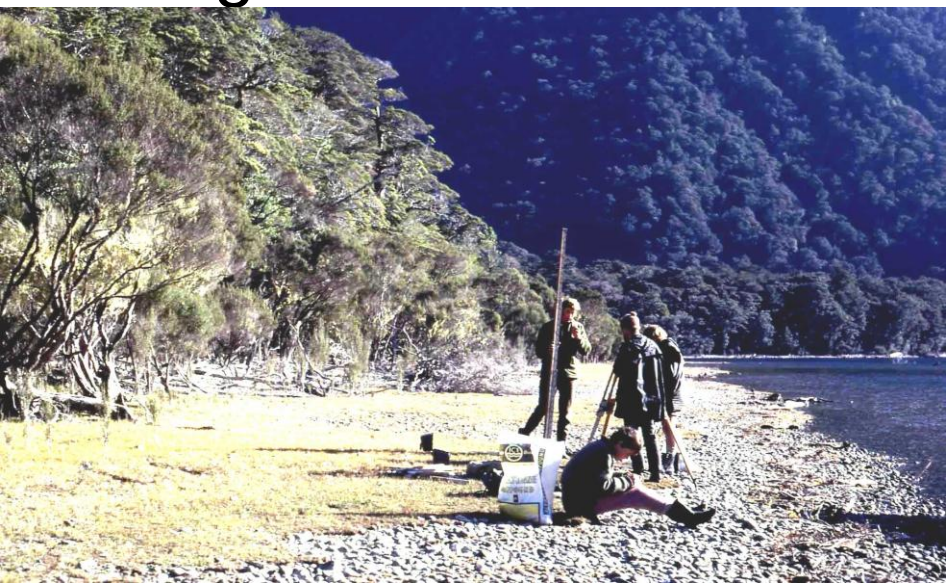
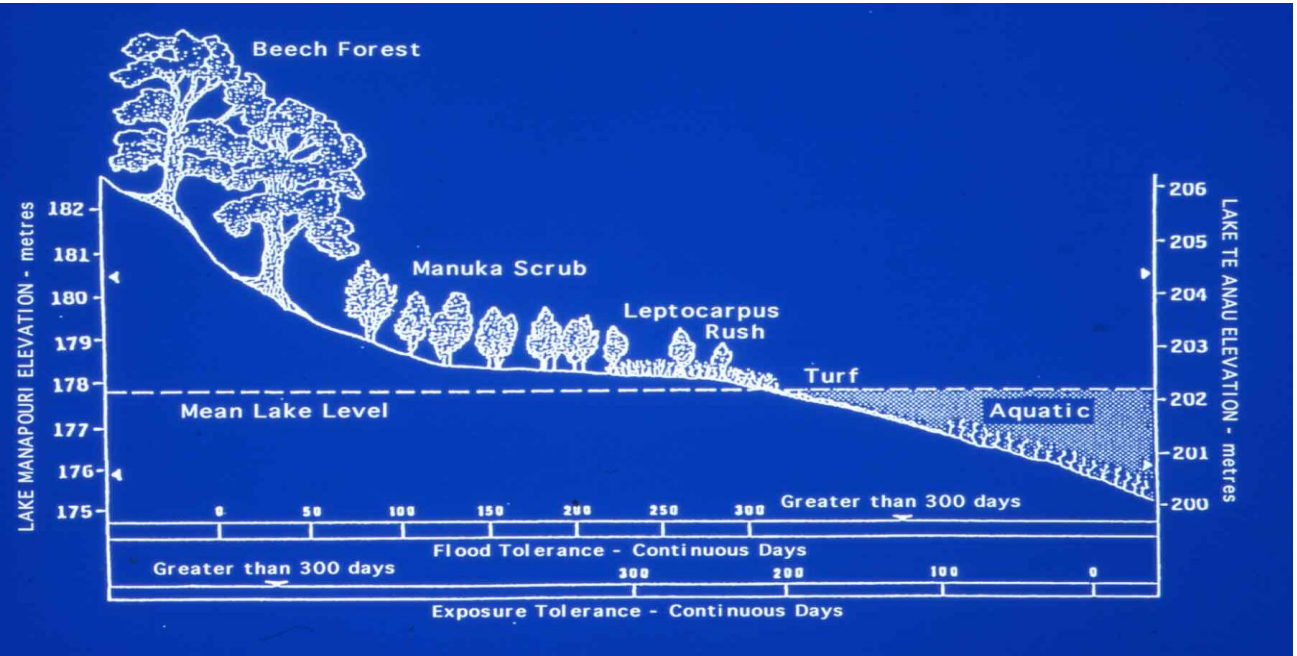
Application of the Manapouri-Te Anau lake-raising experience to Lake Sumner

