COSTS AND BENEFITS OF THE TADMOR VALLEY WATER AUGMENTATION SCHEME
research in progress

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Background

Concerns about diminishing river flows led to construction in 1986-87 of a summer flow diversion from the Hope River to the Tadmor. This project evaluates river flow changes in the Tadmor and the economic and in-stream benefits and costs of water augmentation schemes like the Hope Diversion.

Research objectives

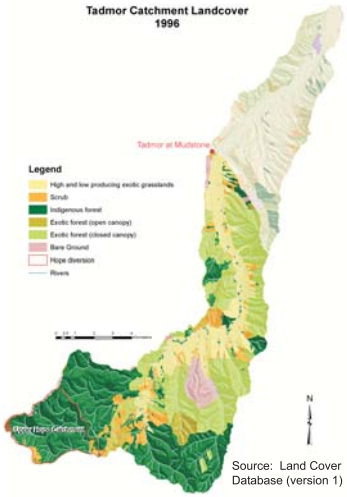
1. Calculate, using our WATYIELD model, the effects on river flows of afforestation in the Tadmor catchment, to determine net water augmentation needs
2. Assess benefits to irrigators of improved security of water supply provided by the summer diversion from the upper Hope River into the Tadmor River since 1988
3. Compare these benefits with capital costs and operation & maintenance costs, and with benefits or costs to in-stream values of the Tadmor and Hope rivers
4. Based on preceding analysis, recommend ways to initiate, support and finance water augmentation proposals in future

Effects of land cover on river flow

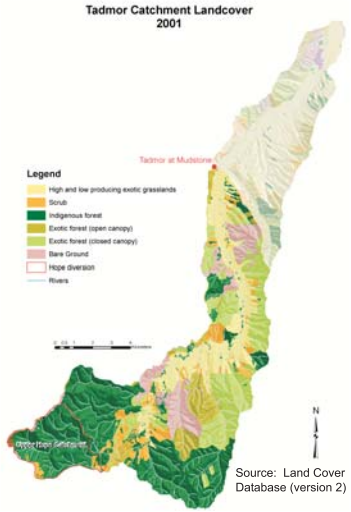
- Woody vegetation intercepts a higher proportion of rainfall and transpires a greater volume of moisture per hectare than grassland. Changes in land use significantly affect river flow in small, summer dry catchments like the Tadmor
- A hypothetical pre-forestry scenario with all planted forest instead in pasture would approximately double flow in the Tadmor
- Actual changes in flow with afforestation are less significant as large areas of plantation forests have been established on land converted from indigenous forest and gorse

Conclusions

- Flow characteristics in the Tadmor are significantly influenced by land-use patterns and phases in particular land-uses
- Land use change in the 1970s and 1980s resulted in a steady decline in natural flow levels



Source: Land Cover Database (version 1)



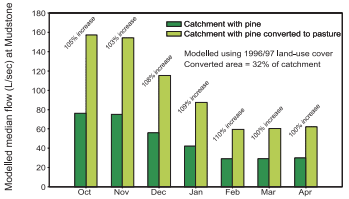
Source: Land Cover Database (version 2)

	1996/97 land cover above Mudstone River		2001/02 land cover above Mudstone River	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Indigenous Forest	2900	33	2900	33
Scrub	700	8	700	8
Bare Ground (including recently harvested forest)	350	4	880	10
Exotic Forest (open canopy)	260	3	620	7
Exotic Forest (closed canopy)	2900	33	2020	23
Pasture	1670	19	1670	19

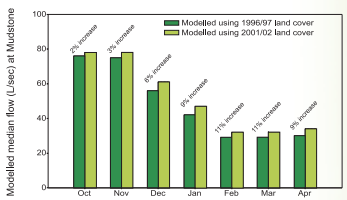
Effects of plantation harvesting on river flow

- The land cover maps show increased areas of harvested and young (open canopy) forest between 1996 and 2001
- The WATYIELD model shows that this change in land cover increases river flows at Mudstone, with the increases proportionately greatest during the summer irrigation months

Effects of land cover on river flow

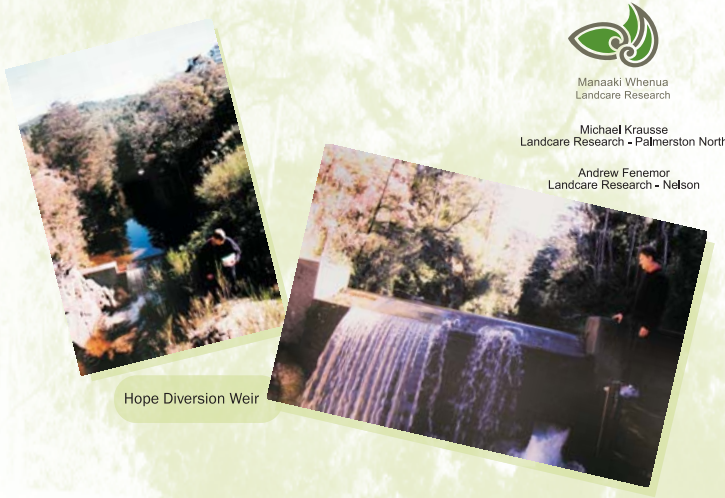


Effects of plantation harvesting on river flow



Research in progress

- Assess the benefits to primary production of the increased take of water as a result of the diversion
- Evaluate the impacts of the diversion on in-stream values in the upper Hope and Tadmor

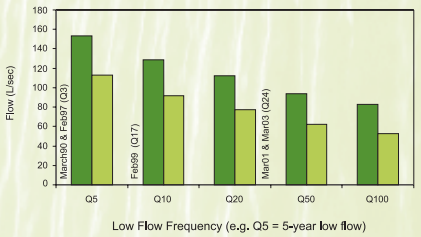


Hope Diversion Weir

Tadmor Water Augmentation Scheme facts

- Up to 750 L/sec is diverted from the Hope River into Tadmor River at Tadmor Saddle October-April each year
- Completed 1986 by Tadmor Valley Irrigation Society and Nelson Catchment Board for $42,000 with a 50% government grant
- Mean diverted flow is 215 L/sec, minimum is 58 l/sec, with a residual flow of 20 L/sec required in the Hope River below the diversion intake
- Scheme operation and metering of downstream usage is managed by the Tadmor Valley Irrigation Society under TDC water permits to divert and take river/groundwater flow
- Major water uses are irrigation of hops and raspberries

Flows for Tadmor River @ Mudstone with and without Hope River diversion, 1988–2004



Low Flow Frequency (e.g. Q5 = 5-year low flow)

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