WATER & SOIL MISCELLANEOUS PUBLICATION NUMBER 81

Inventory of New Zealand Lakes

PART II: SOUTH ISLAND

National Water and Soil Conservation Authority

ISSN 0110-4705

WATER & SOIL MISCELLANEOUS PUBLICATIONS

4.	Synthetic detergents working party report. ($1)	1978
5.	Water quality control committee report. ($1)	1978
8.	Water rights for the Clyde Dam, Clutha hydro power development. ($1.50)	1979
12.	Catchment register for New Zealand, Volume 1. ($8)	1981
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86.	The law relating to watercourses. ($20)	1986
87.	A macroinvertebrate community index of water quality for stony streams. ($8)	1985
88.	Index to hydrological recording sites in NZ 1985. ($10)	1985

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INVENTORY OF NEW ZEALAND LAKES
PART II SOUTH ISLAND

Compiled by

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WELLINGTON 1986

Inventory of New Zealand Lakes. Part II South Island.

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Water & Soil Miscellaneous Publication No. 81, 193p., ISSN 0110-4705.

This inventory provides referenced information on lake and catchment characteristics, water chemistry and biology for 165 New Zealand lakes. Data are taken from published and unpublished material available from scientific journals, Government departments, universities and regional water boards. Chemical and biological information presented relates primarily to trophic status since the inventory originated in response to concern over eutrophication. The inventory is in two parts: Part I for North Island Lakes, Part II for South Island Lakes.

National Library of New Zealand
Cataloguing-in-Publication data

LIVINGSTON, Mary Elizabeth, 1953-
Inventory of New Zealand lakes.
Part II. South Island / compiled
by M.E. Livingston, B.J. Biggs,
J.S. Gifford. - Wellington, N.Z. :
Water and Soil Directorate,
Ministry of Works and Development
for the National Water and Soil
Conservation Authority, 1986. -
1 v. - (Water & soil miscellaneous
publication, 0110-4705 ; no. 81)
551.4820993149
1. Lakes--New Zealand--South Island.
2. Water quality--New Zealand--South
Island. 3. Freshwater invertebrates--
New Zealand--South Island. I. Biggs,
B. J. (Barry John), 1955-
II. Gifford, J. S. III. New Zealand.
Water and Soil Directorate. IV. National
Water and Soil Conservation Authority
(N.Z.). V. Title. VI. Series.

COVER: Lake Christabel. D.E. Harding, photo.

Published for the National Water and Soil Conservation Authority
by the Water and Soil Directorate, Ministry of Works and Development,
P.O. Box 12041, Wellington North, New Zealand.

Contents

Information Sheets—South Island Lakes

Foreword

This inventory has resulted from the combined efforts of several Ministry of Works and Development scientists, PEP scheme workers and vacation students and it provides the most comprehensive compilation of scientific data on New Zealand lakes currently available. It was initiated in 1978 when the Officials Committee on Eutrophication identified the need to gain a national perspective on New Zealand lake conditions. It has since expanded to include land resource inventory data, a comprehensive bibliography and fuller referencing of the chemical and biological data.

As with any compilation of data from multiple sources, the inventory has provided its compilers with many headaches. In retrospect, its design could still have been improved upon, and yet more information unearthed. We are also aware that information on other lakes has recently become available. Further improvements and additions, however, will be part of the next edition or update.

It is hoped that the inventory will be useful in its present form. Comments, criticisms and additional information from users should be sent to the Research Director, Water and Soil Directorate, Ministry of Works and Development, P.O. Box 12 041, Wellington, so that they may be incorporated into the next edition.

Acknowledgements

The assistance of the following staff and temporary workers is gratefully acknowledged: Miss C. Strachan (MWD) for New Zealand Land Resource Inventory data retrieval; Ms S. Laws (PEP Scheme worker) for identifying lake and catchment boundaries; Hydrology Centre staff (MWD) for digitising lake and catchment boundaries; Mr W. Christie (MWD) for NZMS 260 series grid references; Mr B. Esler (vacation student), Mr P. Donovan and Mr D. Bannerman (PEP Scheme workers) for obtaining bibliographic information and extracting data from references onto data sheets; Mrs R. D. Smith (MWD) for draughting the maps; Mrs A. McDonald (MWD) for typing the final information sheets; and Mr D. Harding (MWD) for reference retrieval and editing.

Introduction

1 Aims and Scope

This inventory was begun in 1978 with the aim of compiling information on New Zealand lakes, especially that relevant to eutrophication and nuisance aquatic macrophyte growth. The inventory aimed to include water chemistry and biological information for as many lakes as had been studied. It was hoped that the information would be useful in gaining a national perspective on eutrophication and macrophyte problems, and would assist in regional water quality management.

The information sought focussed on properties necessary to define the severity of lake problems as set out in the "penalty points" system proposed by Dr E. White (Department of Scientific and Industrial Research) in his report "A multiple use classification for New Zealand's lakes" for the Officials Committee on Eutrophication, 1976. In addition to a search of published and unpublished material, regional water boards were circularised for any survey data or local information about lakes in their district.

Since 1978, the scope of the inventory has increased. In 1981, lake and catchment boundaries were digitised and catchment data in the form of land cover, slope and erosion from the NZ Land Resource Inventory (NZLRI) have been added to the inventory. In 1983, an overview of the lake inventory was presented at a workshop of the New Zealand Limnological Society annual meeting. Workshop participants urged that for the inventory to be of maximum use to both water resource managers and data users, the information should be more fully referenced giving details of sampling strategies and quality assurance. It was also requested that a full bibliography of each lake be given. These recommendations have been incorporated.

The scope of the inventory has therefore widened, and the lake, catchment and bibliographic information recorded is considered to have wider and more potential uses than originally planned. The amount of data presented is a direct function of the amount of work that has been reported on each lake, and varies considerably between lakes. The bibliography for each lake aims to be comprehensive although undoubtedly some references will have been missed. Where possible, references were checked to derive more detail on sampling strategies as requested. However, inventory users should check original papers and reports before citing data.

2 Lakes Included in the Inventory

The lakes included in the inventory are listed at the beginning of the North Island and South Island sections of the information sheets. There are 81 lakes included for the North Island and 84 lakes for the South Island. The criterion for inclusion was the existence of chemical or biological information for a particular lake. It is anticipated that the inventory will be updated from time to time, possibly as part of a computer data base.

3 Retrieval of Information

(See summary in Figure 1)

Literature searches initially carried out on FRESH and SIRIS databases (DSIR) were extended by using reference lists in published material. This often led to unpublished material. Government departments and other agencies were approached for unpublished reports and data, and copies of papers and reports were acquired where possible. It is believed that the bibliography covers about 95% of relevant work carried out before 1982 in New Zealand. About 80% of the reports and publications were sighted.

The required information was transferred from each paper to an individual data sheet. These were then collated for each lake and used as the base for the inventory information sheets.

To extract catchment information for each lake from NZLRI, lake catchments had to be defined. Lake catchment boundaries were first identified by highlighting in ink the full stream network on NZMS 1 series maps and then drawing catchment boundaries by inspection of altitude contours. The lake catchment boundaries were then retraced onto NZLRI worksheets, digitised and stored permanently in the NZLRI computerised database. From this, NZLRI information from those

