



Ecological Flows for Rivers in the Te Waihora/Lake Ellesmere Catchment

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Living Lake, Changing Catchment Symposium 2011





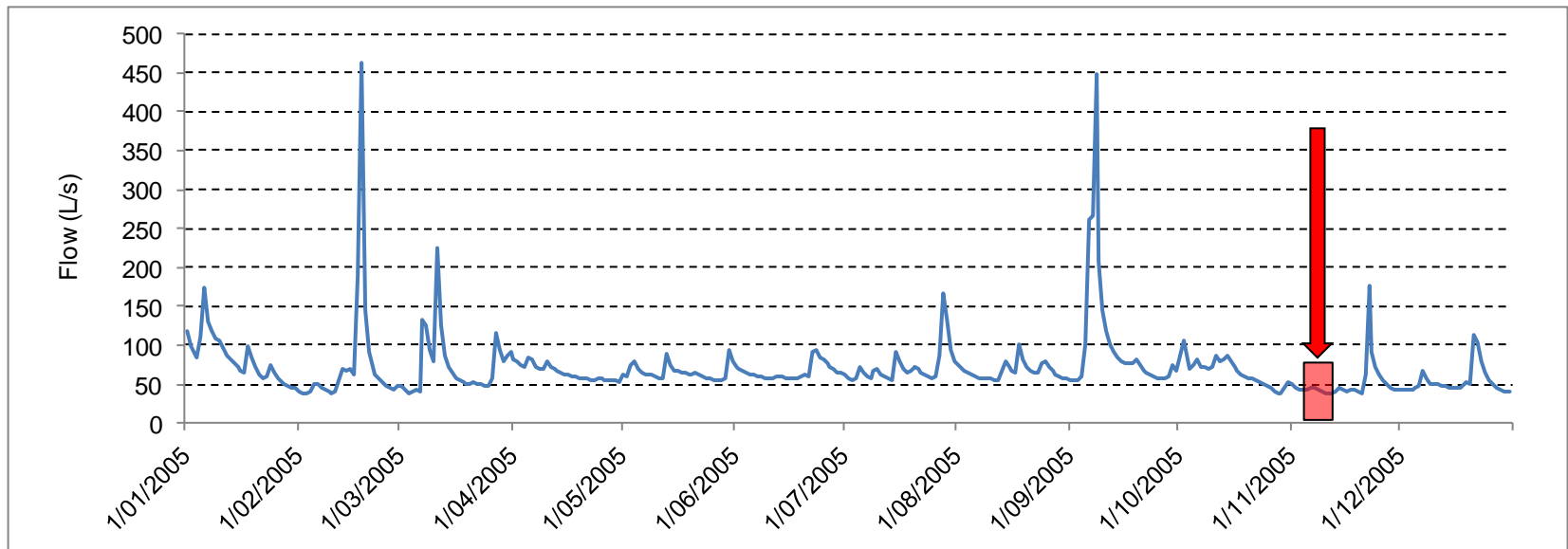
Talk Overview

- Minimum flow update and synthesis
- Ecological implications of hydrological modelling
 - Low flows
 - Flow intermittency



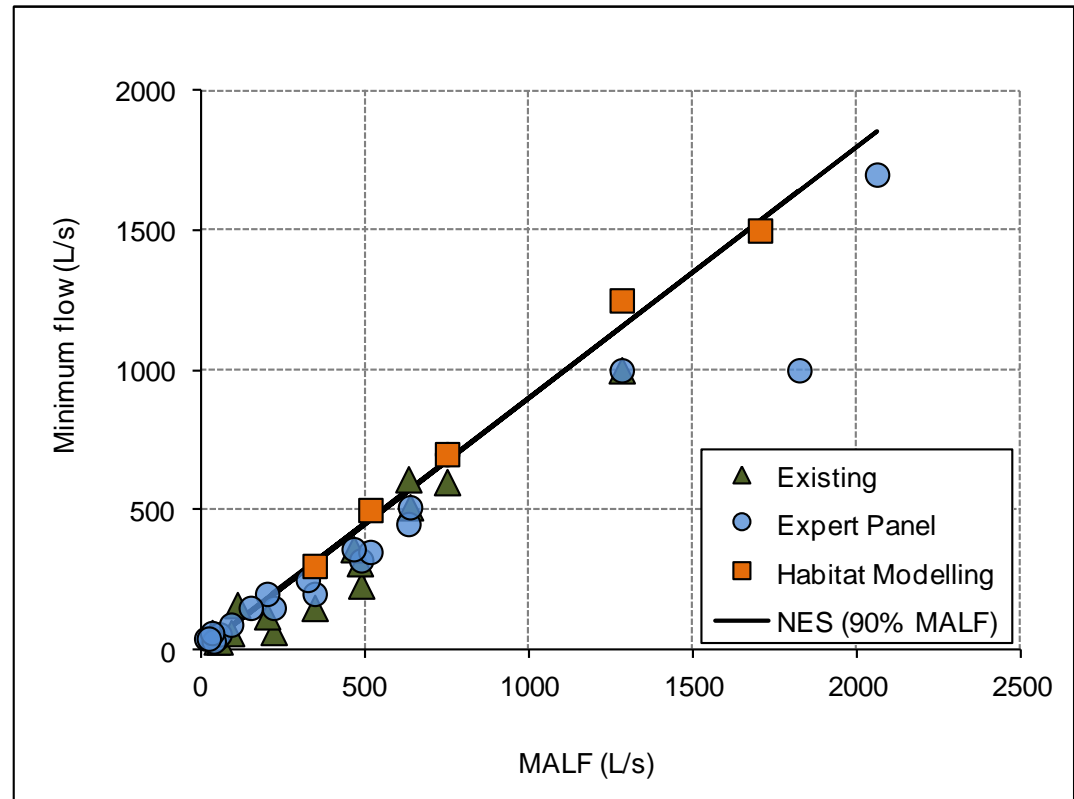
Ecological Flows

- Minimum Flow = flow when cease taking water
- Allocation = total amount of water taken
- MALF = 7 day mean annual low flow



Minimum Flows

- Existing minimum
- NES - 90% MALF
- Expert Panel
- Habitat Modelling
- Similar general pattern BUT...