Alan F. Mark FRSNZ. KNZM.
Emeritus Professor,
Department of Botany,
University of Otago.

Surveying transects and setting tolerance limits for vegetation zones: Lakes Manapouri and Te Anau.



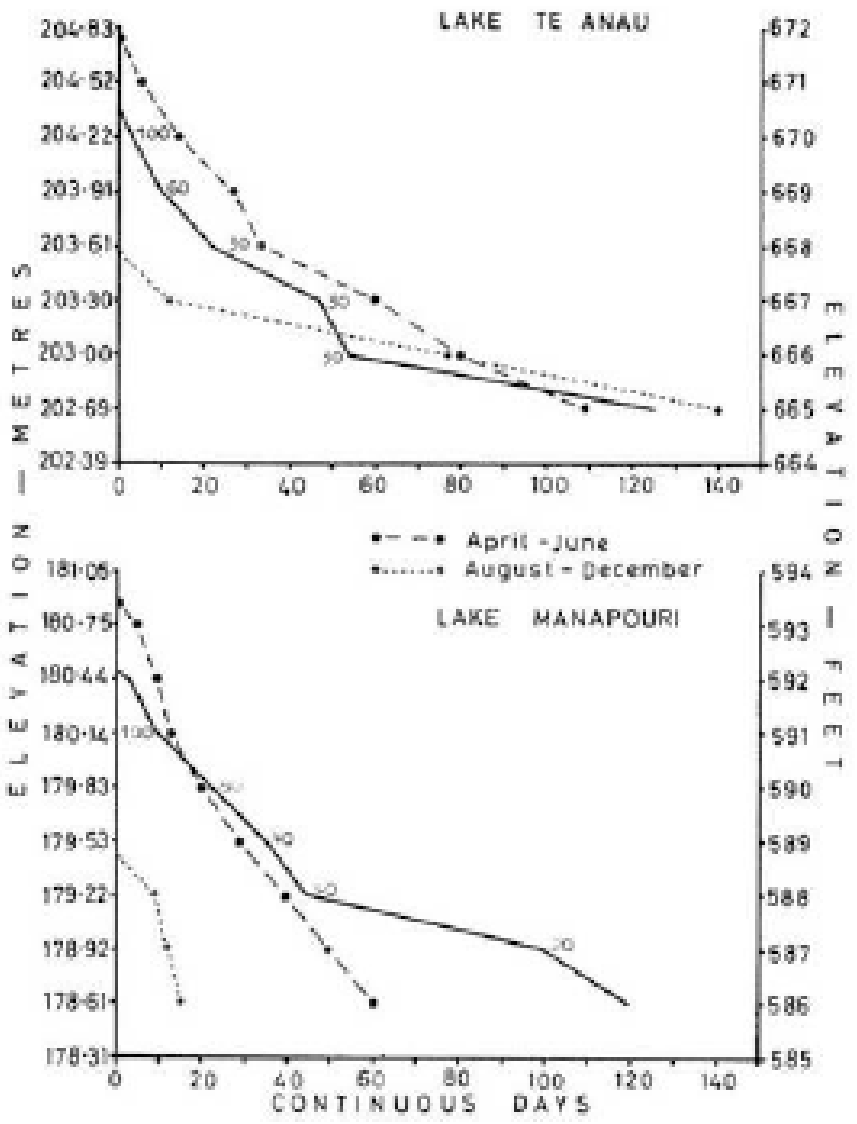


Mark AF, Johnson PN. 1985. Ecologically derived guidelines for managing two New Zealand lakes. *Environ. Mgmt* 9: 155-7.