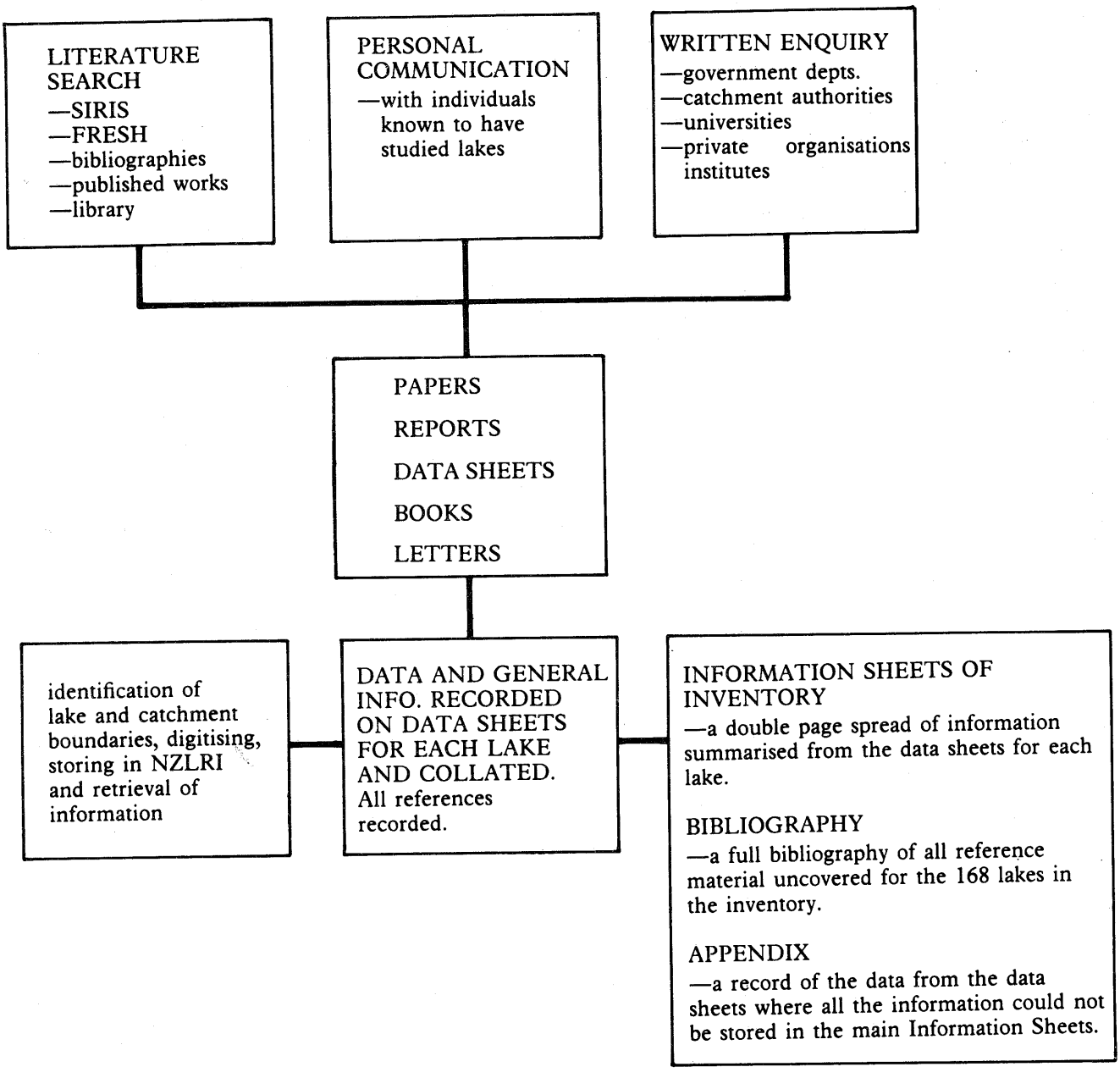


Fig. 1. Procedure followed in the preparation of the Inventory of New Zealand Lakes

worksheet units within each lake catchment was extracted. Categories under Dominant Slope, Dominant Erosion and Dominant Cover are those given in the NZLRI guideline bulletin *Our Land Resources* published by Water and Soil Division, MWD (1979), for NWASCA.

A discrepancy of up to 10% between lake areas given by Irwin (1975) and those held in NZLRI was evident and appeared to be a function of differences in technique. Therefore, the percentage lakes area in the NZLRI information boxes does not always match the Lake Area given above.

Further information on NZLRI, digitised boundaries for lakes not listed in this inventory, and data held on LADEDA, can be obtained from the Director of Water and Soil Conservation, MWD, P.O. Box 12 041, Wellington.

4 Guide to Inventory of New Zealand Lakes

4.1 Information Sheets

The data contained in each box on the information sheets were taken from the data sheets (described above) that were compiled for each lake. A description of the contents of each box is given below.

4.1.1 Lake Name and Location

Lake Name: Lake name as given by Irwin (1975) in alphabetical order for each island. Alternative names for the lake are listed under "General Remarks".

Location Map: Approximate location of the lake in the North or South Island and approximate shoreline of the lake. Scale for the shoreline map can be obtained from the Long Axis data.

4.1.2 Lake and Catchment Characteristics

District: Territorial province that the lake lies within.

Water Board: Regional water board responsible for administering the lake's waters.

Map Ref. (NZMS1): Inch-to-mile series published by Department of Lands and Survey. Grid reference is for the approximate centre of the lake.

Map Ref. (260 Ser): Metric series currently undergoing publication by the Department of Lands and Survey to supersede the NZMS1 series.

Lake Type: Categories describing the mode of formation of the lake taken from Irwin (1975) with slight modification of the lake type terminology:

Beach: lagoon lake formed by beach gravels (Irwin, type B)

Dune: lake formed in sand dunes (Irwin, types B and W)

Riverine: lakes in river valleys, e.g., subsidence, ox-bow lakes (Irwin, types R and S)

Landslide/landslip: lakes created by landslides or slips (Irwin, type L)

Reservoir: man-made impoundments (Irwin, type D)

Volcanic: crater lakes or lakes resulting from volcanic activity (Irwin, type V)

Glacial: formed by glacial action (Irwin, type G)

Tectonic: formed by tectonic activity (Irwin, type T)

Level Changes: Given as m a.s.l. Indicates fluctuations in lake surface level, e.g., hydro-regulated reservoirs.

Altitude: As given by Irwin (1975)

Long Axis: Length and direction of major axis, after Irwin (1975) who defines maximum length as ". . . the length of a line connecting the two remotest extremities of the lake. This line may be straight or curved and is generally along the lake's major axis."

Mean Depth: Source reference number in brackets.

Max Depth: Source reference number in brackets.

Lake Area: As given by Irwin (1975) who measured lake area (with a planimeter) from NZMS18 (1:250,000). Islands are included in the lake area.

Catchment Area: Area of the lake and catchment as recorded in the NZLRI. Catchment area refers to the surface area within the watershed as defined using land surface height contours.

Catchment No. (MWD): As given in the numerical list *Catchments of New Zealand* issued by Soil Conservation and Rivers Control Council 1956, published by Government Printer.

Data Base Code (MAF): The number and lake code as held in the Aquatic Plants Section Database System, available from Aquatic Plant Section, Ruakura Soil and Plant Research Station, Ministry of Agriculture and Fisheries, Private Bag, Hamilton.

4.1.3 New Zealand Land Resource Inventory Data

Dominant Cover (% Catch. Area): Includes 9 vegetation types and 5 other land cover categories. The percentages given indicate the proportion of the catchment under a particular cover type. Totals should approximate 100%. Cover type is determined in the NZLRI by the dominant vegetation (or other cover) in a given map unit. This normally implies that this particular cover exceeds 40% of the total area of the map unit.

Dominant Slope (% Catch. Area): Includes 7 slope categories and 1 category for lakes. The percentages given indicate the proportion of the catchment that is under a particular slope type. Totals approximate 100% after addition of percent areas for rivers, ice and snow, urban and other listed under Dominant Cover. Slope type is determined for any NZLRI map unit by the dominant slope in that unit.

Dominant Erosion (% Catch. Area): Includes 15 erosion categories and 1 category for lakes. In addition the severity of the erosion is indicated (1 = slight, 2 = moderate, 3 = severe, 4 = very severe, 5 = extreme). The percentages given indicate the proportion of the catchment under a particular erosion type of specified severity. Totals approximate 100% after addition of percentage areas for rivers, ice and snow, urban and other listed under Dominant Cover. Erosion type is determined for any NZLR1 map unit by the dominant erosion form in that unit.

(NOTE: 'n.d' alongside 'lakes' category indicates that the lake area has not been separated from the land catchment area. This usually applies to lakes with areas of less than 0.5 km^2.)

4.1.4 General Remarks

This usually provides an indication of the direction of the nearest geographical feature (e.g., township, mountain, coastline). Other information may include: recreational and commercial activities associated with the lake; mean monthly discharges from the lake; sewage; geothermal or waste inputs to the lake; and other miscellaneous information.

4.1.5 Information Sources

This includes all references (published and unpublished) and personal communications for that particular lake. In a few cases, the listing is continued in the Appendix due to lack of space on the information sheets.

No: Refers to the assigned number in the Bibliography. An asterisk indicates that raw data from this reference is given in the Appendix as well as on the information sheets.

Date: Date of publication or of personal communication.

Author(s): First and second author of publication. In cases where there are more than two authors, a full listing is provided in the Bibliography.

Object of Work Reported: A brief statement of the main purpose of the paper. Where possible, dates of data collection periods are indicated.

4.1.6 Lake Water Chemistry and Biology

The data presented on this page are a summary of information derived from available sources. In most cases only one or two sources of information (if any) could be found for each category. For the few lakes that have been studied extensively, raw data from the major studies (asterisked in Information Source box) have been summarised in the Appendix.

Hypolimnion Dissolved Oxygen: Given to provide an indication of the degree of oxygen depletion in the bottom waters of the lake. Data are the deepest oxygen measurements made for the lake waters. *Min* and *max* refer to the lowest and highest values found within all the data available for that lake. *t°C* is the bottom water temperature of the lake at the time of oxygen measurement. *Mean* values are taken from the most extensive study and are not an amalgamation of all studies. *Period of lowest oxygen* is given when stated by the author(s) referenced.

Secchi Disc Depth: Given to provide an indication of water clarity. Definitions of *max*, *min*, and *mean* are the same as for dissolved oxygen above. *Period of worst clarity* is given. *Causes* refers to the causes of low water clarity as proposed by the author(s) referenced.

pH Readings: Given to indicate the pH range of the lake water. Definition of *max* and *min* values are the same as for dissolved oxygen above.

