THE OTHER 80%

Invertebrate biodiversity and management on braided rivers

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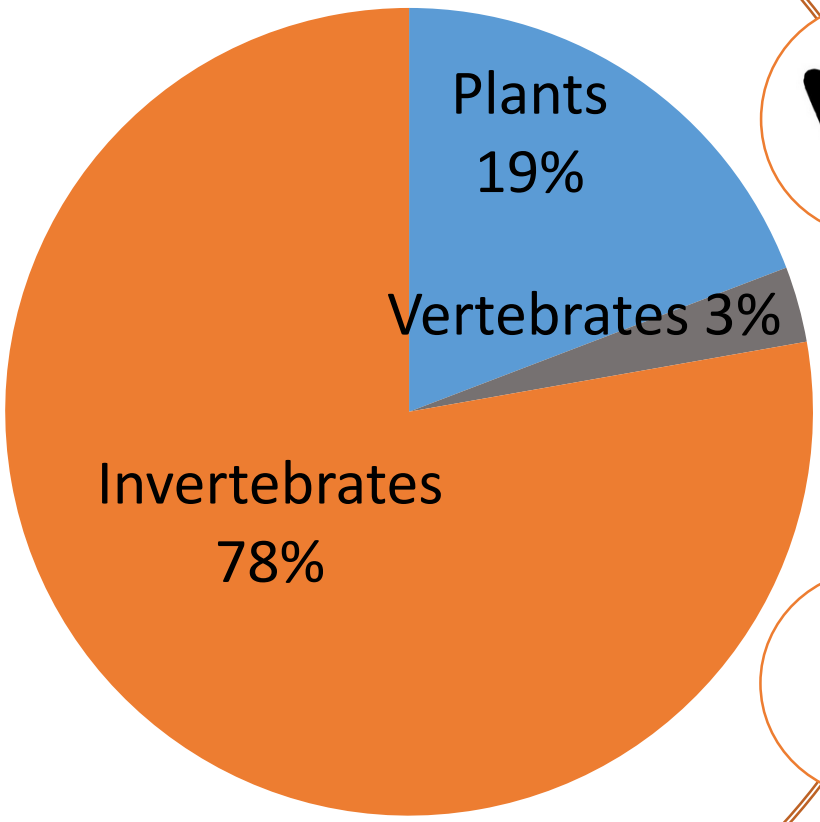
University of Canterbury

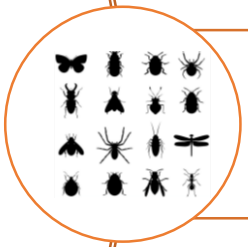
Braided Rivers Seminar

26 June 2019, Lincoln

Biodiversity – 78% of described species are invertebrates



Insects: 1 million described
Estimates ~ 5 million



‘10 quintillion individuals’
(10,000,000,000,000,000,000)

‘more than 1500 million insects for every person’

Tony Harris (ODT 18 June 2018)

Fundamental ecological values

- Detritivores
- Herbivores
- Pollinators
- Prey
- Predators
- Engineers…..

New Zealand:

~20,000 insect species
~15% threat assessed

Threat Status		
Threatened	139	6.6%
At Risk	640	30.2%
Threatened + At Risk	779	36.8%
Data Deficient	441	20.8%
Total		57.6%

What do we know about terrestrial invertebrates in braided rivers?