Mark AF, Turner KS, West CJ. 2001. Integrating nature conservation with hydro-electric development: Conflict resolution with Lakes Manapouri and Te Anau, Fiordland National Park, New Zealand. *Lake & Reserv. Mgmt* 17: 1-16.

Results of Guideline Excession: Tree mortality, Delta Burn, Lake Te Anau. 1975.

Analysis of plant mortality: Lake Te Anau. 1975.



Trees	Species	No.	Mean elev (m)
Dead:	*N. menziesii*	51	203.50
	N. sol. v. cliff.	34	203.49
	Wein. race.	13	203.55
Live:	N. menziesii	38	303.59
	N. sol. V. cliff.	29	203.62
	Wein. race.	7	203.75

Lake Manapouri:

No mortality.

Ref: Mark AF, Johnson PN, Wilson JB. 1977. Factors involved in the recent mortality of plants from forest and scrub along the Lake Te Anau shoreline, Fiordland. Proc. N. Z. Ecol. Soc. 24: 34-42.

Recognition of the achievement

A World First

When a hydro power scheme to supply the Bluff Aluminium Smelter was proposed in the 1950s - one which required the raising of two lakes in Fiordland National Park - the public was outraged.

Eventually a compromise was reached. The Power Scheme would go ahead. But Lakes Manapouri and Te Anau would be operated *within their natural levels*. This was a world first for hydro schemes.

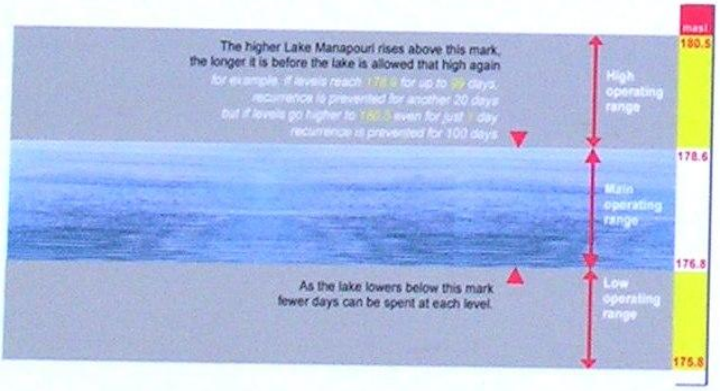
A Government appointed body "The Guardians of Lakes Manapouri, Monowai and Te Anau" ensures that the lakes are managed within their natural levels.

A complex set of guidelines determines how long a lake can be held at a certain level.

If it is *too high* for too long shoreline vegetation may 'drown'.

If it is *too low* for too long beaches are prone to sand and gravel loss and slumping.

The *rate* at which the lake level is lowered is also controlled, but weather determines how fast it rises.

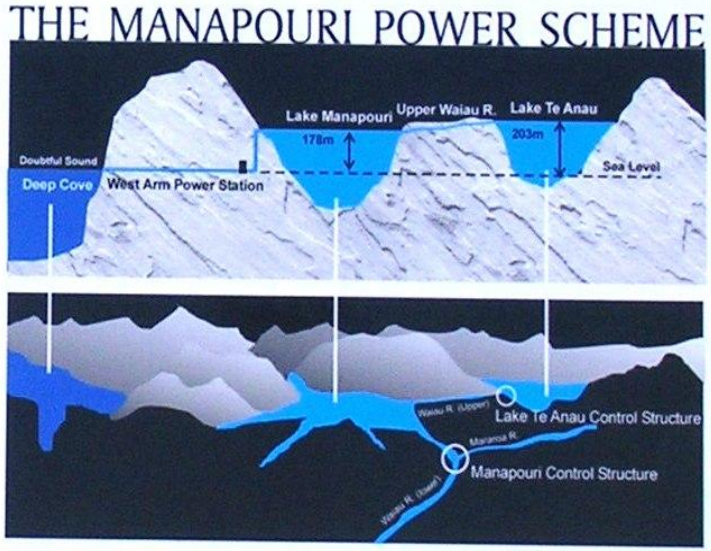


Lake Manapouri is the final collecting area for the combined waters of Lake Te Anau and the Waiau River catchment. The Mararoa River has also been diverted into the lake.

