Where to from here and how?

Factors influencing ecosystem rehabilitation

Angus McIntosh
The state of the waterway(s)

1. High water quality some of the time
   • Deterioration during spates & low flows

2. Variable physical habitat conditions
   • Radical improvement in riparian quality & some in-stream aspects
   But:
   • Dispersal barriers
   • Siltation
   • Organic matter accumulation

3. Degraded fauna
   • Characterised by tolerant species (fish & invertebrates)
   • Loss of sensitive spp. since 1980s
   • Little improvement
The state of the waterway(s)

4. Translocations have failed
   - Mudfish: low survival. None currently known to have survived.
   - Crayfish: high initial survival. May still be present in low numbers.
   - Mayflies: high initial survival. Not recorded after 6 months.
Conclusions

• Rehabilitation efforts thus far have only been partially successful

• Lack of colonists and physical habitat quality are not the only factors involved

• (Lack of recovery is not for the want of trying)
What factors are usually important in recovery?

Modified from Bond & Lake 2003:

1. How will catchment & long-term processes influence the likelihood, or timeframe of responses?
   - Storm water
   - Contaminated sediment
   - Climate warming
   - Campus (& Ilam / Avonhead) expansion & development

   Whole-catchment approach; deal with contaminants 1st

2. Are there barriers to colonization? YES
   - What and where are the source populations?
     City outskirts e.g., Styx; plains; hills
   - How can potential barriers be overcome?

   City-wide approach, Translocations, Biodiversity hotspots, City planning
What factors are usually important in recovery?

3. Do the target species have particular habitat requirements at different life stages?
   - What are these requirements?
   - How should these habitats be arranged spatially?

   E.g., spawning habitat for mudfish;
   migratory access for native fish; high DO for mayflies

4. Are there introduced species that may invade?
   - Who are they? trout, Didymo, pest fish, Elodea
   - Can colonization of these organisms be restricted?

   Weirs & other barriers, education, planning prioritization
What factors are usually important in recovery?

5. What size habitat patches must be created for populations, communities and ecosystem functions to be restored?

- Is there a minimum area required? Don’t know!
- Will the spatial arrangement of habitat affect this (e.g. through the outcomes of competition and predation)? Almost certainly!

6. Is the vision compatible with the constraints on the system?
- Urban and UC catchment with high stormwater input
- Low gradient
- Disrupted aerial and aquatic dispersal pathways
- Huge contemporary change in hydrology
The vision

- self-sustaining waterways
- natural physical character
- high water quality
- rich and diverse community dominated by indigenous species
- appropriate to a natural lowland South Island stream tributary
- integral part of the University’s programme of research and teaching
- contribute to an urban campus environment that can sustain wildlife and is enjoyed by people
What factors are usually important in recovery?

5. What size habitat patches must be created for populations, communities and ecosystem functions to be restored?
   - Is there a minimum area required? Don’t know!
   - Will the spatial arrangement of habitat affect this (e.g. through the outcomes of competition and predation)?
     Almost certainly!

6. Is the vision compatible with the constraints on the system?
   - Urban and UC catchment with high stormwater input
   - Low gradient
   - Disrupted aerial and aquatic dispersal pathways
   - Huge contemporary change in hydrology
     Yes, but only if we deal with 1-5 above & UC continues commitment to the vision!