Minimum Flows – Small Streams

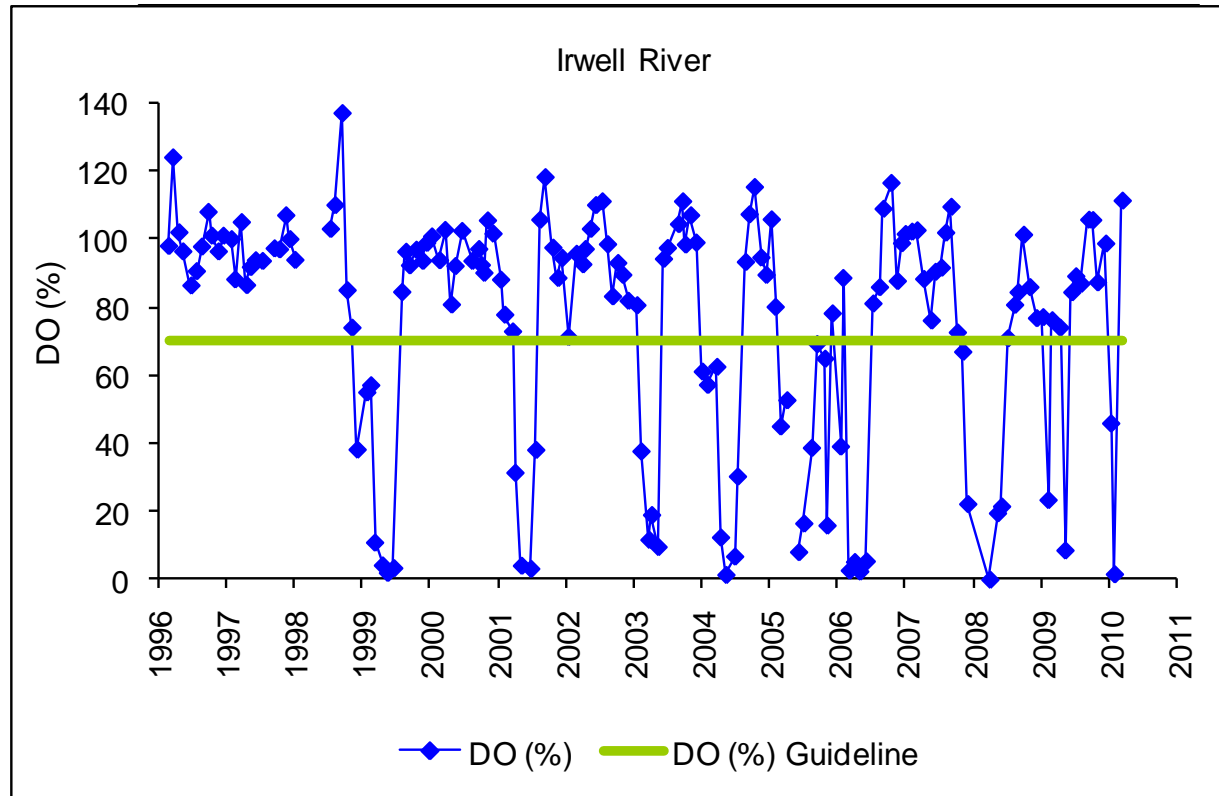
- Existing minimum flows low

- Flow-sensitive

 - Habitat (e.g., eels)