Trophic Status: As given by the referenced author(s). The organisms or determinations from which they derived trophic status are given.

Biological Information Available: A list of the references that include information on fauna and flora. Citation does not imply that the information is extensive or in a quantitative form.

Temperature: Given to indicate the temperature range of the lake waters. The definitions of *min* and *max* values are the same as for dissolved oxygen above. Dates are given in brackets when stated by the authors. *Max difference top to bottom* is the maximum temperature difference observed (date given). *Stratification* indicates the existence, depth and period of stratification.

Chlorophyll a, Phytoplankton: Given to provide an indication of productivity and algal growth. The definition of *min, max*, and *mean* values are the same as for dissolved oxygen above. *Period of blooms* indicates the season of maximum algal growth and the presence of nuisance algae. *Algae* lists taxa that have been recorded as dominants in the lake.

Dominant or Problem Growth Macrophytes: The most common emergent and submergent species are listed. An asterisk marks species reported as a nuisance growth.

Other Water Quality Information Available: Indicates which references contain information on parameters other than dissolved oxygen, secchi disc depth, pH, chlorophyll a. The categories are defined as follows:

Nutrients : nitrogen and phosphorous compounds.

Major ions : sodium, potassium, magnesium, calcium, sulphate, chloride.

Trace elements : copper, zinc, other elements and toxic inorganic materials.

Organic matter : humic/fulvic substances, detritus, etc.

Toxic organics : pesticides, polychlorinated biphenols, etc.

Pigments : pigments other than chlorophyll a.

Optical properties : colour, turbidity, clarity.

Particulate materials : suspended solids, seston, conductivity, redox potential.

Redox : oxygen absorption, biochemical oxygen demand, Eh.

Salinity : salinity, total dissolved solids, electrical conductivity.

Alkalinity : bicarbonate alkalinity, carbonate, carbon dioxide.

Hardness : calcium magnesium hardness.

Silica : silica forms.

Abbreviations: n.d = presence of information in reference not determined by authors of inventory.
n.s = information not specified in reference material examined.

4.2 Appendix

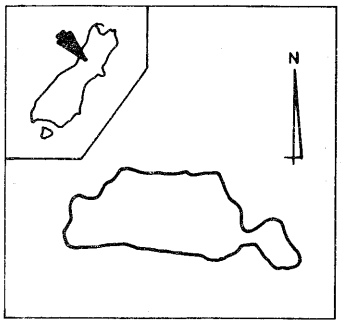
This contains a continuation of reference material where space was insufficient on the main information sheets, and summary of raw data, for certain lakes as indicated by an asterisk on the information sheets. Summaries are given in alphabetical order by lake name.

4.3 Bibliography

This contains 611 references in alphabetical order of author for the whole inventory.

LAKE AHAURA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Amuri	ALTITUDE (m a.s.l.)	243-274
WATER BOARD	Westland	LONG AXIS (km)	2.7 (WNW)
MAP REF (NZMS1)	S52 208709	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K32 059454	MAX DEPTH (m)	33 (351)
LAKE TYPE	-	LAKE AREA (km²)	1.80
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	13.15
MAIN OUTFLOW	creek to Haupiri River	CATCHMENT No. (MWD)	914195
LEVEL CHANGES	-	DATA BASE CODE (MAF)	482 AHAURA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	14.2	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	28.9	-	-	-	-
cropland	-	lakes	14.8	rolling (8–15°)	37.3	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	33.6	soil slip	21.6	-	-	-	-
native forest	85.2	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	14.8	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	34.7				
						lakes	14.8				

GENERAL REMARKS

- WNW of Haupiri township (351)
- in Hochstetter State Forest (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
302	1975b	Hughes	Review of information.
351	1975a	Irwin	Checklist of NZ lakes.
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characterisation of beech forest lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE AHAURA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 3.5 g m^{-3}	t°C 13	date March 1976		486
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single visit, profile graph at 1 site (486).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 23 (3/76)	(surface) 13 (3/76)	(bottom)	486
max difference top to bottom 10°C			486
stratification stratified, thermocline at 20 m			486
Remarks: Single visit, 1 site (486).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 2.9	n 1	period 3/76	486
period of worst clarity -			
causes organic matter			486
Remarks: Water heavily stained with dissolved organic matter, mainly allocthonous (486).			

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min -	date -	
max -	date -	
mean 0.68 mg m^{-3} n 3	date 3/76	486
period of blooms -		
algae *Eudorina, Cryptomonas, Gymnodinium*		
Remarks: Ultraplankton about 24% of total plankton (486).		

pH READINGS		REFS
min	date	
max	date	
Remarks: Near neutral (486).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters other than pH	486
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	486
phytoplankton (algae)	486
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Greater bacterial biomass than algal biomass (486).	

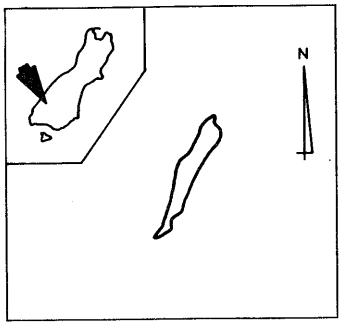
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	486	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	486	other ATP	486
Remarks: Reactive phosphorus very low (486).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ALABASTER

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	20
WATER BOARD	Otago	LONG AXIS (km)	6.0 (NE)
MAP REF (NZMS1)	S113 090305	MEAN DEPTH (m)	-
MAP REF (260 ser.)	D39 249205	MAX DEPTH (m)	-
LAKE TYPE	riverine	LAKE AREA (km^2)	4.17
MAIN INFLOW	Pyke River	CATCHMENT AREA (km^2) (land and lake)	466.30
MAIN OUTFLOW	Pyke River to Hollyford River	CATCHMENT No. (MWD)	851050
LEVEL CHANGES	-	DATA BASE CODE (MAF)	680 ALABASTR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	32.7
cropland	-	lakes	1.8
lowland scrub	2.5	rivers	-
subalpine scrub	11.1	ice and snow	-
native forest	51.0	urban	-
exotic forest	-	other	1.0

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	6.2
undulating (4–7°)	1.4
rolling (8–15°)	0.5
strongly rolling (16–20°)	0.8
moderately steep (21–25°)	6.1
steep (26–35°)	55.9
very steep (>35°)	26.3
lakes	1.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	23.6	1.4	1.7	-	-
wind	-	-	-	-	-
scree creep	6.1	21.5	9.4	3.6	-
soil slip	18.9	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	0.3	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	6.9	-	-	-	-
deposition	-	0.4	-	-	-
negligible	3.5				
lakes	1.8				

GENERAL REMARKS

- SW of Lake McKerrow (351)
- in Mt Aspiring National Park
- used for camping, fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
-	1981	Irwin NZOI pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ALABASTER

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 3.2	date n.s.		Irwin p.c.
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: -			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	date		
max	date		
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	
phytoplankton (algae)	
macrophytes	
zooplankton	
macroinvertebrates	
fish	
wildlife	
Remarks: None found.	

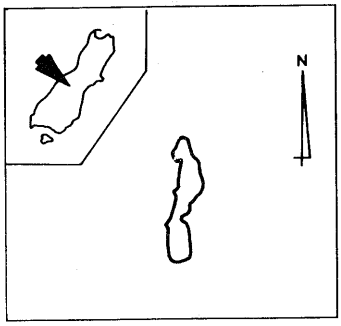
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ALEXANDRINA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mackenzie	ALTITUDE (m a.s.l.)	732-763
WATER BOARD	Waitaki	LONG AXIS (km)	6.9 (N)
MAP REF (NZMS1)	S89 075044	MEAN DEPTH (m)	13.4 (Irwin p.c.)
MAP REF (260 ser.)	I37 051913	MAX DEPTH (m)	30 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	5.80
MAIN INFLOW	4 streams on W side, 2 on N side	CATCHMENT AREA (km²) (land and lake)	37.41
MAIN OUTFLOW	to Lake McGregor	CATCHMENT No. (MWD)	711394
LEVEL CHANGES	-	DATA BASE CODE (MAF)	619 ALEXNDRN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	64.3	flat (0–3°)	7.0
sand dune	-	tussock	18.0	undulating (4–7°)	14.0
cropland	-	lakes	17.7	rolling (8–15°)	59.4
lowland scrub	-	rivers	-	strongly rolling (16–20°)	2.0
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	-	urban	-	steep (26–35°)	-
exotic forest	-	other	-	very steep (>35°)	-
				lakes	17.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	3.4	74.4	0.4	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	4.2				
lakes	17.7				

GENERAL REMARKS

- NNW of Mt John (351)
- one small island (351)
- used for fishing, boating, swimming
- 2 settlements, huts mainly (559)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
495	1960	Percival	Investigation report.
559	1981	Stout	General article on water quality.
580	1984	Vant & Davies-Colley	Water clarity (1983).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ALEXANDRINA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min - t°C - date -	
max - t°C - date -	
mean - n - period -	
period of lowest oxygen does not normally occur	559
Remarks: No data found.	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max - (surface) - (bottom)	
max difference top to bottom -	
stratification usually well mixed	559
Remarks: No data found.	

