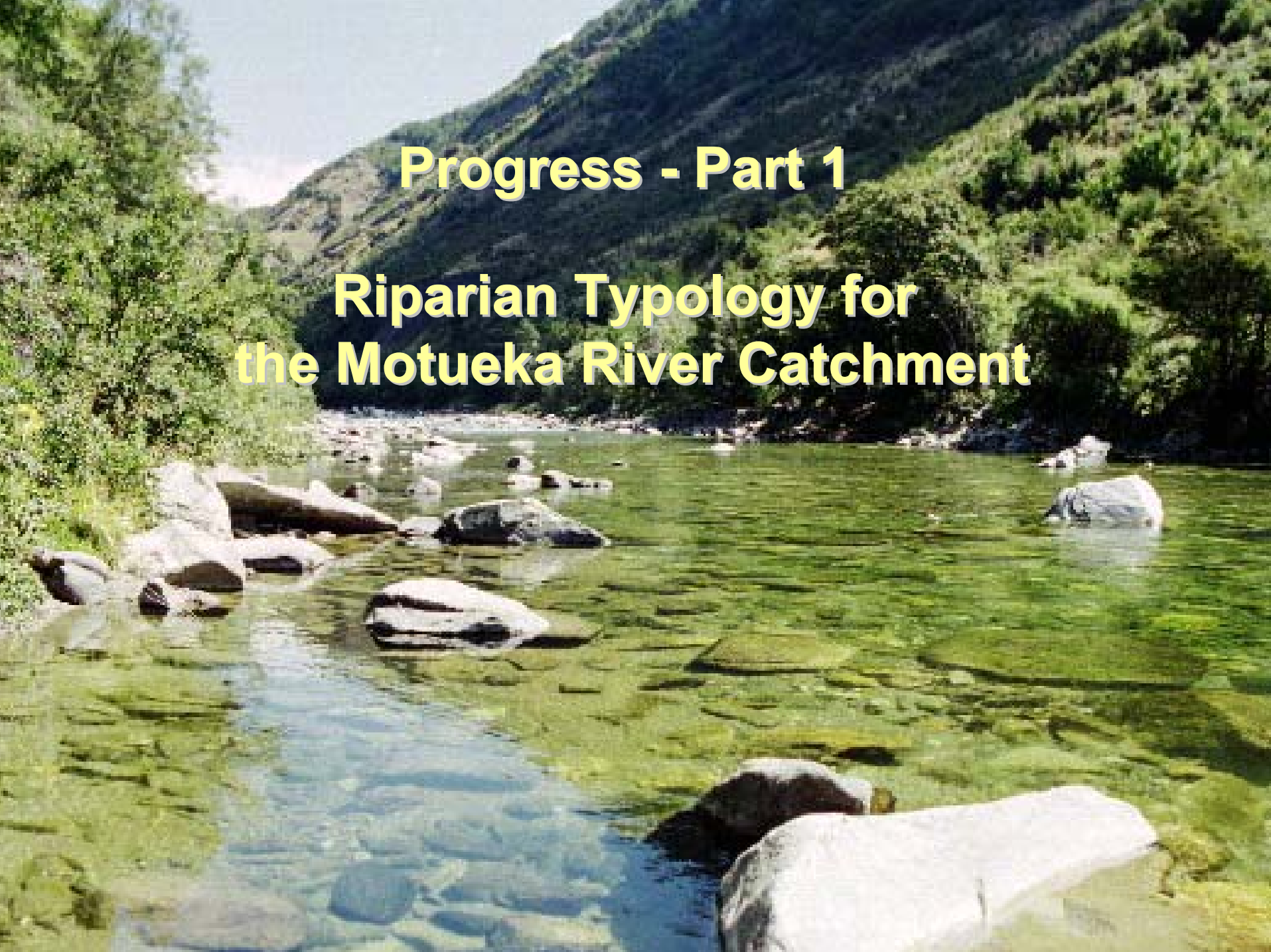
Riparian functions

- Bank stabilization
- Filtering of contaminants – bugs, sed., nutr.
- Nutrient uptake by plants
- Denitrification
- Shading for temperature
- Shading for instream plant control
- Input of wood & leaf litter
- Enhancing fish habitat
- Controlling downstream flooding
- Recreation
- Aesthetics