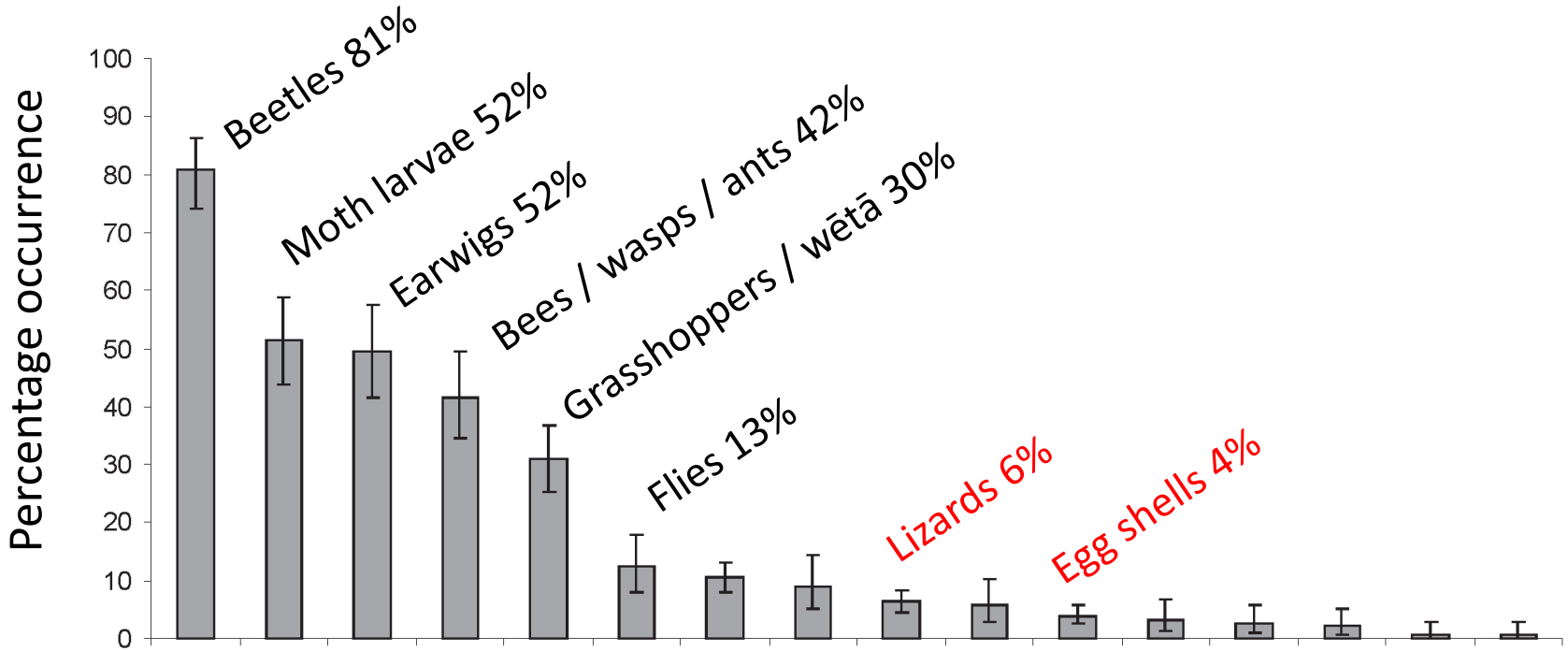
- What is present
- What is healthy
  Who's threatened
- How to protect species / communities
- How management of other species affects invertebrates

Threats

Threats

Jones et al (2005) NZ J Ecology 29: 29-35

- Hedgehog gut contents
- 100% contained insects



- Gut of one male hedgehog contained 283 wētā legs = at least 47 wētā in one night


Robust grasshopper
Nationally endangered
Cryptic, habitat specialist

Tasman invertebrate study

- *Raoulia haastii – R. australis* cushionfield
- 1 of 11 vegetation communities
- October 2005 - February 2006
- Field work by Susan Anderson