SECCHI DISC DEPTH (m)	REFS
min - date -	
max - date -	
mean 6.0 n 1 period March 1983	580
period of worst clarity -	
causes -	
Remarks: Single visit (580).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min date	
max date	
mean n date	
period of blooms *Anabaena*, January 1980	559
algae *Anabaena, Volvox, Oocystis, Melosira*	196,559
Remarks:	

pH READINGS	REFS
min date	
max date	
Remarks: No data found.	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	n.s.	580
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,559
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	559
wildlife	-
Remarks: General comments about lake, catchment topdressing and development (559).	

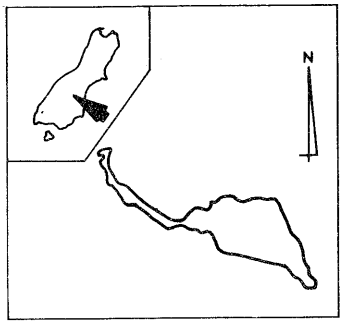
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	580
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE AVIEMORE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitaki/Waimate border	ALTITUDE (m a.s.l.)	271
WATER BOARD	Waitaki	LONG AXIS (km)	17.6 (NW)
MAP REF (NZMS1)	S117 960236	MEAN DEPTH (m)	-
MAP REF (260 ser.)	I40 959173	MAX DEPTH (m)	62 (196)
LAKE TYPE	reservoir	LAKE AREA (km^2)	24.80
MAIN INFLOW	Waitaki River	CATCHMENT AREA (km^2) (land and lake)	1141.83
MAIN OUTFLOW	Waitaki River	CATCHMENT No. (MWD)	711000
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	690 AVIEMORE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	6.6
sand dune	-	tussock	88.4
cropland	-	lakes	2.4
lowland scrub	0.8	rivers	-
subalpine scrub	1.5	ice and snow	-
native forest	-	urban	0.3
exotic forest	-	other	0.1

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	1.1
undulating (4–7°)	9.4
rolling (8–15°)	9.8
strongly rolling (16–20°)	12.6
moderately steep (21–25°)	10.5
steep (26–35°)	53.3
very steep (>35°)	0.6
lakes	2.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	1.6	17.1	10.0	0.1	-
wind	5.0	20.5	4.3	1.5	-
scree creep	0.3	9.0	17.7	6.3	3.9
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	2.4				

GENERAL REMARKS

- ESE of Otemata township (351)
- downstream from Lake Benmore (351)
- man-made HEP dam (351)
- used for boating, swimming, fishing
- monthly mean discharge 300 m^3 sec^{-1}

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-	ongoing	Chemistry Division	Water analyses.
195	1970	Flint	Phytoplankton.
196	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status.
351	1975a	Irwin	Checklist of NZ lakes.
553	1975b	Stout	General description of water quality.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE AVIEMORE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 0 g m^{-3} t°C - date n.d.	196
max - t°C - date -	
mean - n - period -	
period of lowest oxygen n.d.	
Remarks:	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 13.3 (4/70) (surface) - (bottom)	282
max difference top to bottom -	
stratification -	
Remarks: Single reading (282).	

SECCHI DISC DEPTH (m)	REFS
min - date -	
max - date -	
mean 1.0 n 1 period April 1970	282
period of worst clarity -	
causes glacial till	196
Remarks:	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms -	
algae *Melosira, Asterionella, Mougeotia*	195,196
Remarks: No data found.	

pH READINGS	REFS
min date	
max date	
Remarks: No data found.	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Potamogeton cheesemanii	282
		Ranunculus fluitans	282
		Myriophyllum	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	195,196,282
macrophytes	282
zooplankton	282
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

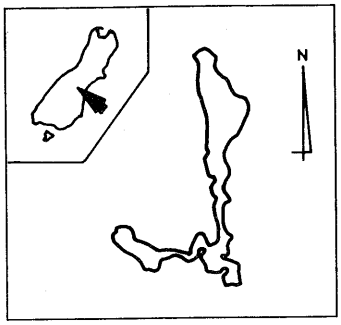
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE BENMORE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitaki/Waimate border	ALTITUDE (m a.s.l.)	360
WATER BOARD	Waitaki	LONG AXIS (km)	26.1 (N)
MAP REF (NZMS1)	S109 888501	MEAN DEPTH (m)	-
MAP REF (260 ser.)	H39 889414	MAX DEPTH (m)	120 (196)
LAKE TYPE	reservoir	LAKE AREA (km^2)	68.6
MAIN INFLOW	see general remarks	CATCHMENT AREA (km^2) (land and lake)	4466.04
MAIN OUTFLOW	Waitaki River	CATCHMENT No. (MWD)	711000
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	670 BENMORE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	22.7
sand dune	-	tussock	70.4
cropland	0.2	lakes	1.7
lowland scrub	0.6	rivers	1.1
subalpine scrub	2.2	ice and snow	0.4
native forest	0.5	urban	-
exotic forest	-	other	0.3

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	24.1
undulating (4–7°)	12.6
rolling (8–15°)	7.7
strongly rolling (16–20°)	5.0
moderately steep (21–25°)	9.9
steep (26–35°)	36.1
very steep (>35°)	1.4
lakes	1.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	8.1	16.0	5.2	1.2	-
wind	16.3	21.4	4.4	0.5	-
scree creep	0.1	5.8	6.2	5.0	2.7
soil slip	-	0.3	0.1	-	-
earth slip	-	-	-	-	-
slump	-	+	0.1	-	-
debris avalanche	0.1	0.1	+	0.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	0.4	0.2	+	+
tunnel gully	-	-	-	-	-
streambank	0.4	-	-	-	-
deposition	+	-	-	-	-
negligible	2.1				
lakes	1.7				

GENERAL REMARKS

- N of Otematata township (351)
- man-made HEP dam (351)
- 6 islands (351)
- inflow of Ohau, Twizel, Pukaki, Tekapo, Ahuriri Rivers (351)
- used for boating, fishing, swimming
- monthly mean discharge 327 m^3 sec^{-1}
- NZLRI + sign means <0.1

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status (1970).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
553	1975b	Stout	General description of water quality.
557	1978	Stout	Silt loading (1975-78).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE BENMORE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification deep stratification Oct-April			557
Remarks: No data found.			

SECCHI DISC DEPTH (m)				REFS
min 0.9	date April 1970			282
max 5.2	date n.d.			Irwin p.c.
mean 4.0	n -	period n.d.		Irwin p.c.
period of worst clarity late spring				557
causes glacial till, silt				557
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Diatoma, Melosira, Asterionella*			282,196
Remarks: Dominant species are green algae (557).			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	282	*Potamogeton cheesemanii*	282
		Ranunculus fluitans	282
		Elodea canadensis	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,282,553,557
macrophytes	282
zooplankton	557
macroinvertebrates	282
fish	-
wildlife	-
Remarks:	

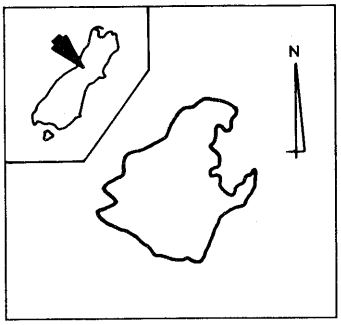
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	282	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	282
optical properties	-	other	-
Remarks: See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE BRUNNER

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	86
WATER BOARD	Westland	LONG AXIS (km)	9.4 (NNE)
MAP REF (NZMS1)	S51 946668	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K32	MAX DEPTH (m)	109 (351)
LAKE TYPE	glacial/tectonic	LAKE AREA (km²)	36.10
MAIN INFLOW	2 main streams	CATCHMENT AREA (km²) (land and lake)	379.27
MAIN OUTFLOW	Arnold River	CATCHMENT No. (MWD)	914067
LEVEL CHANGES	84.9-87.0 m a.s.l.	DATA BASE CODE (MAF)	489 BRUNNER

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	4.0	pasture	13.8
sand dune	-	tussock	9.8
cropland	-	lakes	10.6
lowland scrub	3.6	rivers	0.6
subalpine scrub	13.0	ice and snow	-
native forest	44.6	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	13.6
undulating (4–7°)	7.4
rolling (8–15°)	7.4
strongly rolling (16–20°)	3.1
moderately steep (21–25°)	9.4
steep (26–35°)	34.5
very steep (>35°)	13.6
lakes	10.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	12.3	-	-	-	-
wind	-	-	-	-	-
scree creep	-	1.7	0.6	5.0	-
soil slip	2.3	4.4	2.1	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	14.5	11.2	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	2.4	5.1	-	-	-
tunnel gully	-	-	-	-	-
streambank	5.4	-	-	-	-
deposition	-	-	-	-	-
negligible	21.9				
lakes	10.6				

GENERAL REMARKS

- E of Kumara (351)
- one island - Refuge Island (351)
- main inflow, eastern Hohonu River and Crooked River (351)
- used for HEP, fishing, swimming, camping, boating

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
209	1959b	FFAS	Fisheries investigation.
210	1961	FFAS	Fisheries investigation - trout and food supply (1961).
212	1963b	FFAS	Fisheries investigation.
302	1975b	Hughes	Review of information.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
484	1977a	Paerl	Ultraplankton and productivity (1975-76).
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characterisation of beech forest lakes (1976).
553	1975b	Stout	General description of water quality.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE BRUNNER

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min -	t°C -	date -		
max 7.5 g m^{-3}	t°C 12	date March 1976		486
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single value, profile graph (486).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 17.8 (3/76)	(surface) 12 (3/76)	(bottom)	486
max difference top to bottom 5.5°C			486
stratification stratified, thermocline @ 25 m			486
Remarks: Single visit, profile graph (486).			