 - Drying up

 - Water quality



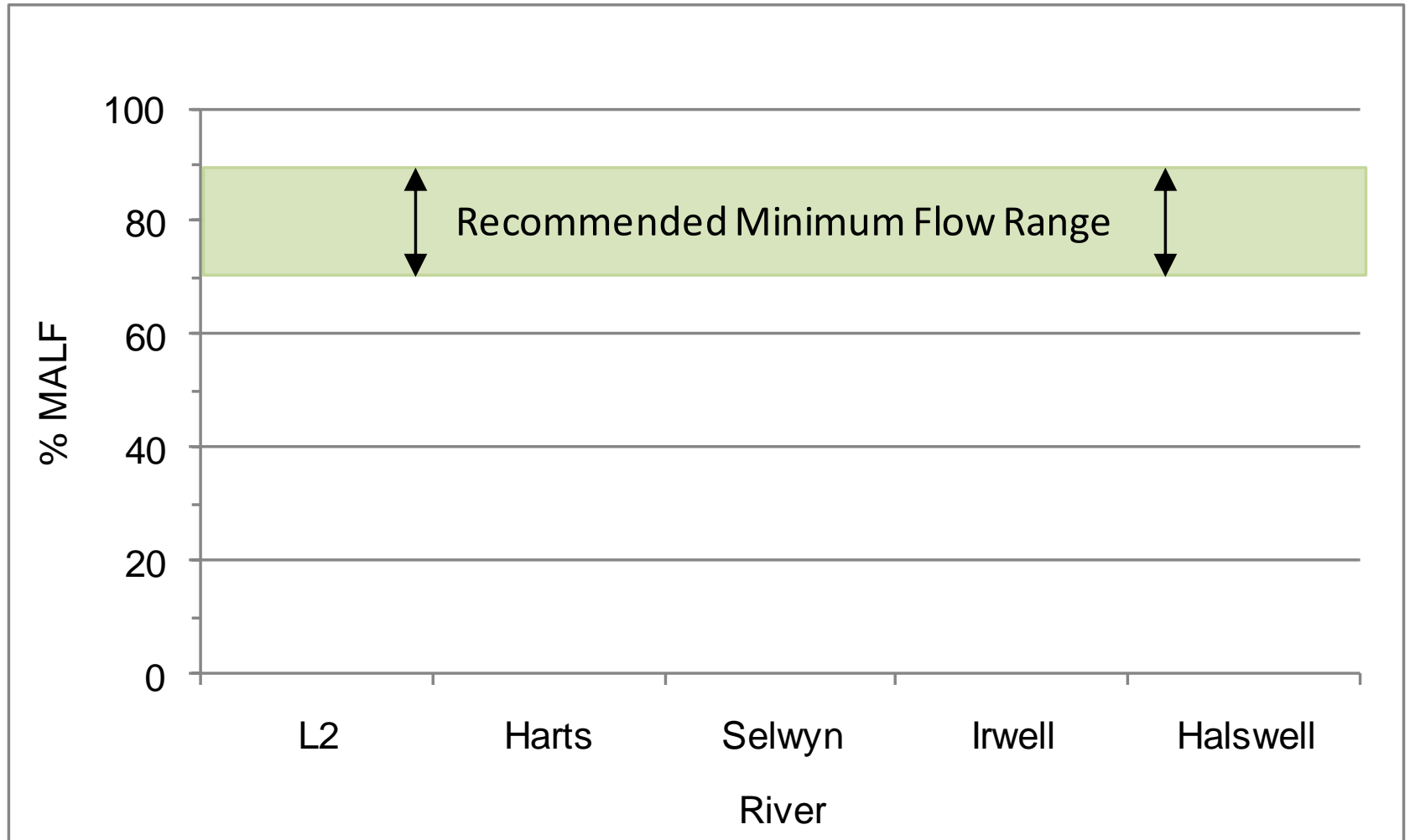


Minimum Flow Recommendations

- **At least 70 % of MALF**
 - Larger rivers (MALF > 300 L/s)
- **At least 90% of MALF**
 - Smaller rivers (MALF <300 L/s)
 - Upper Selwyn & Banks Peninsula hill-fed rivers
 - Canterbury mudfish sites – Hororata area and Waianiwaniwa