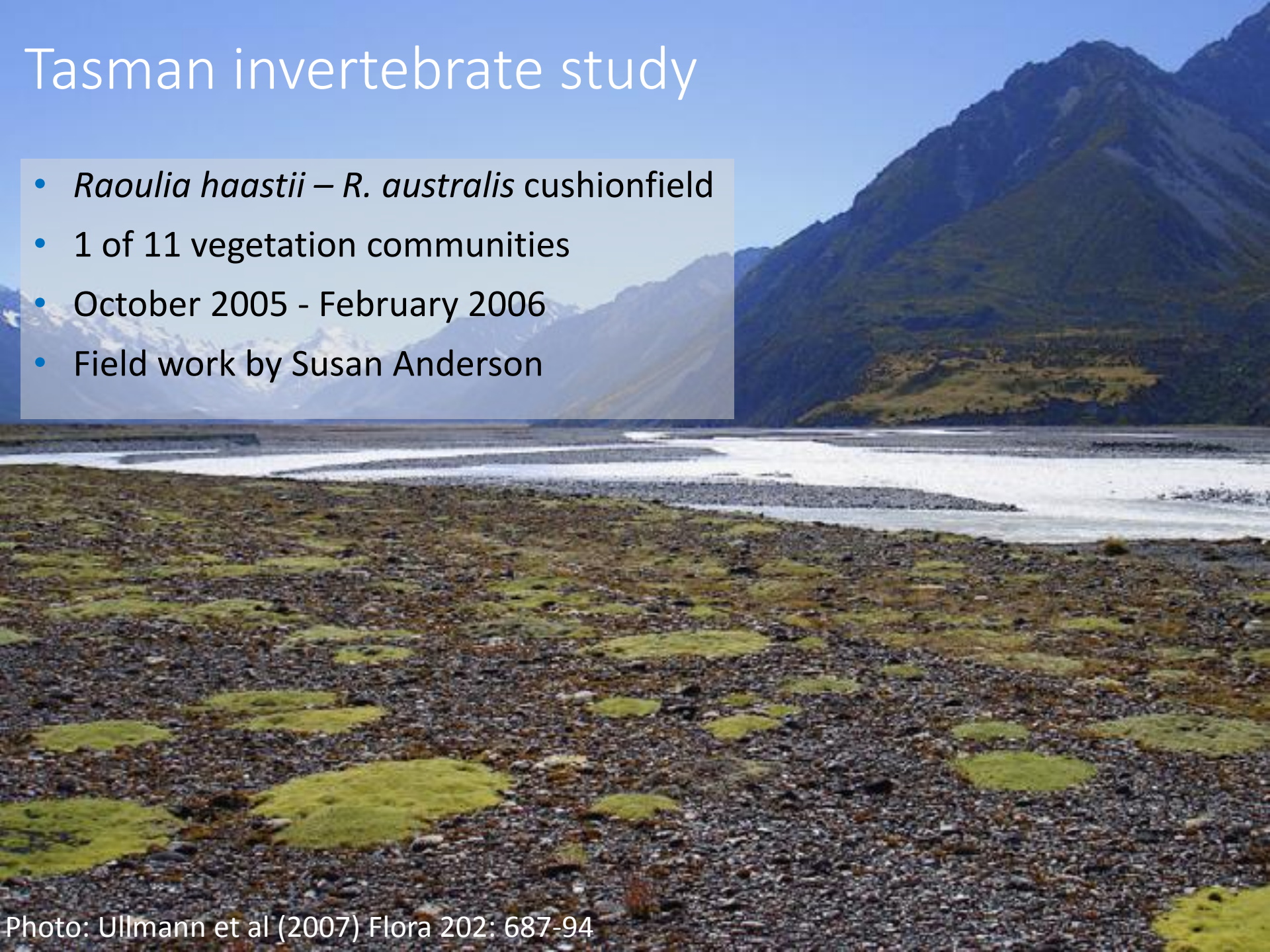


Photo: Ullmann et al (2007) Flora 202: 687-94

Aims

Comprehensive sampling:

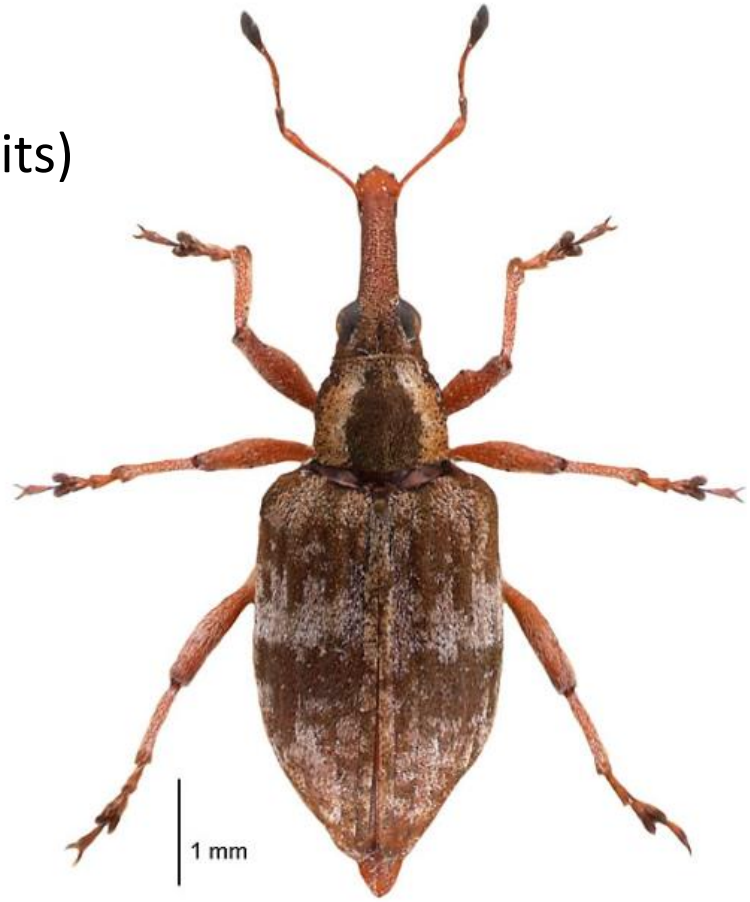
- 6 sites
- 4 months
- 5 sampling methods