SECCHI DISC DEPTH (m)			REFS
min 3.5	date n.s.		Irwin p.c.
max 5.5	date March 1978		486
mean -	n -	period -	
period of worst clarity -			
causes highly stained with organic matter			886
Remarks: Visited once (486).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 3.6 mg m^{-3}	n 3	date 3/76	486
period of blooms -			
algae *Asterionella, Volvox, Synedra*			486
Remarks: Algal biomass greater than bacterial biomass (486).			

pH READINGS		REFS
min -	date -	
max -	date -	
Remarks: Near neutral (486).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea	210
Remarks: Little macrophyte growth (486).			

TROPHIC STATUS	BASIS	REFS
dystrophic?	organic matter	486
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,210,486
macrophytes	210
zooplankton	92
macroinvertebrates	210
fish	210
wildlife	-
Remarks:	

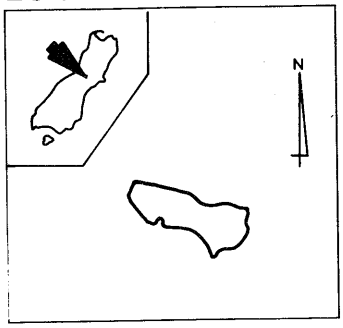
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	486	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	486	other ATP	486
Remarks: Reactive phosphorus very low (486).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE CAMP

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ashburton	ALTITUDE (m a.s.l.)	671-701
WATER BOARD	South Canterbury	LONG AXIS (km)	1.3 (WNW)
MAP REF (NZMS1)	S81 607464	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K36 530306	MAX DEPTH (m)	13 (ref 351)
LAKE TYPE	glacial	LAKE AREA (km^2)	0.49
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	3.41
MAIN OUTFLOW	Camp Gulley Creek to Lake Roundabout	CATCHMENT No. (MWD)	695111
LEVEL CHANGES	-	DATA BASE CODE (MAF)	584 CAMP 1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	59.2
sand dune	-	tussock	26.1
cropland	-	lakes	14.7
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	79.5
strongly rolling (16–20°)	-
moderately steep (21–25°)	-
steep (26–35°)	5.9
very steep (>35°)	-
lakes	14.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	65.1	-	-	-	-
wind	-	14.4	-	-	-
scree creep	-	-	5.9	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	14.7				

GENERAL REMARKS

- S of Lake Clearwater (351)
- also called Lake Howard (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout conditions (1969-70).
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
208	1959a	FFAS	Fisheries survey (1958).
351	1975a	Irwin	Checklist of NZ lakes.
544	1969a	Stout	Description of mountain lakes (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE CAMP

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 1.3 (n.s.) (surface) - (bottom)	544
max 18.8 (n.s.) (surface) 14.2 (12/58) (bottom)	544,208
max difference top to bottom n.d.	544
stratification not stratified	544
Remarks: Bi-monthly samples from 1 site, May 1967-July 1968 (544).	

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0.89 mg m^{-3} date n.s.	544
max 3.11 mg m^{-3} date n.s.	544
mean 15.9 mg m^{-3} n 5 date n.s.	51
period of blooms -	
algae *Anacystis, Crucigenia, Nephrocytium*	196
Remarks: 5 random samples, 2/69-3/70 (51). Algae cont.- *Cyclotella, Dinobryon* (196).	

pH READINGS		REFS
min 6.6	date n.s.	544
max 7.1	date n.s.	544
Remarks: Bi-monthly samples May 1967-July 1968 (544).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	51,196,544
macrophytes	-
zooplankton	544
macroinvertebrates	200
fish	51,208
wildlife	-
Remarks:	

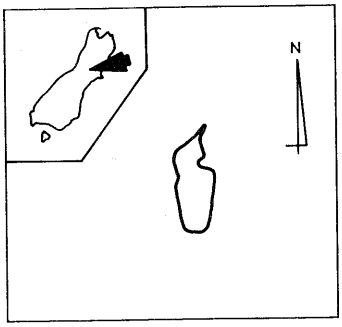
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,544	particulates	-
major ions	544	redox	51,544
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	544
pigments	-	silica	544
optical properties	-	other Pmax	51
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE CATHERINE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	700-731
WATER BOARD	North Canterbury	LONG AXIS (km)	0.9 (N)
MAP REF (NZMS1)	S66 053944	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K34 930752	MAX DEPTH (m)	4.9 (531)
LAKE TYPE	n.d.	LAKE AREA (km^2)	0.15
MAIN INFLOW	Catherine Stream	CATCHMENT AREA (km^2) (land and lake)	5.43
MAIN OUTFLOW	Ryton River	CATCHMENT No. (MWD)	685074
LEVEL CHANGES	-	DATA BASE CODE (MAF)	548 CATHERN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	93.4
cropland	-	lakes	3.5
lowland scrub	-	rivers	-
subalpine scrub	3.1	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	3.9
moderately steep (21–25°)	43.6
steep (26–35°)	45.9
very steep (>35°)	3.1
lakes	3.5

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	3.9	40.1	-	-	-
wind	-	3.5	-	-	-
scree creep	-	11.6	-	9.0	28.4
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	3.5				

GENERAL REMARKS

- SW if Craigieburn Forest (351)
- also called Lake Monk (351)
- crested grebe habitat (531)
- limited access (531)
- used for fishing (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing 1975a	Chemistry Division Irwin	Water analyses. Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE CATHERINE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 12° (2/76)	(surface) -	(bottom)	531
max difference top to bottom -			
stratification mixed			531
Remarks: Single visit (531).			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.54 mg m^{-3}	date February 1976		531
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Single sample only (531).			

pH READINGS		REFS
min -	date -	
max 9.0	date February 1976	531
Remarks: Single visit only (531).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biochemical assay	531
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	-
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

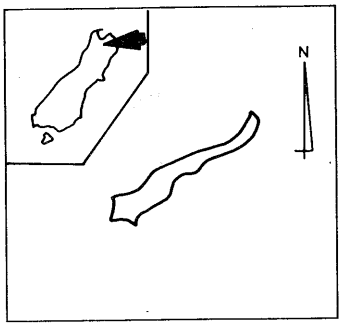
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	-
trace elements	531	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax	531
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE CHALICE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Marlborough	ALTITUDE (m a.s.l.)	750
WATER BOARD	Marlborough	LONG AXIS (km)	2.3 (NE)
MAP REF (NZMS1)	S27 642929	MEAN DEPTH (m)	-
MAP REF (260 ser.)	028 358597	MAX DEPTH (m)	61 (441)
LAKE TYPE	landslip	LAKE AREA (km^2)	0.50
MAIN INFLOW	Chalice Stream	CATCHMENT AREA (km^2) (land and lake)	13.92
MAIN OUTFLOW	Goulter River (subterranean)	CATCHMENT No. (MWD)	601355
LEVEL CHANGES	natural fluctuation of several metres	DATA BASE CODE (MAF)	439 CHALICE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-74)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	-
sand dune	-	tussock	-	undulating (4–7°)	-
cropland	-	lakes	3.4	rolling (8–15°)	-
lowland scrub	43.1	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	1.4	ice and snow	-	moderately steep (21–25°)	-
native forest	52.1	urban	-	steep (26–35°)	87.8
exotic forest	-	other	-	very steep (>35°)	8.9
				lakes	3.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	1.7	41.5	25.4	25.9	1.4
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	3.4				

GENERAL REMARKS

- WNW of Hillersden, 5.5 km from Wairau River (351)
- a source of Goulter River which flows into Wairau River (351)
- recommended worthy of reserve status (441)
- inflow streams gauged (524)
- popular area for camping and tramping (RWB)
- unusual native fish population of high scientific value (441)
- created by a landslide about 2,200 years ago (441)
- very picturesque lake (524)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
441	1977	Meredyth-Young & Pullan	Fisheries survey (1976).
-	-	RWB pers comm	Hydrology, land use.
524	1980	Simpson	Description of mountain environment.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE CHALICE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min -	t°C -	date -		
max 8.8 g m^{-3}	t°C 7.0	date July 1976		441
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single value only measured at 30 m (441).				