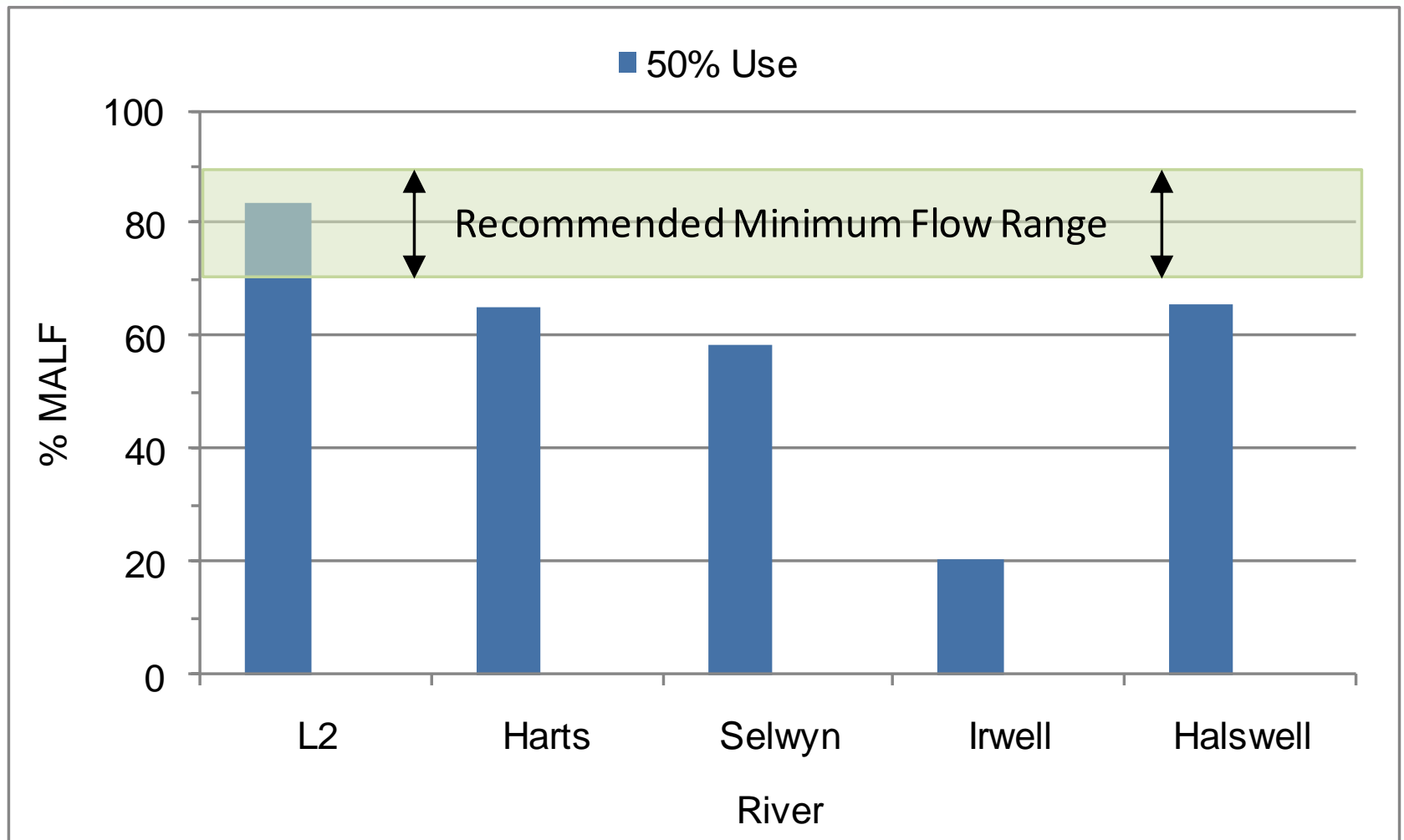


Minimum Flows – Indexed to MALF

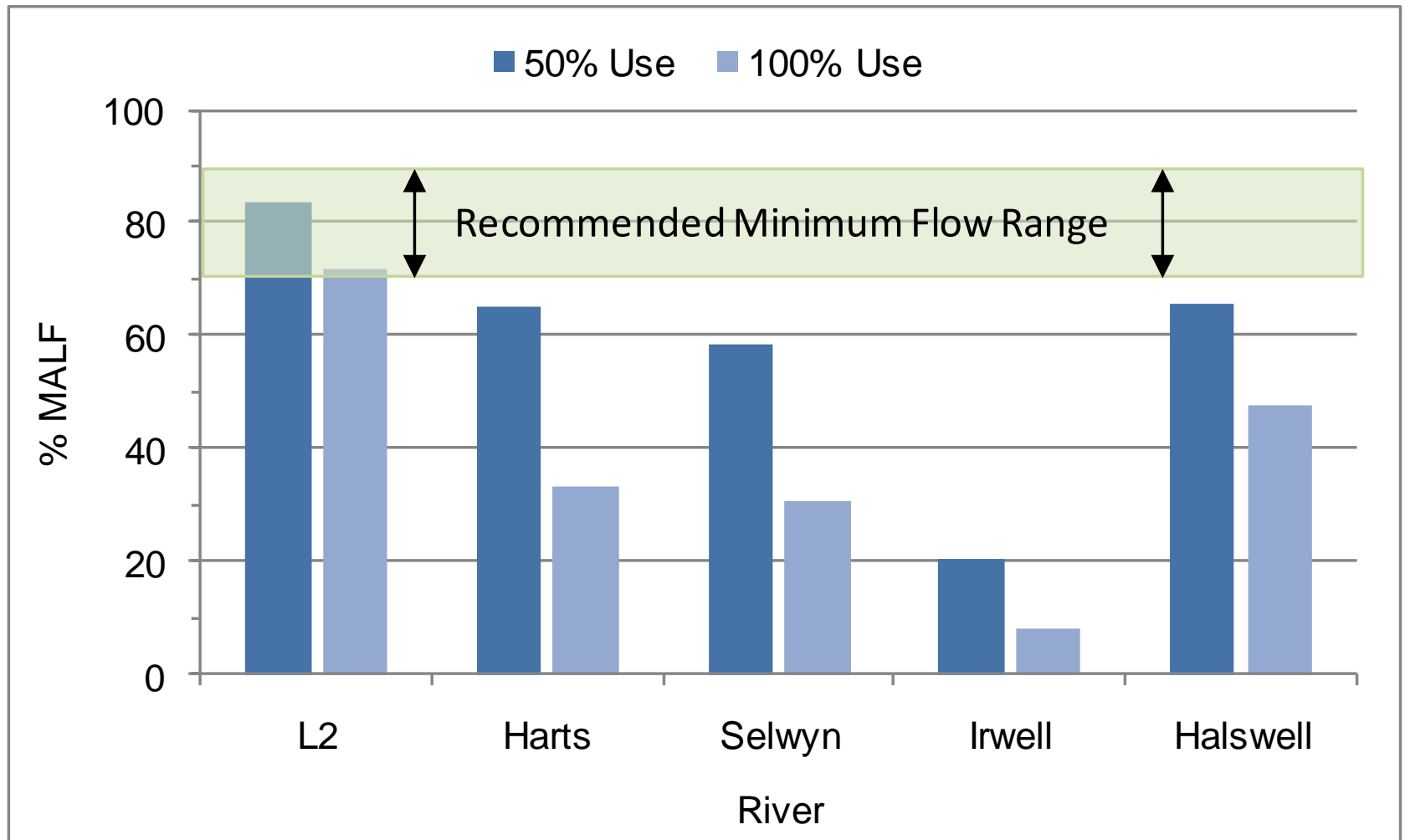