Water then drops 178 metres down penstocks to West Arm Power Station deep in the heart of a mountain where it turns the turbines to generate electricity before being discharged into Doubtful Sound.

Year-round rainfall makes these catchments ideal for hydro power generation. Storms can refill the lake within three days.

When Manapouri rises into its High Operating Range, water is released into the lower Waiau River. If floods discolour the water of the Mararoa River, it too is released down the Waiau River.



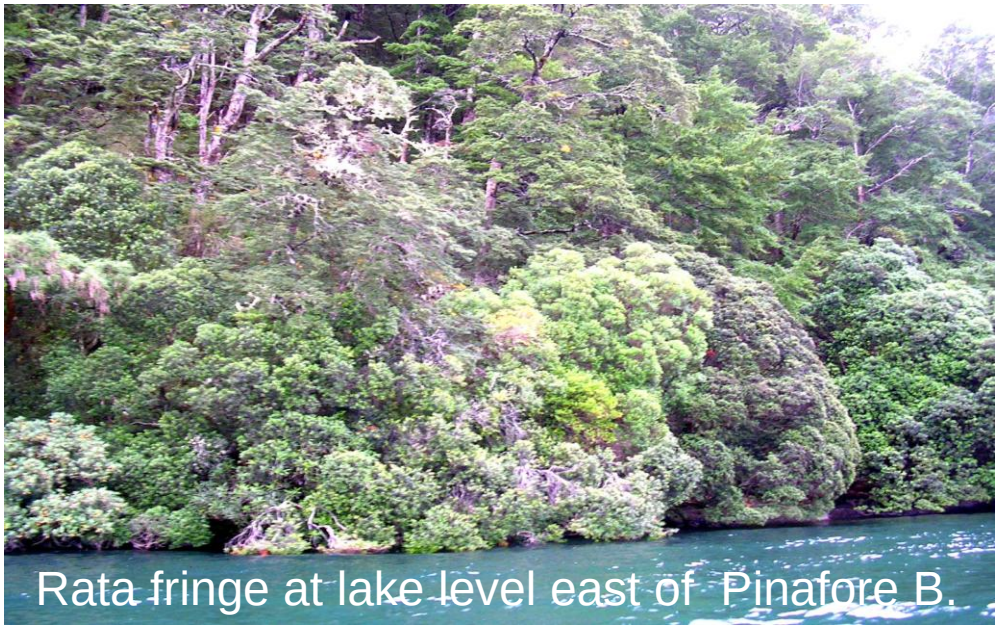
Lake Sumner, Loch Katrine and environs

2. Swell Bay
3. Breaksea Bay
5. Charleys Point
6. Pinafore Bay
7. Marion Bay
8, 9. Loch Katrine
D. Datum

Lake Sumner shoreline study: April 17, 2010.

Note, plants <1.4 m above this level would be inundated at the "Hold" or Run height of 2.896m or 1.4m above the level shown.

View east from Pinafore Bay. Rata fringe



Rata fringe at lake level east of Pinafore B.

View west from Breaksea Bay.

Kamahi & rata trees on forest fringe.

Rata canopies to the water line east of Pinafore Bay

Lake Sumner. North shoreline. 16/4/10.

Rata canopies to water line.
East of Pinafore Bay.

Rata canopies to the water line.
East of Pinafore Bay.

Kowhai tree on forest margin (left).

Coprosma propinqua shrubs on lakeedge

Lake Sumner: Storm beach & outlet

Storm beach.

Breaksea Bay

The outlet: Mountain beech forest and mixed shrubland

Lake Sumner. Sth shoreline & L. Katrine.


Mtn beech/Kowhai/*Coprosma propinqua*


Hall's totara-Mtn beech/*Cop. propinqua*


Mtn beech/*Coprosma propinqua* fringe


Loch Katrine. Manuka- *Cop. propinqua* fringe