TEMPERATURE (°C)				REFS
min 4.1 (7/76)	(surface) 4/1 (7/76)	(bottom)		441
max 7.0 (9/76)	(surface) -	(bottom)		524
max difference top to bottom -				
stratification mixed				441
Remarks: Single visit, 2 sites (441).				

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 8	date July 1976		441
mean -	n -	period -	
period of worst clarity after storms			441
causes silt			441
Remarks: Single visit (441). After heavy rain, lake remains turbid for long periods (524).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Asterionella, Bosmina*			441
Remarks:			

pH READINGS			REFS
min 7.4	date September 1976		524
max 7.7	date July 1976		441
Remarks: Several depths, 2 sites (441). Two visits (524). Inflow streams all consistently alkaline, pH up to 8.1 (524).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Nitella hockeri	524	Characeae	441
Remarks: In a band around lake margin (524). Hydroseres described (441).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	water chemistry	441
oligotrophic	nitrogen, phosphorus	524
Remarks: Phosphorus higher in lake than inputs (524).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	441
macrophytes	441
zooplankton	441
macroinvertebrates	441
fish	441
wildlife	441
Remarks: Benthic invertebrates very sparse (441).	

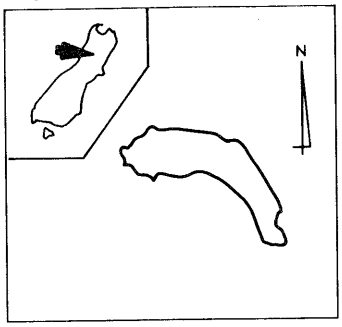
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	441	particulates	-
major ions	441	redox	441
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	441
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE CHRISTABEL

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	640
WATER BOARD	Westland	LONG AXIS (km)	3.7 (WNW)
MAP REF (NZMS1)	S46 656930	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L31 465663	MAX DEPTH (m)	-
LAKE TYPE	landslide	LAKE AREA (km^2)	2.40
MAIN INFLOW	1 main stream	CATCHMENT AREA (km^2) (land and lake)	45.75
MAIN OUTFLOW	subterranean river, Clear Grey River	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	476 CHRISTBL

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	41.1
cropland	-	lakes	5.7
lowland scrub	-	rivers	-
subalpine scrub	7.5	ice and snow	-
native forest	45.6	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	5.7
moderately steep (21–25°)	2.0
steep (26–35°)	37.5
very steep (>35°)	49.1
lakes	5.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	2.0	-	-	-	-
wind	-	-	-	-	-
scree creep	-	11.6	26.7	0.9	-
soil slip	5.1	3.7	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	31.1	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	7.5	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	5.7				
lakes	5.7				

GENERAL REMARKS

- SE of Springs Junction (351)
- source of Clear Grey River which flows into Upper Grey River (351)
- 3 islands (351)
- recommended worthy of preservation in present natural state (369)
- despite presence of islands, lake believed to be very deep as a result of ice scouring

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
369	1975a	Irwin	Checklist of NZ lakes.
	1976	Johnson *et al*	Fisheries survey (1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE CHRISTABEL

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)				REFS
min 6° (6/74)	(surface)	6° (6/74)	(bottom)	369
max -	(surface)	-	(bottom)	
max difference top to bottom -				
stratification -				
Remarks: Single visit (369).				

SECCHI DISC DEPTH (m)				REFS
min 10	date	June 1964		369
max 15	date	June 1964		369
mean -	n -	period -		
period of worst clarity -				
causes -				
Remarks: Slightly brownish hue (369). Single visit only (369).				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Melosira, Bosmina*			369
Remarks:			

pH READINGS			REFS
min 7.1	date	June 1964	369
max 7.2	date	June 1964	369
Remarks: Several depths, one site (369).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Potamogeton spp.	369
		Myriophyllum sp.	369
Remarks: No exotic weeds (369). Large weed beds at shallow western end of lake (369).			

TROPHIC STATUS	BASIS	REFS
oligotrophic/slightly mesotrophic	water chemistry	369
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	369
macrophytes	369
zooplankton	369
macroinvertebrates	369
fish	369
wildlife	369
Remarks: No exotic fish (369).	

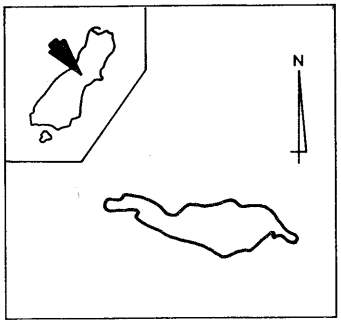
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	369	particulates	369
major ions	369	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	369
pigments	-	silica	369
optical properties	-	other	-
Remarks: See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE CLEARWATER

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ashburton	ALTITUDE (m a.s.l.)	668
WATER BOARD	South Canterbury	LONG AXIS (km)	3.8 (W)
MAP REF (NZMS1)	S81 597479	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J36 521320	MAX DEPTH (m)	18 (208)
LAKE TYPE	glacial	LAKE AREA (km²)	1.98
MAIN INFLOW	stream from Mystery Lake	CATCHMENT AREA (km²) (land and lake)	42.97
MAIN OUTFLOW	Lambies Stream	CATCHMENT No. (MWD)	688070
LEVEL CHANGES	-	DATA BASE CODE (MAF)	582 CLEARWTR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	7.6	pasture	6.9
sand dune	-	tussock	81.0
cropland	-	lakes	4.5
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	12.4
rolling (8–15°)	38.2
strongly rolling (16–20°)	25.5
moderately steep (21–25°)	9.8
steep (26–35°)	9.6
very steep (>35°)	-
lakes	4.5

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	9.1	52.0	1.8	8.6	-
wind	-	21.2	-	-	-
scree creep	-	-	2.9	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	4.5				

GENERAL REMARKS

- WNW of Hakatere (351)
- also called Tripp Lake (351)
- one island, swamp at E and W ends (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout conditions (1969-73).
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
208	1959a	FFAS	Fisheries survey (1958).
351	1975a	Irwin	Checklist of NZ lakes.
544	1969a	Stout	Comparison of mountain lakes (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE CLEARWATER

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 2.6	(surface) -	(bottom)	544
max 21.2	(surface) 14.2 (12/58)	(bottom)	544,208
max difference top to bottom -			
stratification not stratified			544
Remarks: Bimonthly readings 5/67-7/68 (544).			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min 1.99 mg m^{-3}		date n.s.		544
max 5.97 mg m^{-3}		date n.s.		544
mean 5.2 mg m^{-3}	n 5	date n.s.		51
period of blooms -				
algae *Botryococcus, Crucigenia, Cosmarium, Asterionella*				196
Remarks: 5 random samples (51).				

pH READINGS		REFS
min 6.8	date n.s.	544
max 8.3	date n.s.	544
Remarks: Bimonthly readings 5/67-7/68 (544).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	51,196,544
macrophytes	-
zooplankton	544
macroinvertebrates	200
fish	51,208
wildlife	-
Remarks:	

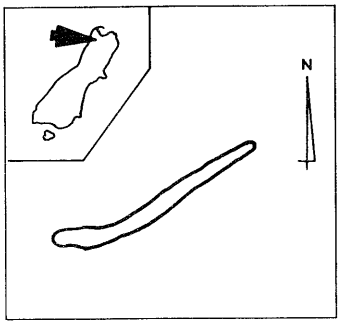
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,544	particulates	-
major ions	544	redox	51,544
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other Pmax	51
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

COBB RESERVOIR

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Golden Bay	ALTITUDE (m a.s.l.)	808
WATER BOARD	Nelson	LONG AXIS (km)	5.9 (NE)
MAP REF (NZMS1)	S13 041476	MEAN DEPTH (m)	-
MAP REF (260 ser.)	M27 792083	MAX DEPTH (m)	20 (215)
LAKE TYPE	reservoir	LAKE AREA (km^2)	1.55
MAIN INFLOW	Cobb River	CATCHMENT AREA (km^2) (land and lake)	4.38
MAIN OUTFLOW	Cobb River	CATCHMENT No. (MWD)	529170
LEVEL CHANGES	controlled for HEP	DATA BASE CODE (MAF)	413 COBBr

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-77)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	78.1	undulating (4–7°)	-	sheet	-	21.9	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	78.1	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	21.9	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	100	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	n.d.				