Progress - Part 1

Riparian Typology for the Motueka River Catchment

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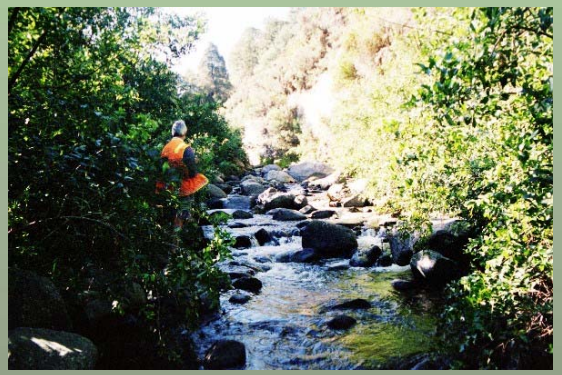
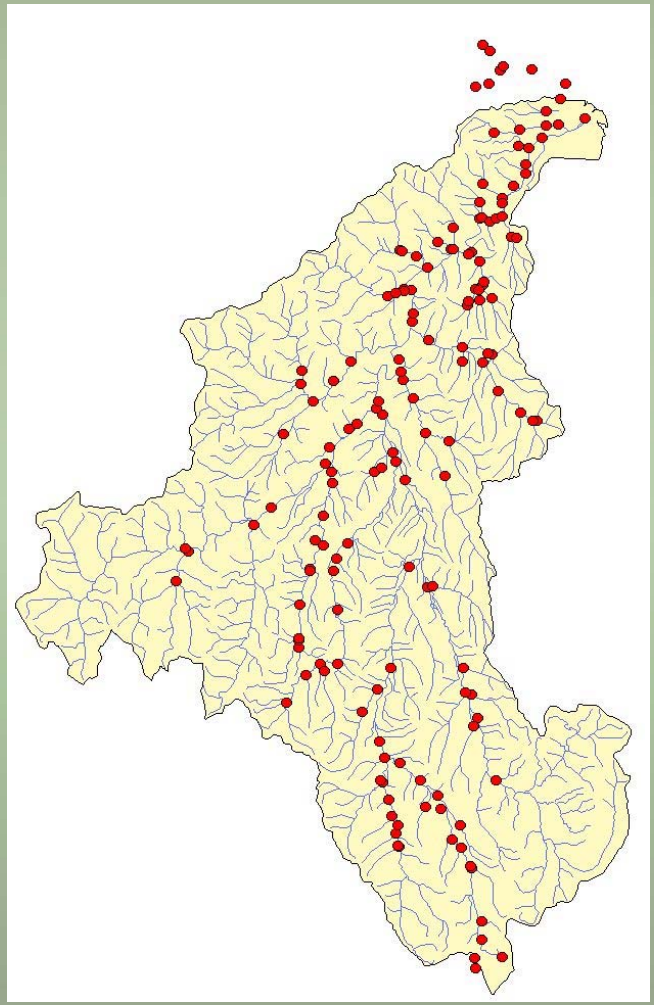
Methods - general

- 156 stream sections examined
- Big rivers and small streams
- Not in mountains – DOC estate
- Access a key criteria
- John Quinn's methodology
- Rapid assessment – 40 mins
- Riparian function C & P
- Biophysical parameter





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Results – general

- Many low order streams dry
- Geomorphic control > land use control
- Substrate variable
- Riparian veg. generally poor in non-forest areas
- What's there is narrow - 1 or 2 trees deep
- Natives very low – mostly willows/weeds
- Most functions represented
- Lowest current activity for denitrification, wood input and flood reduction
- Highest for bank stability and fish habitat

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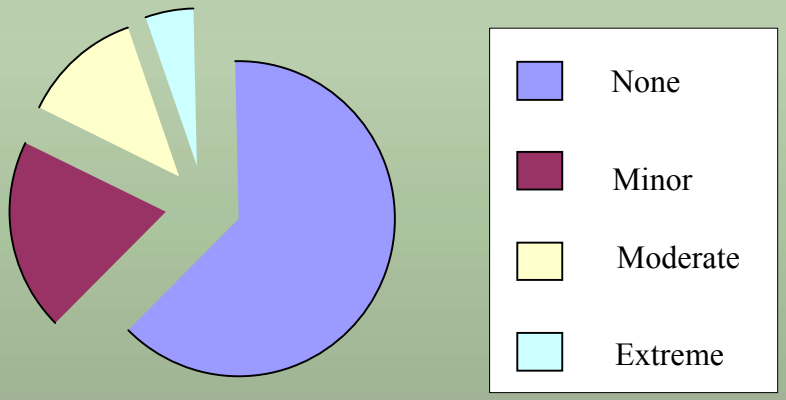
Results - stock

- Stock had access to stream at about 40% of sites - similar for both banks
- Stock damage to bank