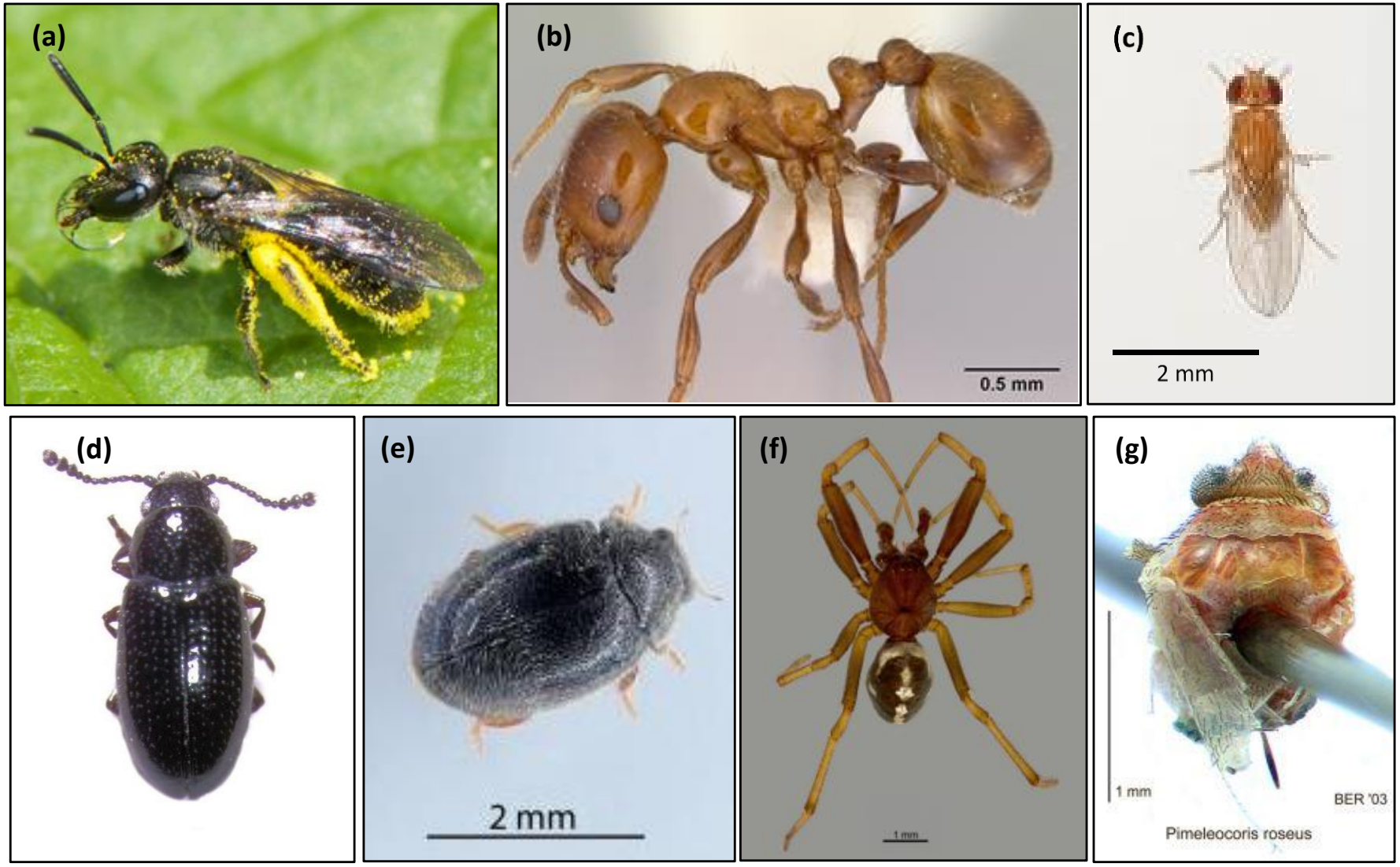
- Characteristics of the invertebrate community