GENERAL REMARKS

- ESE of Mt Cobb (351)
- used intensively for tramping, fishing, duckshooting (RWB)
- high concentration of suspended solids in inflow (215)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
215	1964b	FFAS	Fisheries survey (1963-64).
253	1975b	Green	Water clarity.
282	1970a	Hill	Current status (1970).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Jolly pers comm	Temperature.
-	-	RWB pers comm	Water quality data.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

COBB RESERVOIR

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 7.2 g m^{-3} t°C 10.2 date November 63	215
max 10.2 g m^{-3} t°C 14.75 date March 1964	215
mean - n - period -	
period of lowest oxygen -	
Remarks: 2 visits, 2 samples per visit (215).	

TEMPERATURE (°C)	REFS
min 11.5 (11/63)(surface) 10.2 (11/63) (bottom)	215
max 17.8 (n.s.) (surface) 14.75 (3/64) (bottom)	Jolly p.c. 215
max difference top to bottom 3.7°	Jolly p.c.
stratification possibly	282
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min 1.6 date n.s.	282
max 4.75 date November 1963	215
mean - n - period -	
period of worst clarity March	214
causes excess plankton; sediment?	282,215
Remarks: Single reading (282). 2 readings only (215). More turbid since 1959 (282).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms -	
algae *Chlamydomonas, Tabellaria*	282
Remarks:	

pH READINGS	REFS
min date	
max date	
Remarks: No data found.	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Potamogeton cheesemanii	282
		Myriophyllum elatinoides	282
		Isoetes	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: Surprisingly high productivity (282).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	282
macrophytes	215,282
zooplankton	92,215,282
macroinvertebrates	215
fish	215
wildlife	-
Remarks:	

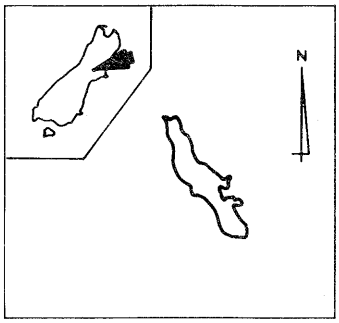
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	215,282	particulates	-
major ions	215	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	215,282
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE COLERIDGE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	507
WATER BOARD	North Canterbury	LONG AXIS (km)	17.8 (NW)
MAP REF (NZMS1)	S74 029816	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K35 910635	MAX DEPTH (m)	200 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	32.90
MAIN INFLOW	7 streams	CATCHMENT AREA (km²) (land and lake)	200.14
MAIN OUTFLOW	Harper River	CATCHMENT No. (MWD)	685070
LEVEL CHANGES	HEP regulated	DATA BASE CODE (MAF)	556 COLERIDG

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-74)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	5.8
sand dune	-	tussock	70.0
cropland	-	lakes	18.4
lowland scrub	0.9	rivers	-
subalpine scrub	-	ice and snow	-
native forest	0.6	urban	-
exotic forest	-	other	4.0

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	6.0
undulating (4–7°)	10.5
rolling (8–15°)	3.5
strongly rolling (16–20°)	7.9
moderately steep (21–25°)	3.2
steep (26–35°)	48.1
very steep (>35°)	2.3
lakes	18.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	5.8	16.9	12.1	4.0	-
wind	6.2	4.9	0.7	2.3	-
scree creep	-	0.2	6.4	2.3	12.2
soil slip	-	-	-	4.1	-
earth slip	-	-	2.4	-	-
slump	-	-	-	-	-
debris avalanche	-	0.6	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	0.4				
lakes	18.4				

GENERAL REMARKS

- WNW of Springfield (351)
- one island (351)
- 7 inflows are Coleridge, Scamander, Simois Streams, Ryton and Harper River, Lake Stream (351)
- used for fishing, boating, HEP
- all inflows and outflows gauged

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout environment (1969-70).
52	1975	Burnet & Wallace	Productivity and trout environment.
109-	ongoing	Chemistry Division	Water analyses.
170	1969b	Fish	Brief discussion of eutrophication.
189	1970	Flain	Bathymetric chart.
190	1971	Flain	Ecological investigation.
200	1975	Forsyth	Benthic fauna.
217	1966	FFAS	Fisheries survey (1965).
239	1964	Goldman	Productivity limiting factors (1962).
282	1970a	Hill	Current status (1970).
351	1975a	Irwin	Checklist of NZ lakes.
382	1975	Jolly & Irwin	Thermal conditions.
527	1913	Speight	Shingle spit formation.
531	1978b	Spencer	Trophic status (1976).
553	1975b	Stout	General description of water quality.
580	1984	Vant & Davies-Colley	Water clarity (1983).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE COLERIDGE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min - t°C - date -	
max - t°C - date -	
mean 10.2 g m^{-3}n n.d. period n.d.	170
period of lowest oxygen -	
Remarks: Lake virtually oxygen-saturated to 68 m (170).	

TEMPERATURE (°C)	REFS
min 10 (surface) - (bottom)	382
max 15 (surface) 10 (bottom)	382
max difference top to bottom 5°C	382
stratification mixed	531
Remarks: Sampling strategy not specified (382).	

SECCHI DISC DEPTH (m)	REFS
min 6.0 date April 1970	282
max 18.5 date n.s.	217
mean - n - period -	
period of worst clarity -	
causes -	
Remarks: Sampling strategy not specified (217). Single reading (282).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0.5 mg m^{-3} date February 1976	531
max 0.8 mg m^{-3} date n.s.	51
mean - n - date -	
period of blooms -	
algae *Melosira, Mougeotia*	282
Remarks: Mean of 4 samples, one visit (531). Mean of 7 samples 2/69-6/70 (51).	

pH READINGS	REFS
min 7.5 date n.s.	217
max 7.84 date February 1976	531
Remarks: One visit, 2 readings (531). Sampling strategy not specified (282).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	282
		Ranunculus fluitans	282
		Potamogeton cheesemanii	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	217
oligotrophic	productivity	51
highly oligotrophic	biochemical assay	531
oligotrophic	"plankton"	282
Remarks: Very low nutrient levels, barely measurable microbial activity (531).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	51,52,217,282
macrophytes	282
zooplankton	-
macroinvertebrates	200
fish	51,52,217
wildlife	-
Remarks:	

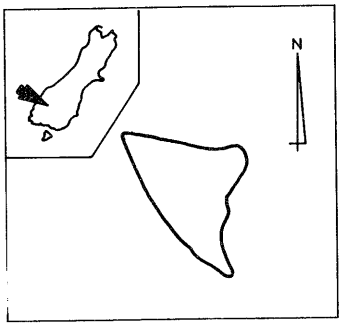
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,282,531	particulates	580
major ions	282,531	redox	-
trace elements	282	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	580	silica	282
optical properties	580	other Pmax	531
Remarks: List of micronutrient limiting factors (239). Experiment repeated by Burnet and Wallace (52). Pmax (51).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE DIAMOND

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	350
WATER BOARD	Otago	LONG AXIS (km)	2.4 (NW)
MAP REF (NZMS1)	S122 292049	MEAN DEPTH (m)	-
MAP REF (260 ser.)	E40 438975	MAX DEPTH (m)	-
LAKE TYPE	riverine	LAKE AREA (km^2)	1.67
MAIN INFLOW	Creek in Earnslaw Burn	CATCHMENT AREA (km^2) (land and lake)	63.82
MAIN OUTFLOW	Diamond Creek to Rees River	CATCHMENT No. (MWD)	752746
LEVEL CHANGES	-	DATA BASE CODE (MAF)	707 DIAMOND1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-77)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	8.2
sand dune	-	tussock	50.3
cropland	-	lakes	2.7
lowland scrub	2.6	rivers	-
subalpine scrub	-	ice and snow	-
native forest	30.1	urban	-
exotic forest	-	other	6.0

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	5.8
undulating (4–7°)	2.7
rolling (8–15°)	1.1
strongly rolling (16–20°)	5.3
moderately steep (21–25°)	-
steep (26–35°)	62.5
very steep (>35°)	13.9
lakes	2.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	40.2	-	-	-	-
wind	4.9	-	-	-	-
scree creep	-	11.8	6.6	1.9	-
soil slip	-	21.5	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	4.4				
lakes	2.7				

GENERAL REMARKS

- NNW of Glenorchy (351)
- used for fishing, stock watering, wildlife

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE DIAMOND

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)				REFS
min 5.0		date n.s.		Irwin p.c.
max -		date -		
mean -	n -		period -	
period of worst clarity -				
causes -				
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min		date	
max		date	
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	-
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