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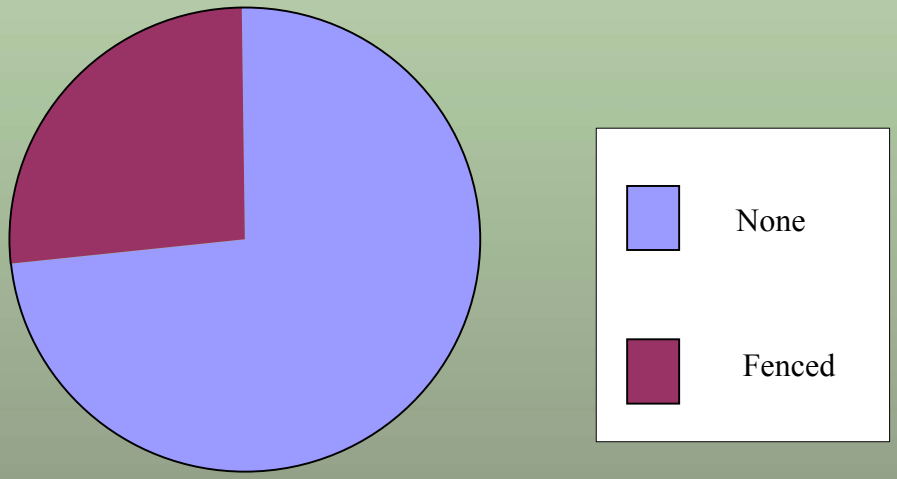
Results - fencing



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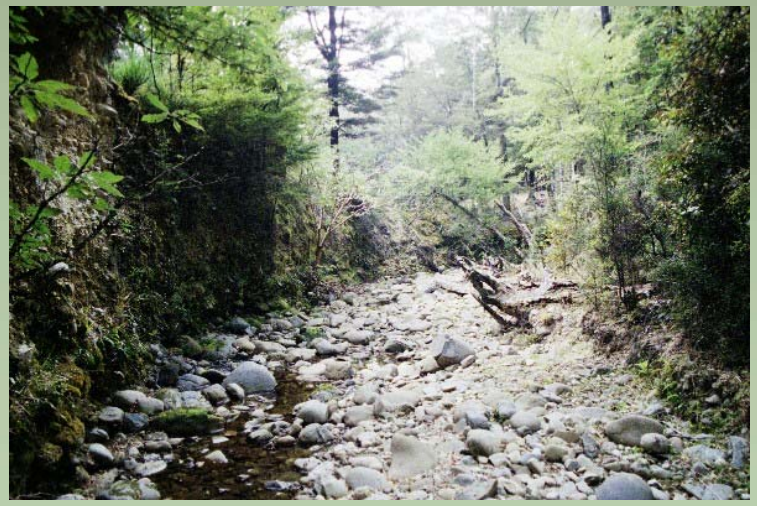
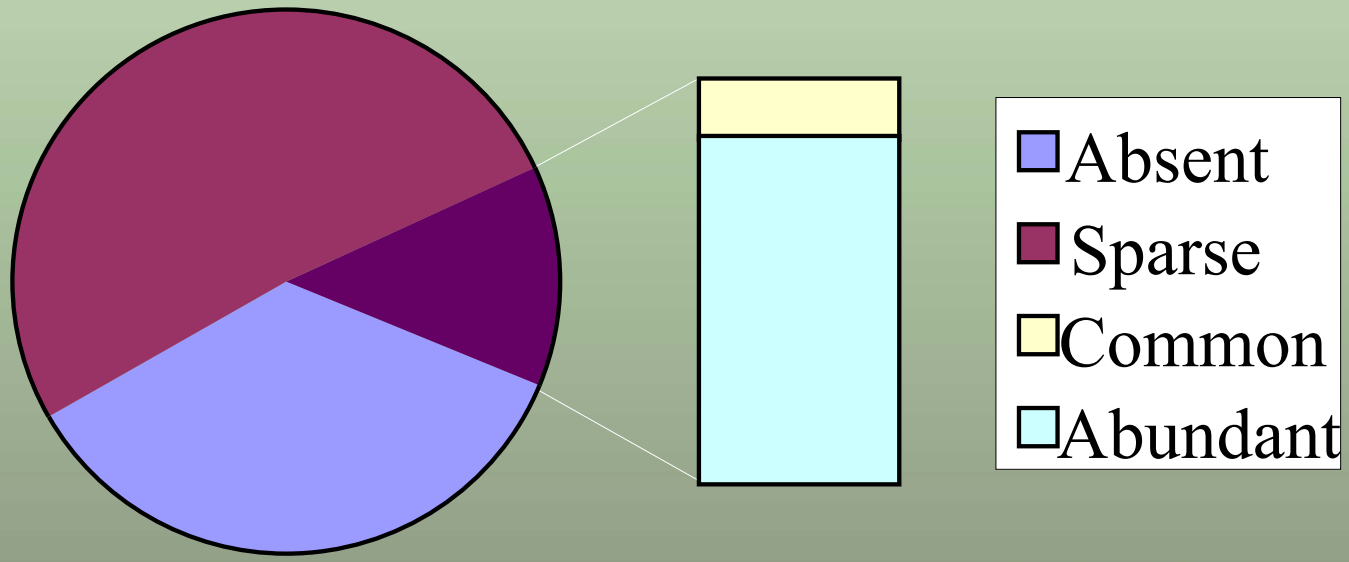
Results – Woody debris