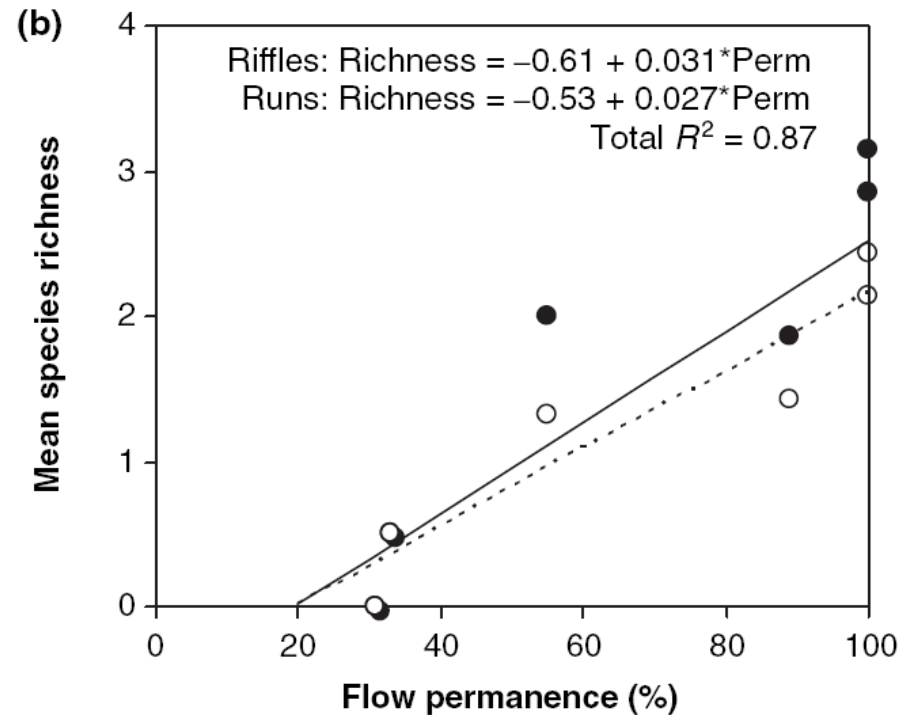
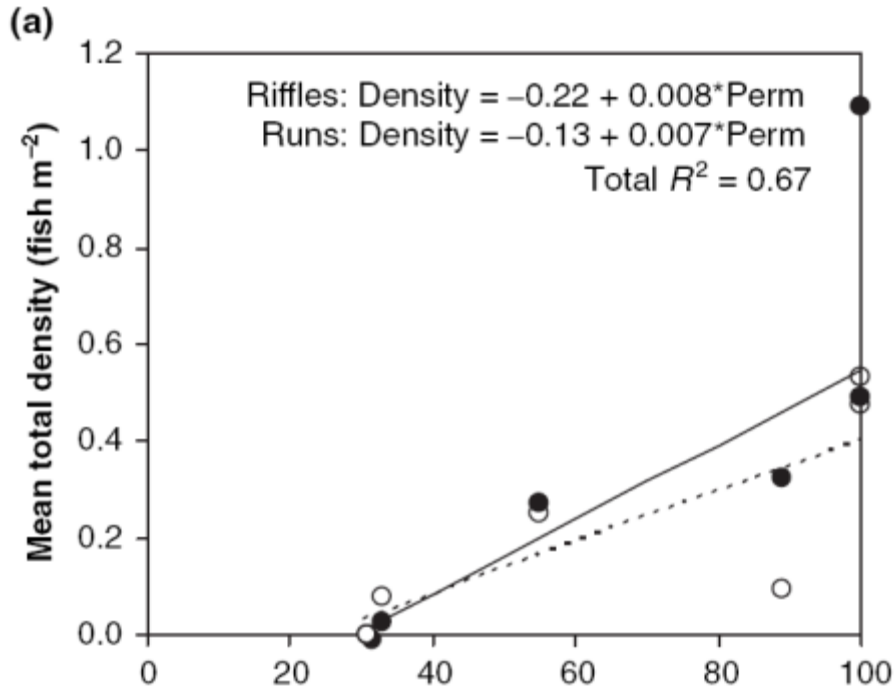
Impacts of Current Allocation