- Best method for rapid assessment of other rivers

Results

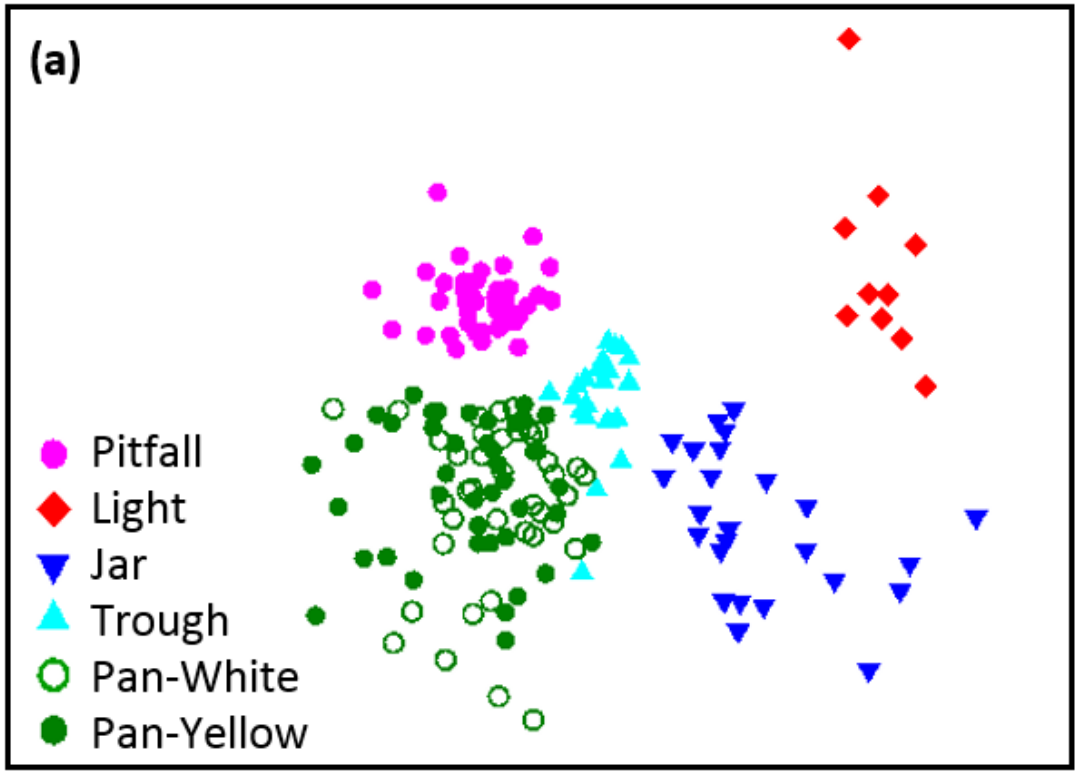
- 152,506 specimens
- 919 RTUs (Recognisable Taxonomic Units)
- 21 Orders within 5 Classes
  - Flies 34%
  - Bees / wasps / ants 20%
  - Moths 13%
  - Beetles 10%
  - Bugs 8%
  - Spiders 6%