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Assessed functions at sites

	Mean ratings		
	Current	Potential	Diff.
Bank Stability	3.3	4.3	1.0
Overland flow	2.7	3.8	1.1
Nutrient	2.0	2.9	0.9
Denitrification	1.0	1.6	0.6
Shade for temp control	2.5	4.0	1.5
Shade for plants	2.5	3.9	1.4
Wood	1.7	3.1	1.4
Litter	2.4	3.7	1.3
Fish habitat	2.8	3.2	0.5
Flooding reduction	1.8	2.1	0.3
Recreation	2.3	2.8	0.5
Aesthetics	2.3	3.8	1.5

0 Low ⟷ High 5

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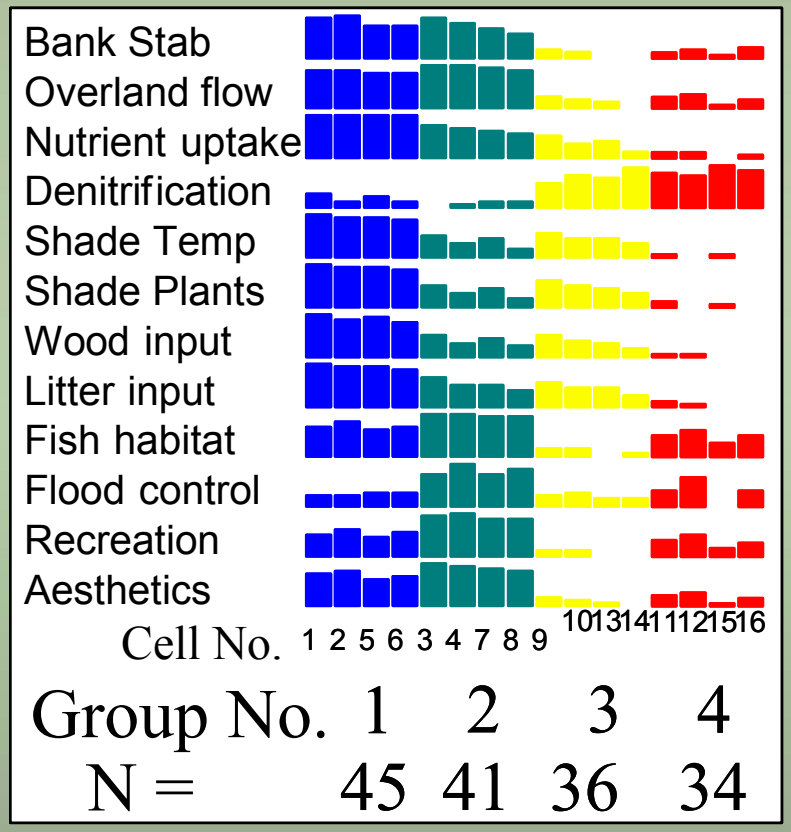
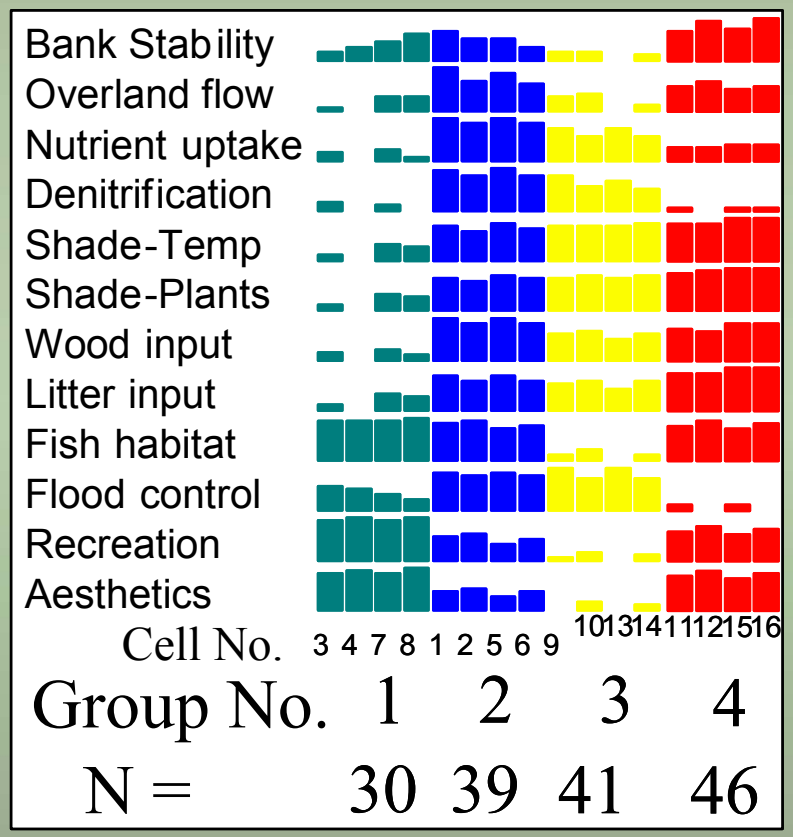
Cluster analysis