Current Allocation – Increased Usage Impacts



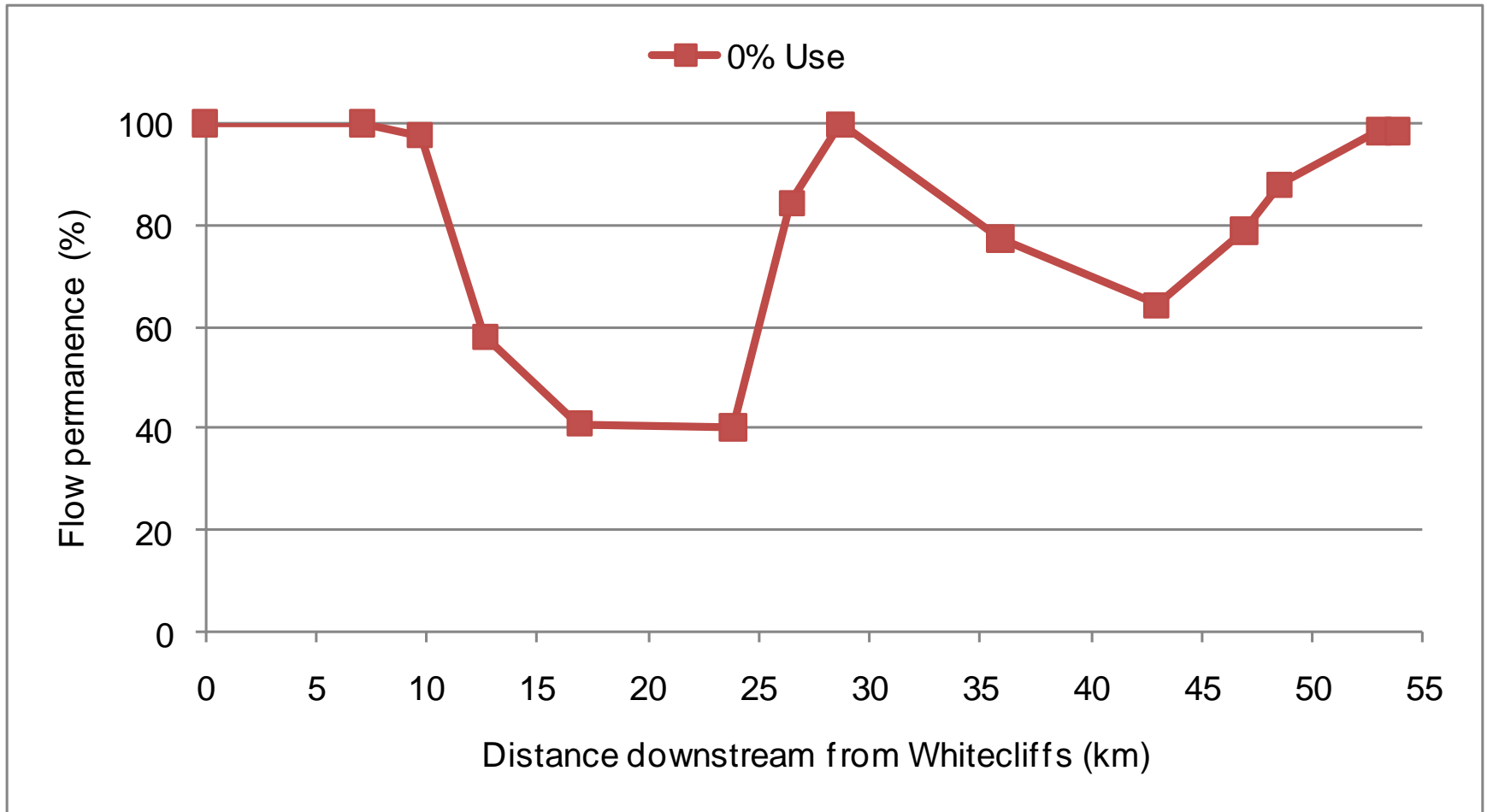
Ecological Values: Flow intermittency



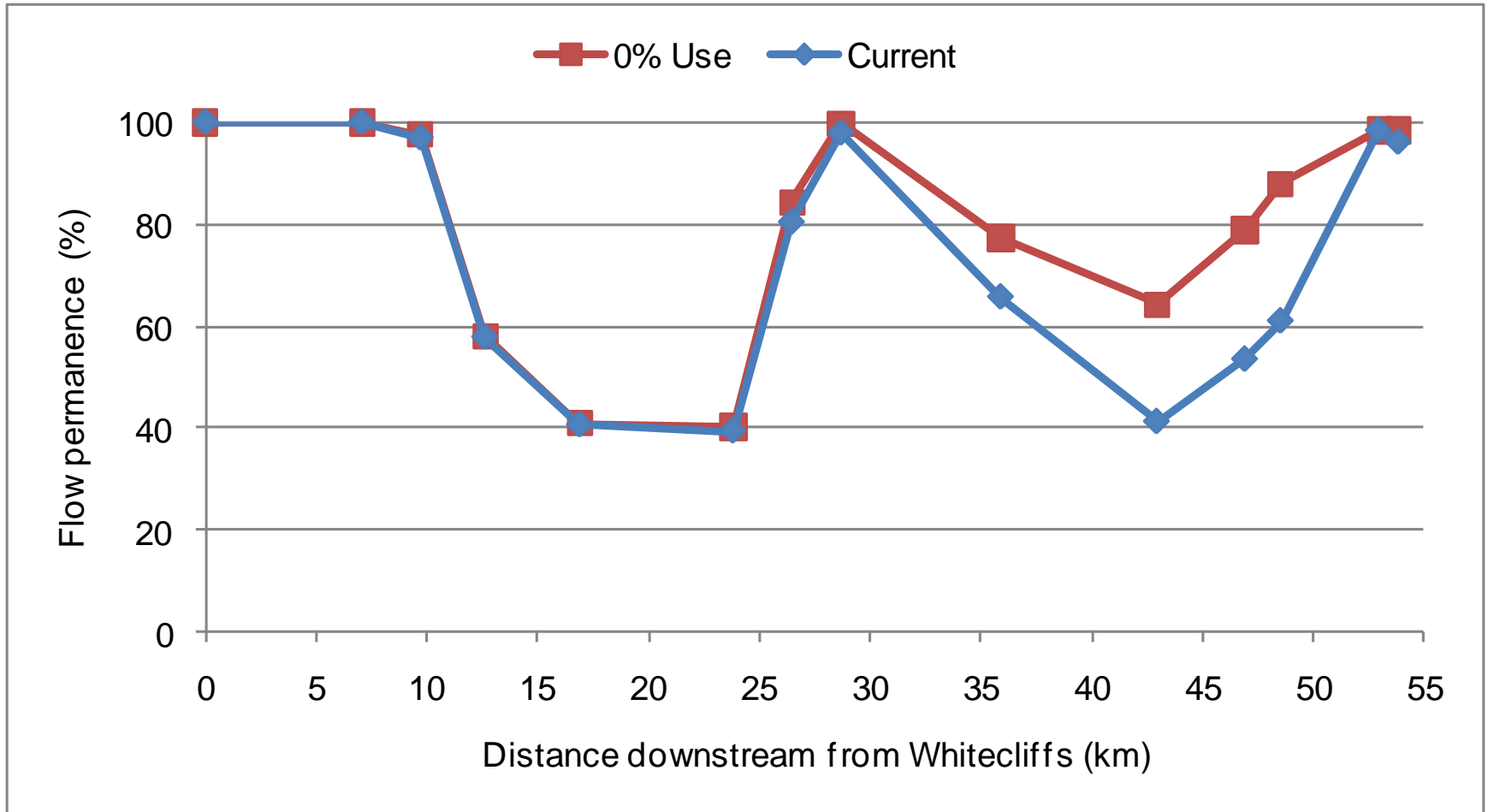
Source: Davey & Kelly (2007).