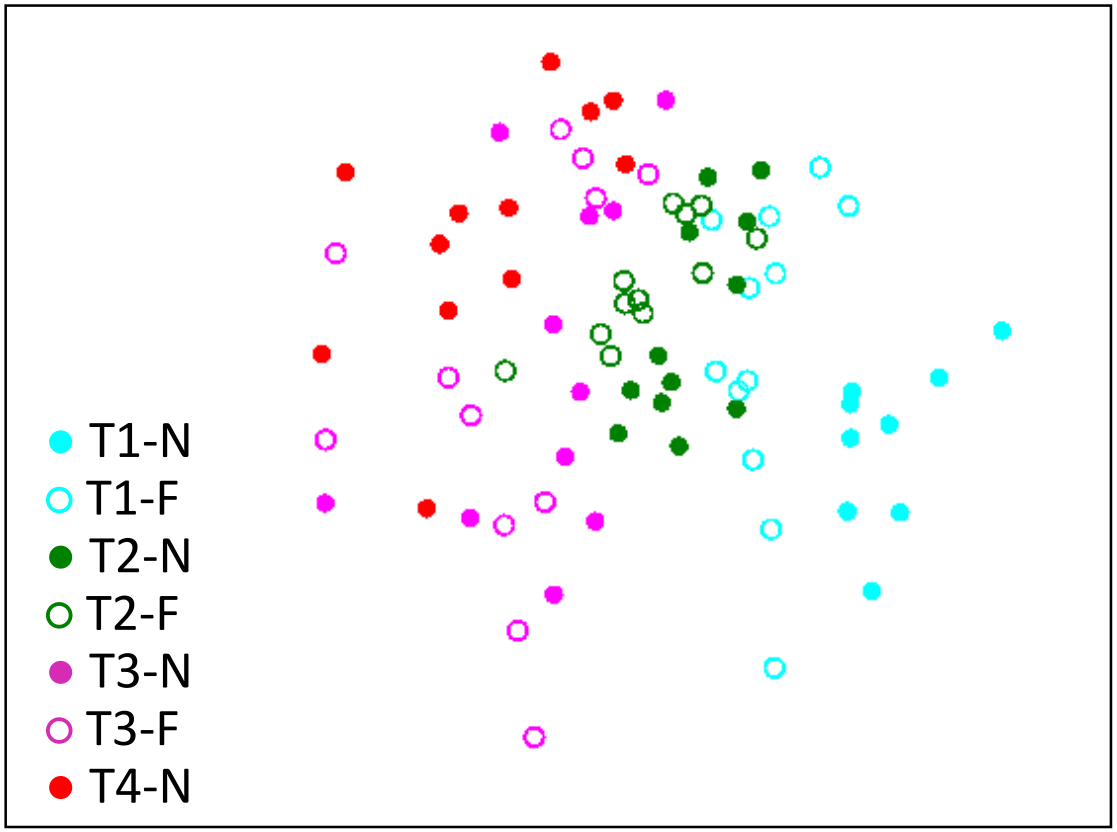
- 292 (32%) found in only one sample
- Extrapolator indices estimate true total of ~1207 spp.

Optimal sampling method?



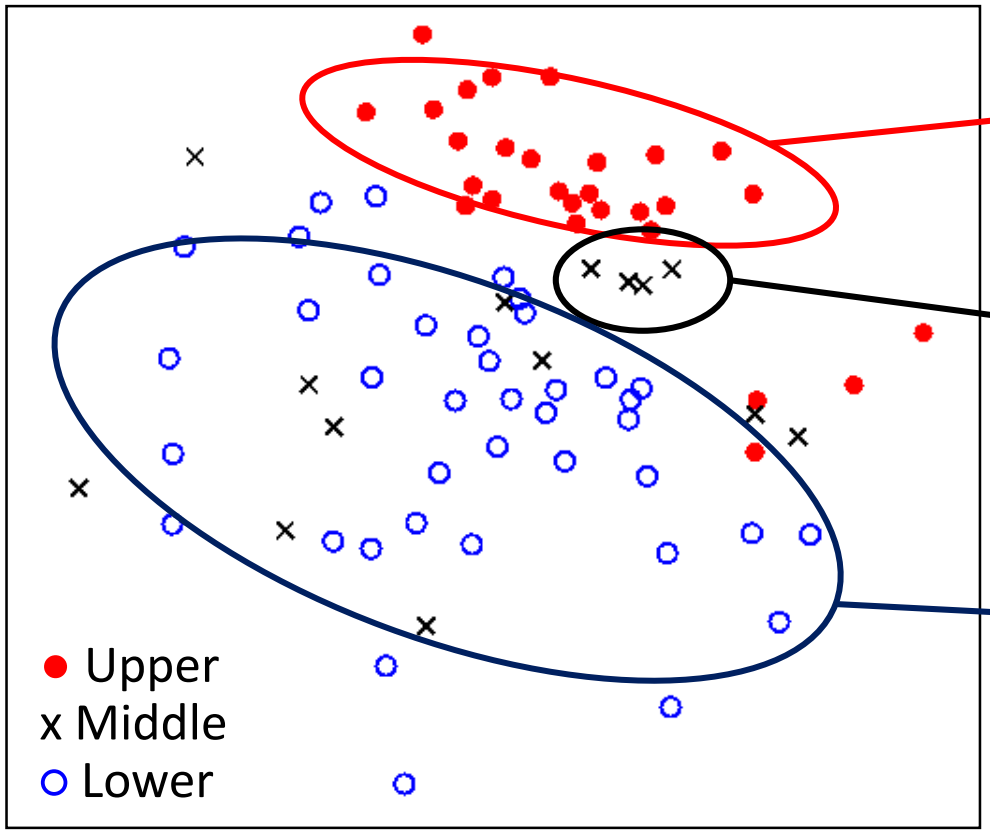
- Sampling methods detected different but overlapping communities
- 48% of species found in only one sampling method
- Malaise detected greatest diversity