Current function SOM Cells



Potential function SOM Cells



>> discriminant functions >> maps

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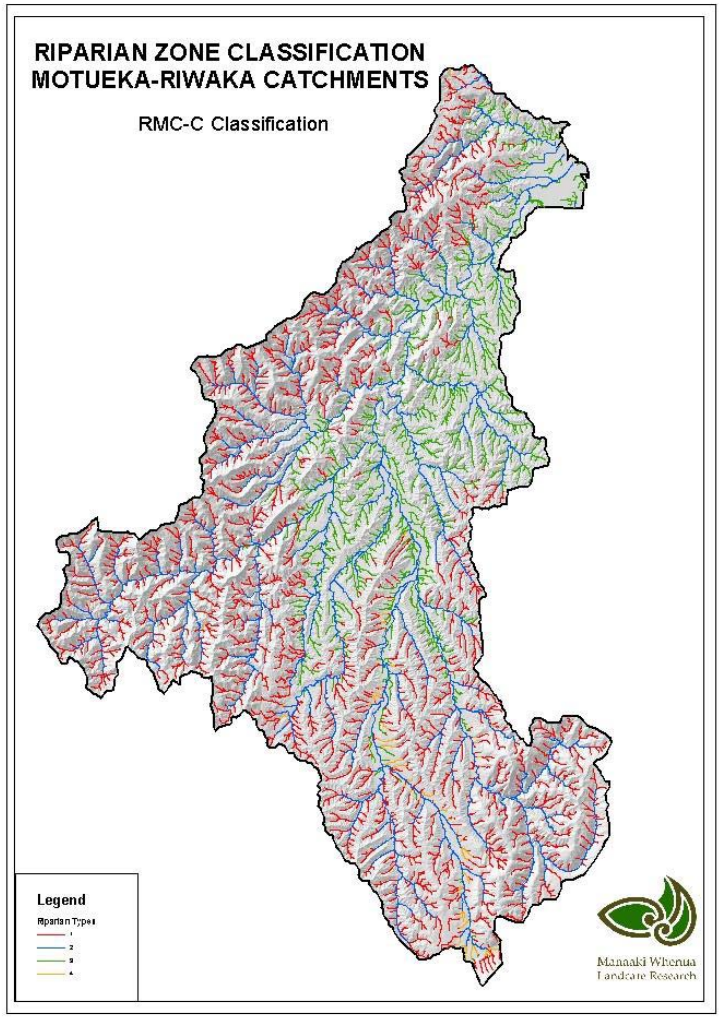
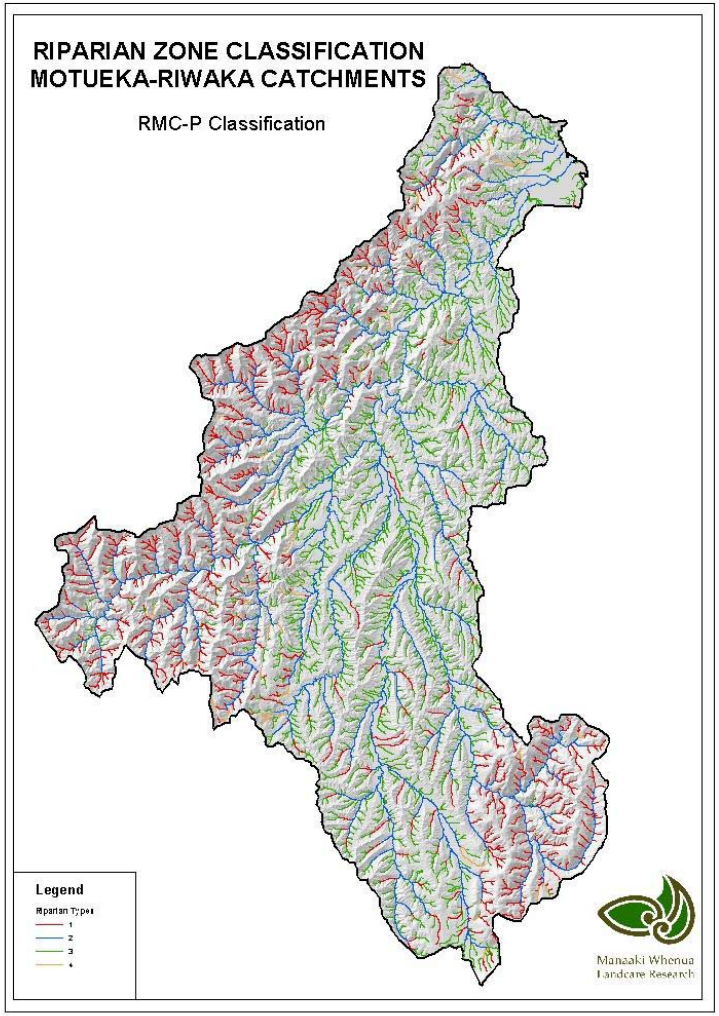
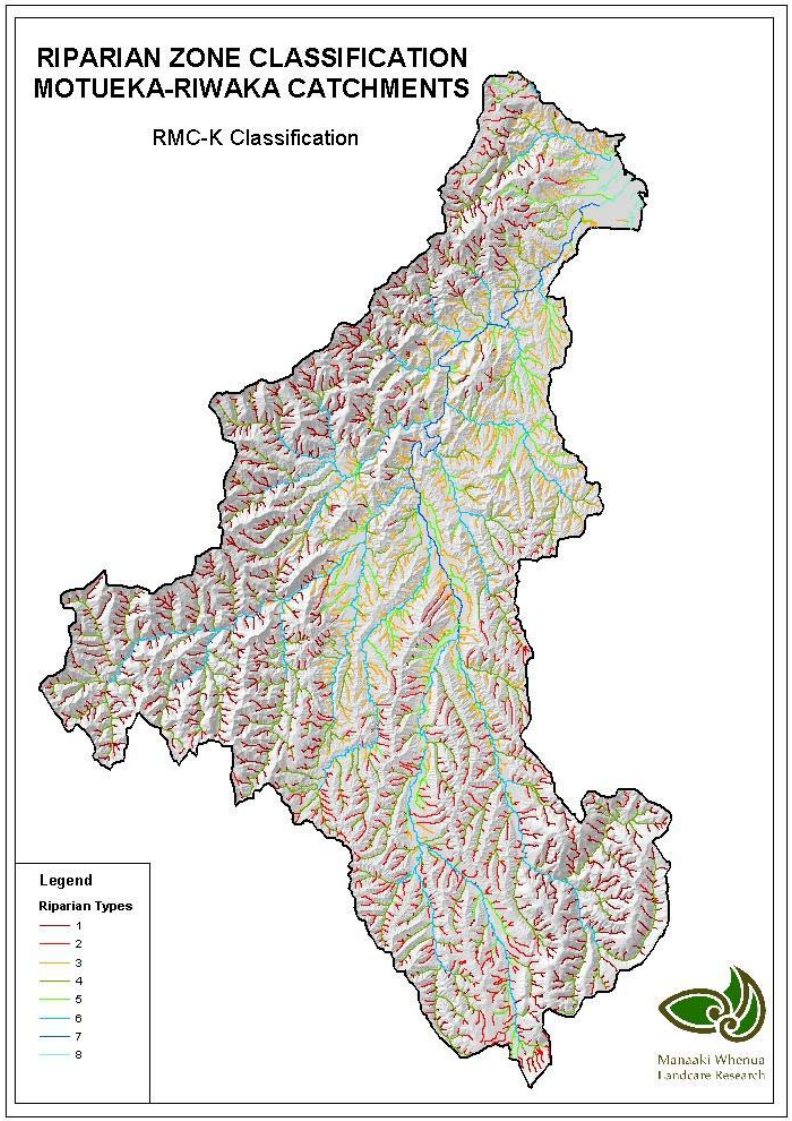
Results