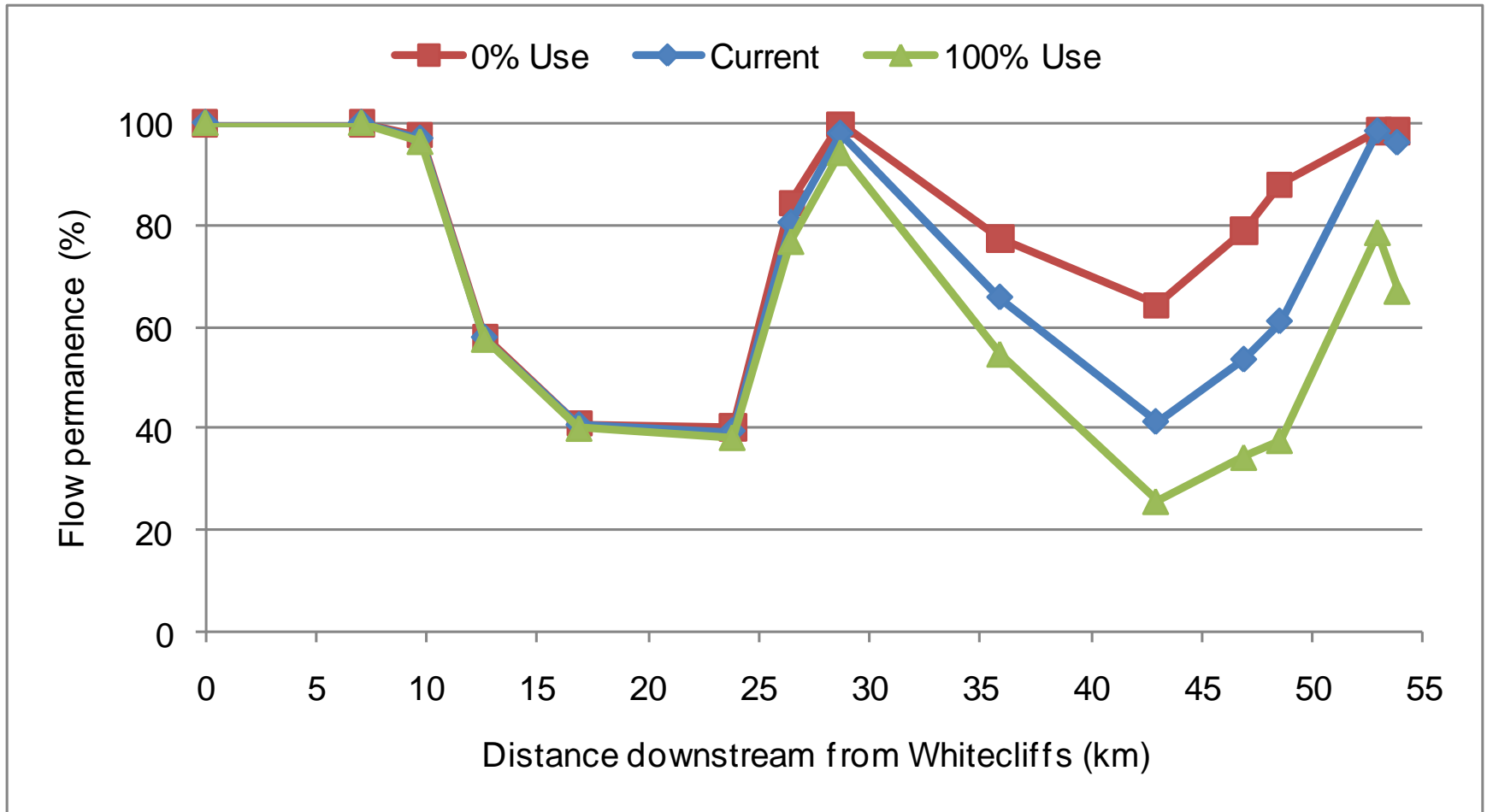
Selwyn River Flows



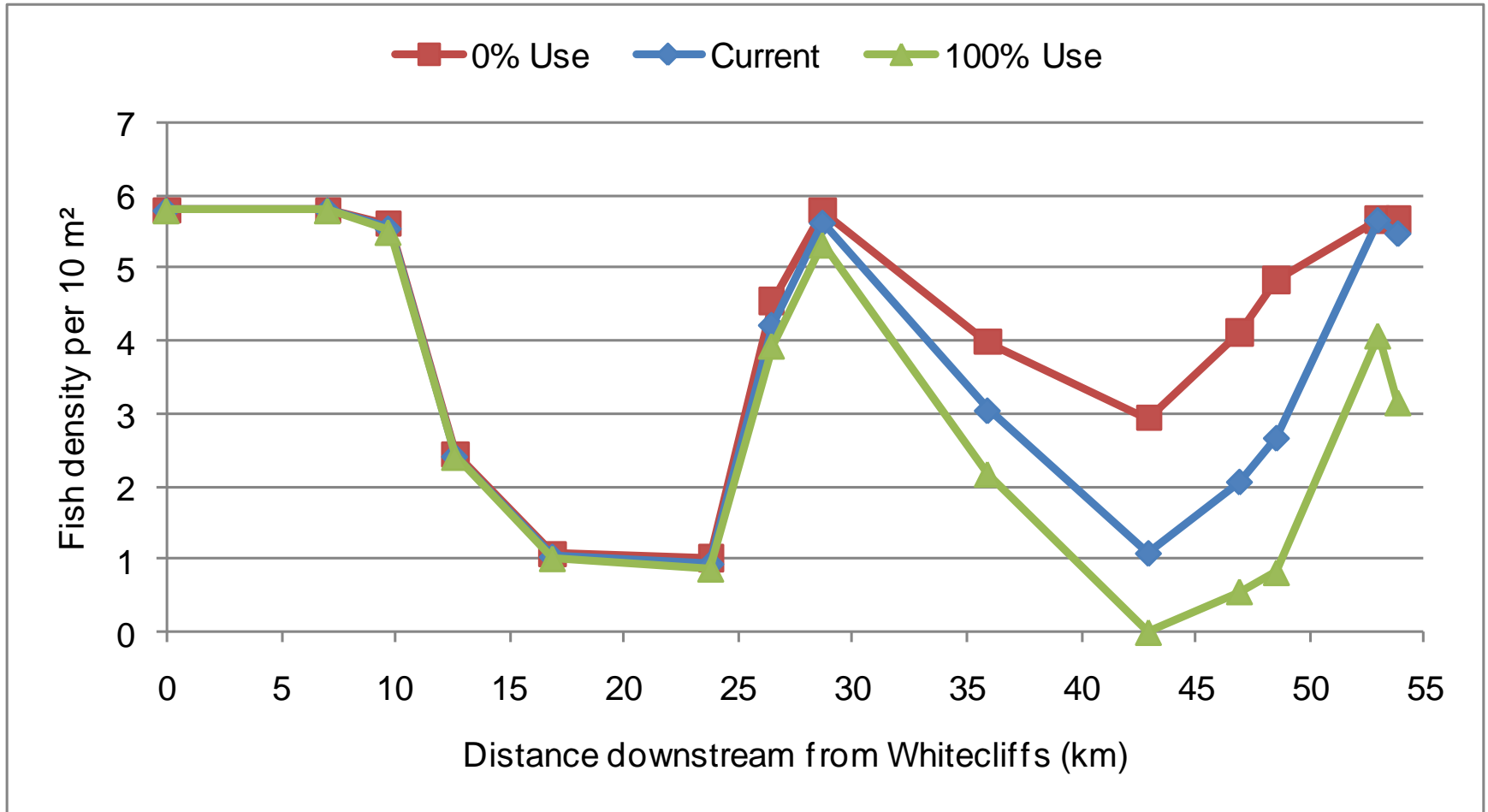
Selwyn River Flows



Selwyn River Flows

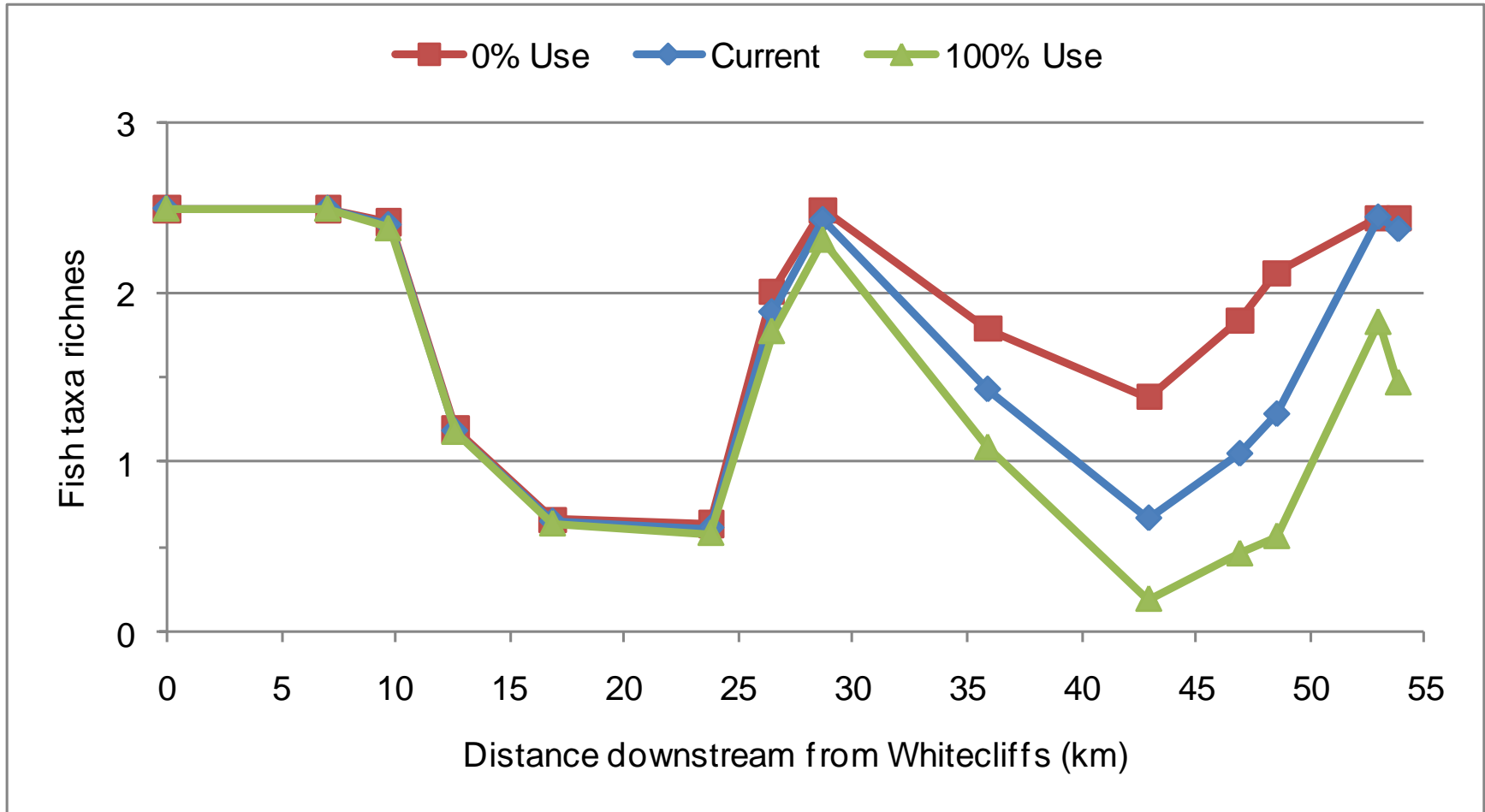


Dry Reaches Affect Fish Numbers

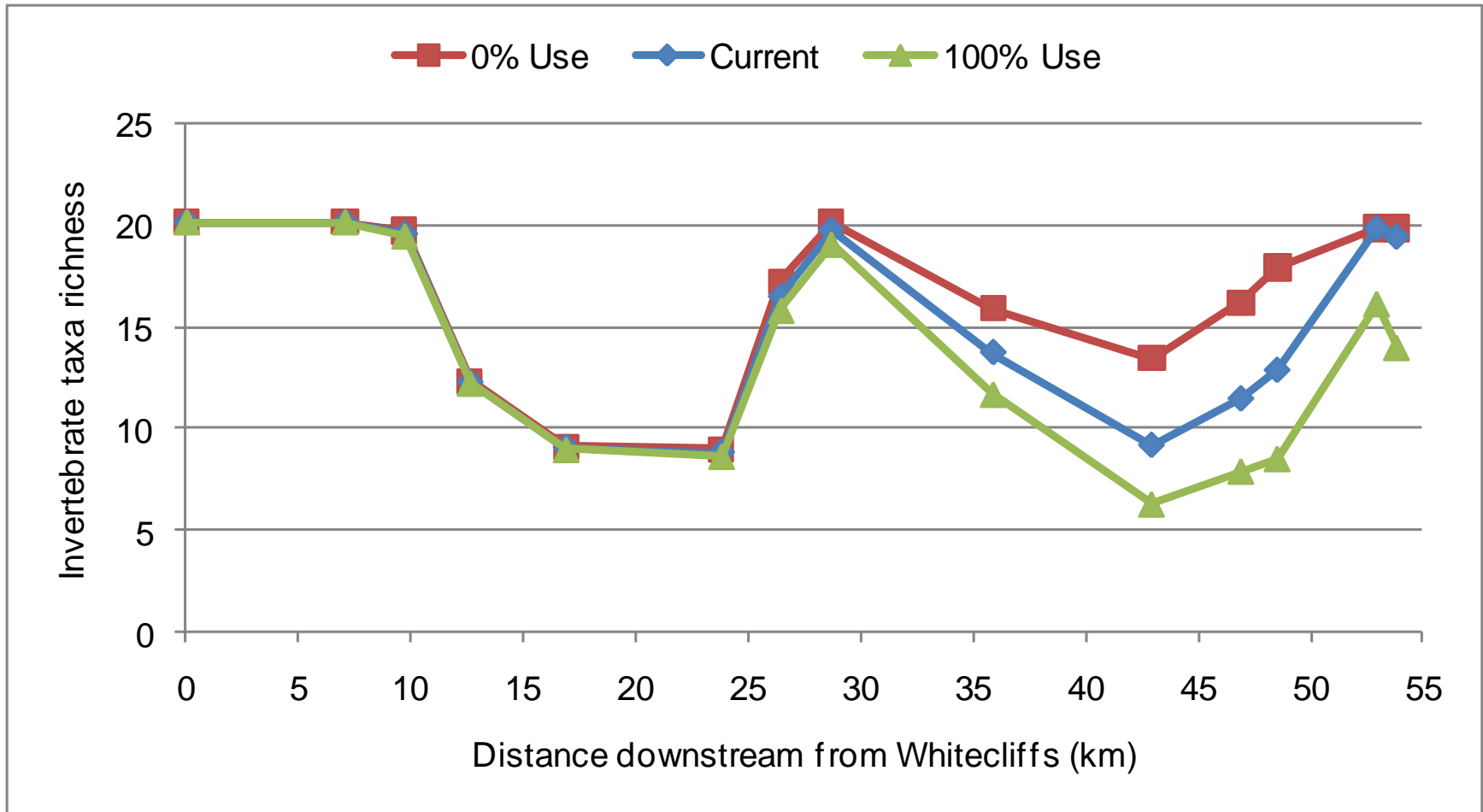




Dry Reaches Affect Fish Diversity



Dry Reaches Affect Invertebrate Diversity





Next Steps

- Catchment management scenarios - ecological indicators
 - Converting: habitat, intermittency, flow variability
 - Into: Fish and invertebrate abundance and biodiversity