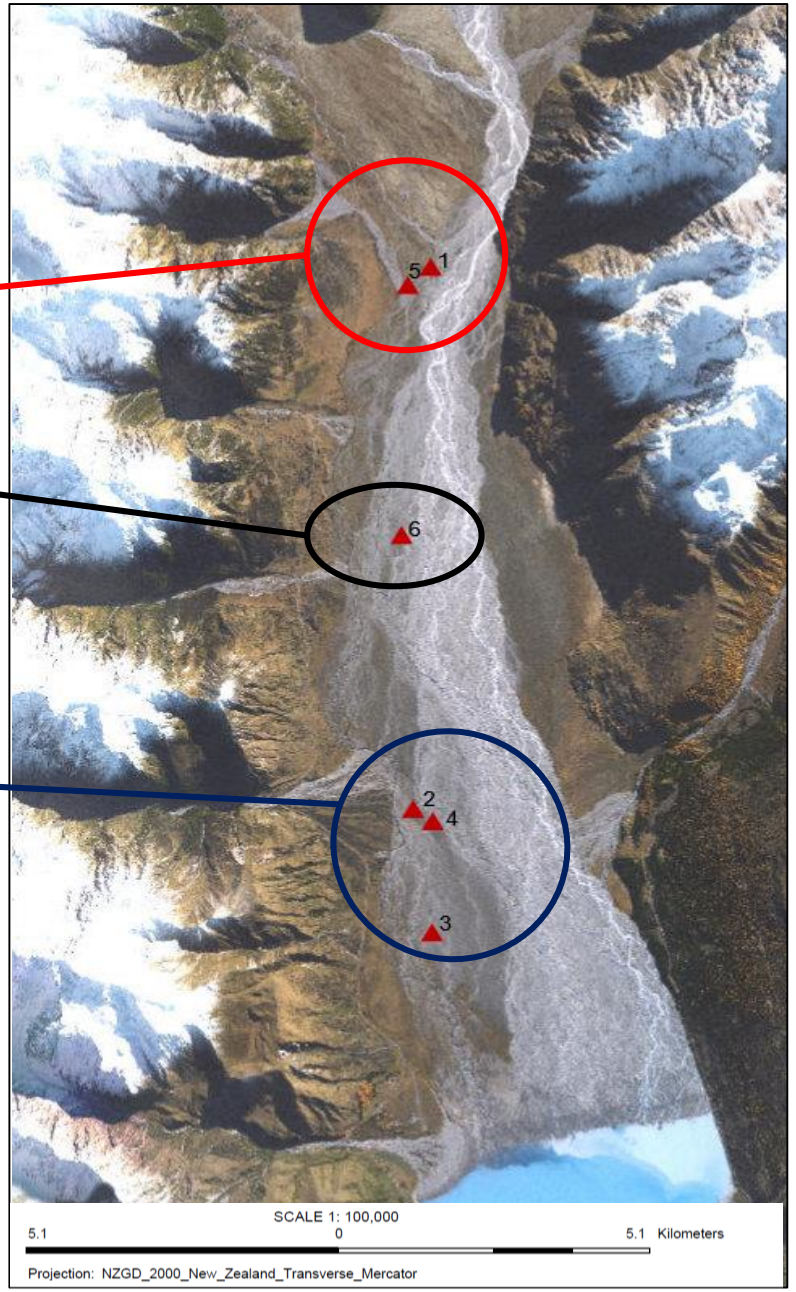
Optimal sampling time?



- Moderate seasonal effect
- 344 (37%) found during only one of the eight sampling periods
- Important to sample across season

Where to sample?





- Effect of distribution along river
- Greatest diversity in upper reaches
- Important to replicate along reaches

Reducing sampling & processing effort

Overall patterns remain if:

- Use only 1-2 sampling methods

- Ignore RTUs < 2mm in size
- Ignore juveniles
- Reduces processing time by 46.5% (70,773 specimens)

- ID to Genus or Family

Next Steps

- What are the invertebrate biodiversity values of our less pristine rivers?
  - Upper and lower reaches
  - Weedy and non-weedy
- Impacts of predators?
- Impacts of weed management?

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Te Papa Atawhai

Environment Canterbury
Regional Council
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