Results cont….



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Riparian Management Flow chart

Riparian Management Classification

Evaluate current RMC classes from field survey and map information using discriminant models and infer riparian function ratings or make direct assessments

Evaluate potential RMC classes from field survey and map information using discriminant models and infer riparian function ratings or make direct assessments

Other relevant information

e.g. Statutory obligations, Maori perspectives, Local interest/politics, terrestrial biodiversity goals, landscape ecology issues and available resources

Farmer/landowners goals for their properties

Riparian microhabitat based native species planting recommendations

River management

1. Identify specific goals for catchment and river segments
2. Identify how riparian functions contribute to goals currently
3. Evaluate potential riparian function ratings with best practicable riparian management
4. Identify priority river segments for riparian management where riparian functions that contribute to goals are predicted to increase most in activity
5. Develop riparian management strategies recognising variations in priorities and riparian functions within the catchment or region
6. Reach and farm scale riparian management plans

after Quinn et al. 2002

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Plant micro-habitats

1. Water margins
2. Channel/banks
3. Bankside levees
4. Wetlands & back swamps

5a. Footslope of terrace scarp or hill

5b. Midslope or crest of terrace scarp or hill

6. Lower tidal riparian salt marsh
7. Upper tidal riparian salt marsh
8. Stopbanks & levees

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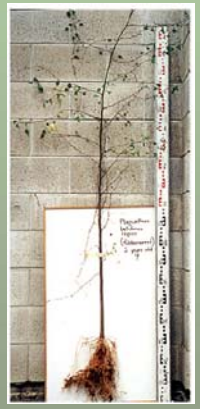
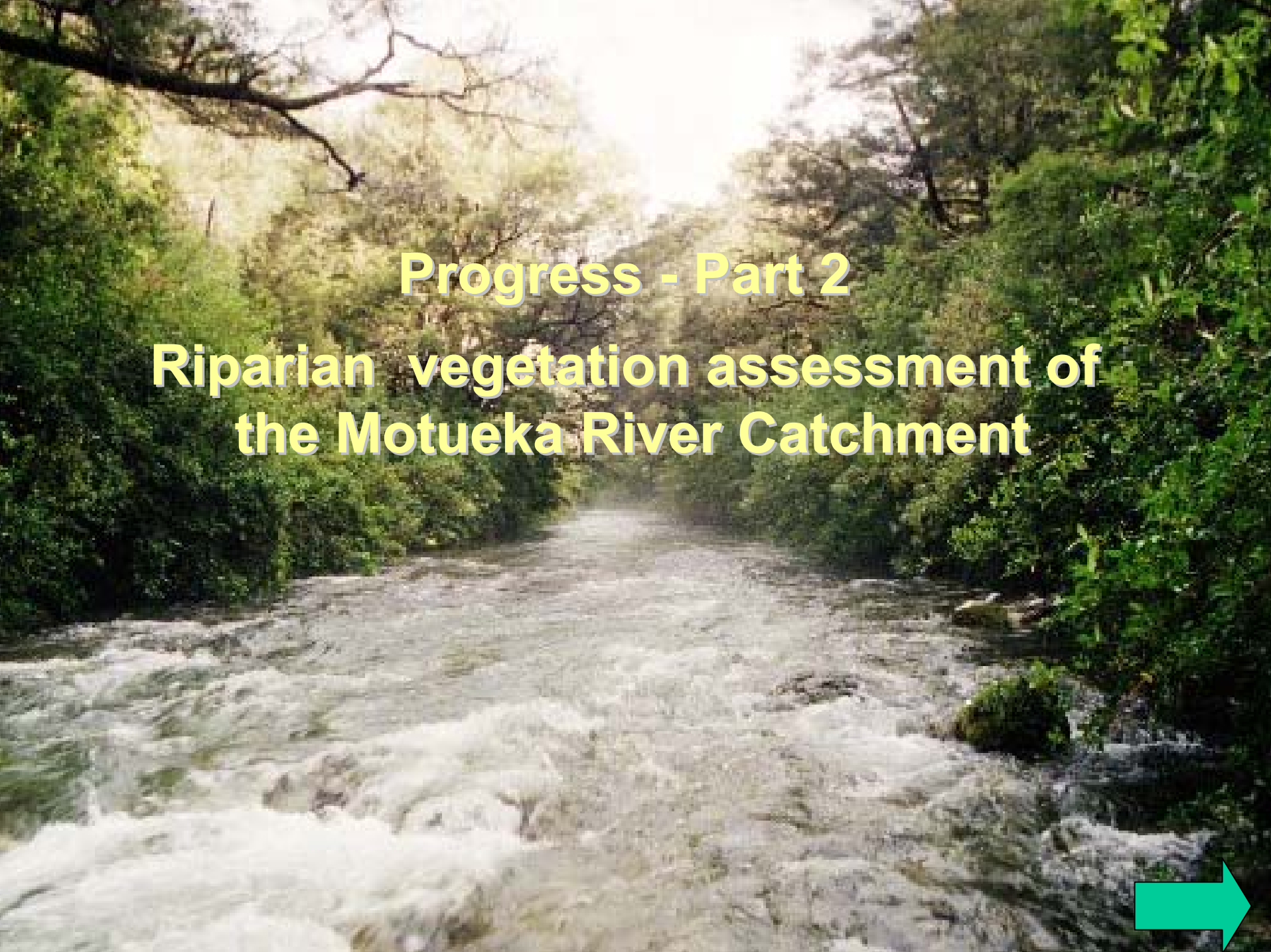
Plant lists

Microhabitat type	Native riparian plant species recommendations
1. Water margins (base flow level – continuously flooded)	*Carex secta, Typha orientalis, Schoenoplectus tabermontanei, Eleocharis acuta.* N.B. *Typha* may not be desirable if channel blocking is of concern.
2. Channels/banks (flooded during freshes – ca. 3–10 times per year)	*Phormium tenax, Carex secta, Carex virgata, Carex geminata,* *Cortaderia richardii, Polystichum vestitum, Hebe salicifolia,* *Coprosma propinqua, Blechnum novae-zelandiae* (including *B. minus*)
3. Levees (flooded in extreme events – every 1–3 years	*Sophora microphylla, Carpodetus serratus* (with shelter), *Cordyline australis, Pittosporum tenuifolium, Pseudopanax crassifolius, Hoheria angustifolia, Plagianthus regius, Melicytus ramiflorus* (with shelter), *Aristotelia serrata* (with shelter), *Coprosma robusta, Myrsine australis* (with shelter), *Lophomyrtus obcordata, Prumnopitys taxifolia, Podocarpus totara, Cyathea dealbata* (with shelter), *Dicksonia squarrosa* (with shelter), *Astelia fragrans* (with shelter).



…….etc for other micro-habitats

C. Meurk pers. Comm.



Progress - Part 2

Riparian vegetation assessment of the Motueka River Catchment

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Benefits of riparian managment

- Restoration of in-stream habitat
- Stabilisation of stream banks
- Stream health and productivity
- Shelter and shade for livestock
- Economic return
- Recreational enhancement
- Protection/restoration of cultural resources
- Reduced nutrients
- Reduced contaminants
- Biodiversity gains
- Terrestrial habitat – corridors
- Big effect for little land area

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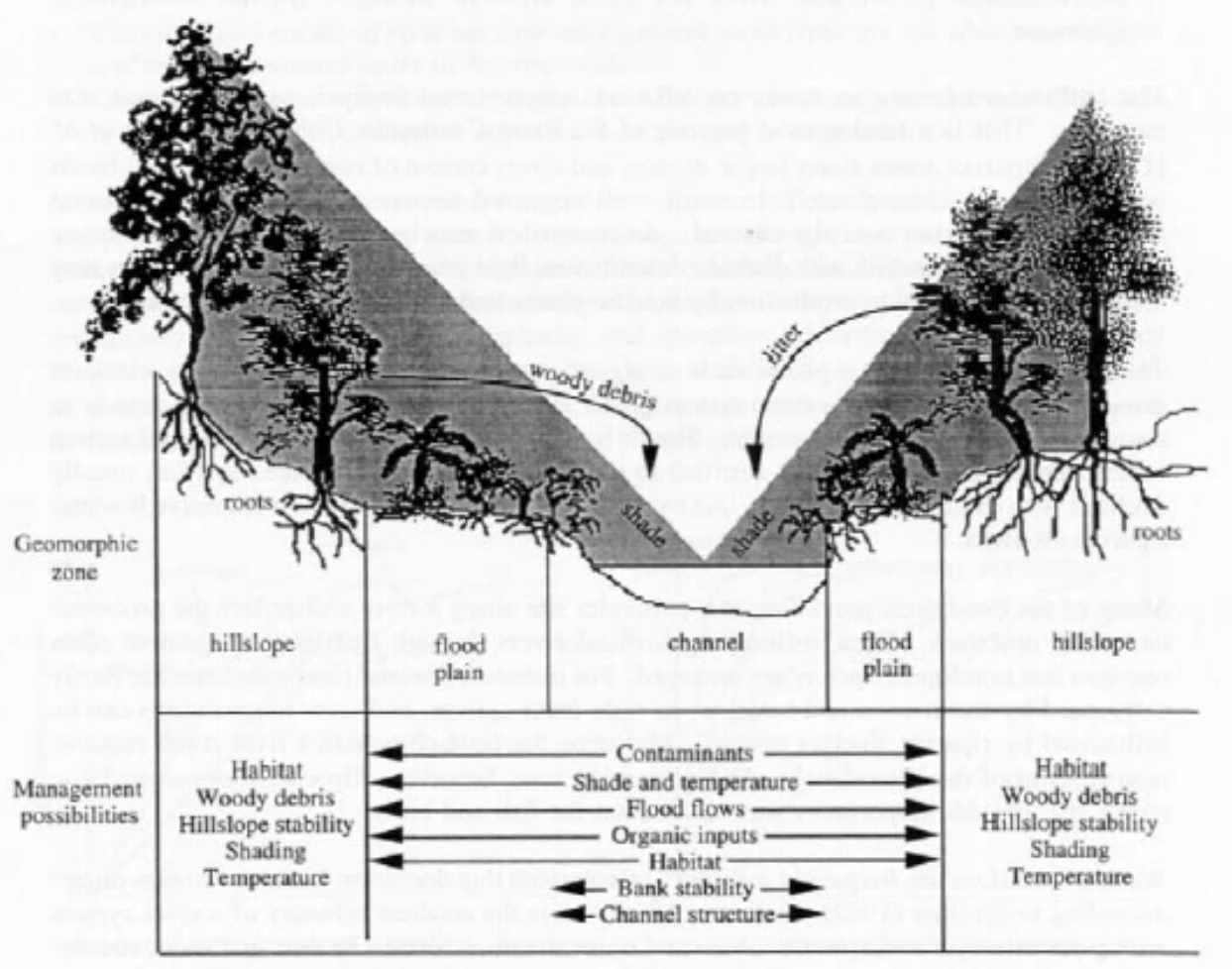
Riparian zone



from Managing Waterways on Farms MfE 2001, after Collier et al. 1995