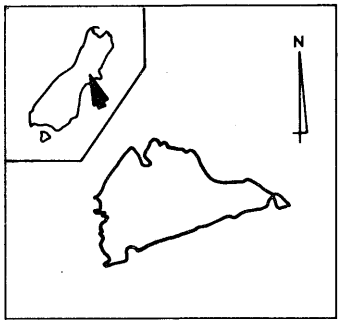
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ELLESMERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ellesmere	ALTITUDE (m a.s.l.)	0-30
WATER BOARD	North Canterbury	LONG AXIS (km)	26.3 (ENE)
MAP REF (NZMS1)	S93 832250	MEAN DEPTH (m)	-
MAP REF (260 ser.)	M36 654130	MAX DEPTH (m)	2.1 (307)
LAKE TYPE	beach	LAKE AREA (km²)	181.75
MAIN INFLOW	Selwyn River	CATCHMENT AREA (km²) (land and lake)	2039.16
MAIN OUTFLOW	to sea via artificial outlet	CATCHMENT No. (MWD)	683000
LEVEL CHANGES	varies	DATA BASE CODE (MAF)	599 ELLESMR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1972)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	77.0	flat (0–3°)	61.9
sand dune	-	tussock	8.5	undulating (4–7°)	2.5
cropland	-	lakes	8.9	rolling (8–15°)	6.1
lowland scrub	1.1	rivers	-	strongly rolling (16–20°)	2.9
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	7.5
native forest	1.1	urban	-	steep (26–35°)	7.9
exotic forest	1.2	other	1.9	very steep (>35°)	0.4
				lakes	8.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.5	2.1	1.0	0.5	-
wind	37.1	1.4	-	-	-
scree creep	-	-	-	-	-
soil slip	1.7	0.4	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	0.9	-	-	-	-
gully	-	-	-	-	-
tunnel gully	2.2	0.9	0.2	-	-
streambank	0.5	-	-	-	-
deposition	0.1	0.2	-	-	-
negligible	25.8				
lakes	8.9				

GENERAL REMARKS

- E of Leeston (351)
- large shallow lake separated from sea by Kaitorete Spit (351)
- surrounded by mud-flats
- brackish water (51)
- wildlife, duckshooting, eeling
- subject of considerable research

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
23	1965	Best	Emergent vegetation.
51	1973	Burnet & Wallace	Productivity and trout environment (1970).
52	1975	Burnet & Wallace	Productivity and trout environment.
58	1964	Burrows	Botany?
59	1969	Burrows	Ecology.
109-	ongoing	Chemistry Division	Water analyses.
150	1981	Dodgshun	Comment on eutrophication.
159	1953	Evans	Halophytic vegetation.
196	1975	Flint	Phytoplankton
200	1975	Forsyth	Benthic fauna.
223	1973b	Freshwater Section	Lake report.
307	1974	Hughes *et al*	Review of lake and catchment data.
351	1975a	Irwin	Checklist of NZ lakes.
398	1979	Lineham	Phytoplankton and chemistry.
412	1933	Marshall	Water source and sediments.
475	1972	North Canterbury Catchment Board	Notes on lake.
527	1913	Speight	Spit formation.
545	1969b	Stout	General description of biology.
553	1975b	Stout	General description.
609	1975	Winterbourn & Lewis	Littoral fauna.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ELLESMERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max - (surface) - (bottom)	
max difference top to bottom -	
stratification mixed	51
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min - date -	
max - date -	
mean - n - period -	
period of worst clarity -	
causes -	
Remarks: Permanently turbid (307).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean 28.0 mg m^{-3} n 4 date -	51
period of blooms occur frequently	307
algae *Nodularia, Dictyosphaerium*	307
Remarks:	

pH READINGS		REFS
min	date	
max	date	
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Potamogeton pectinatus	307
		Ruppia megacarpa	307
Remarks:			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	51,196,307
very highly eutrophic	algae	150
Remarks: Evaporative concentration of nutrients (307).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	51,52,196,307,398
macrophytes	23,58,159,307
zooplankton	-
macroinvertebrates	200,609
fish	51,52
wildlife	-
Remarks:	

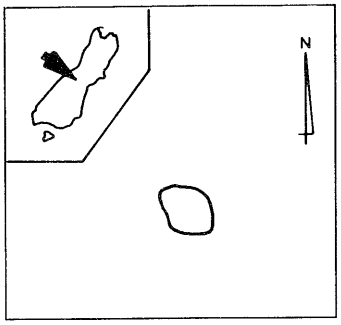
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,307	particulates	-
major ions	-	redox	51
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Pmax	51
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE EMILY

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ashburton	ALTITUDE (m a.s.l.)	617
WATER BOARD	South Canterbury	LONG AXIS (km)	0.6 (NW)
MAP REF (NZMS1)	S81 759542	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J36 668380	MAX DEPTH (m)	-
LAKE TYPE	riverine	LAKE AREA (km^2)	0.14
MAIN INFLOW	river	CATCHMENT AREA (km^2) (land and lake)	5.77
MAIN OUTFLOW	river	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	578 EMILY

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1972)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	4.7	pasture	92.5	flat (0–3°)	4.7
sand dune	-	tussock	-	undulating (4–7°)	60.3
cropland	-	lakes	2.8	rolling (8–15°)	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	17.2
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	15.1
native forest	-	urban	-	steep (26–35°)	-
exotic forest	-	other	-	very steep (>35°)	-
				lakes	2.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	34.8	17.2	-	-	-
wind	-	37.8	-	-	-
scree creep	-	-	2.8	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	4.7				
lakes	2.8				

GENERAL REMARKS

- ENE of Lake Clearwater (351)
- in a depression contained within 671 m contour (351)
- used for wildlife and duckshooting (196)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE EMILY

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	date		
max	date		
mean	n	date	
period of blooms			
algae *Botryococcus, Crucigenia, Pediastrum, Asterionella*			196
Remarks:			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

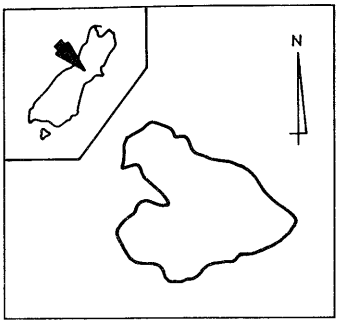
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE EMMA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ashburton	ALTITUDE (m a.s.l.)	657
WATER BOARD	South Canterbury	LONG AXIS (km)	1.9 (NW)
MAP REF (NZMS1)	S81 654439	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J36 574284	MAX DEPTH (m)	3 (351)
LAKE TYPE	glacial	LAKE AREA (km^2)	1.55
MAIN INFLOW	Balmacaan Stream	CATCHMENT AREA (km^2) (land and lake)	27.97
MAIN OUTFLOW	to Lambies Stream	CATCHMENT No. (MWD)	688070
LEVEL CHANGES	-	DATA BASE CODE (MAF)	589 EMMA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	8.8	pasture	0.7
sand dune	-	tussock	84.3
cropland	-	lakes	6.1
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	8.8
undulating (4–7°)	0.1
rolling (8–15°)	17.6
strongly rolling (16–20°)	-
moderately steep (21–25°)	-
steep (26–35°)	67.4
very steep (>35°)	-
lakes	6.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.6	18.5	6.8	22.6	17.6
wind	0.1	0.5	-	-	-
scree creep	-	-	4.4	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	8.8				
lakes	6.1				

GENERAL REMARKS

- SE of Lake Clearwater (351)
- also known as Acland Lake
- lake level raised by one metre in 1958 by damming outlet (208)
- used for fishing (214)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton
208	1959a	FFAS	Fisheries survey (1958-59).
214	1964a	FFAS	Fisheries survey (1963).
351	1975a	Irwin	Checklist of NZ lakes.
544	1969a	Stout	Comparison of mountain lakes (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE EMMA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min -	t°C -	date -			
max 13.6	t°C 14.75	date 12/63			214
mean -	n -	period -			
period of lowest oxygen -					
Remarks: Single site, single sample (214). Dissolved oxygen higher at bottom of lake than at surface (214).					

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 16.25(12/63)	(surface) 14.75(12/63)	(bottom)	214
max difference top to bottom 1.9°C			214
stratification no thermocline apparent			
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 1.0	n 1	period 12/63	214
period of worst clarity -			
causes wind stirred mud			214,544
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.15 mg m^{-3}	date n.s.		544
max 8.8 mg m^{-3}	date n.s.		544
mean -	n -	date -	
period of blooms -			
algae *Volvox, Pediastrum, Cosmarium, Synedra*			196
Remarks:			

pH READINGS		REFS
min 6.7	date n.s.	544
max 8.9	date n.s.	544
Remarks: 7 readings, 5/67-7/68 (544).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	214
		Myriophyllum	214
Remarks:			

TROPHIC STATUS	BASIS	REFS
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,214,544
macrophytes	214
zooplankton	214,544
macroinvertebrates	214
fish	208,214
wildlife	-
Remarks:	

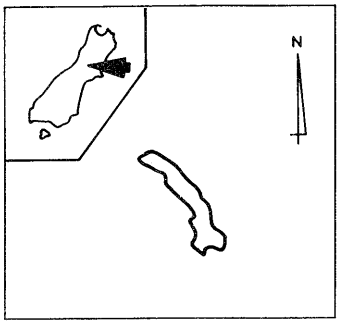
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	214,544	particulates	-
major ions	214,544	redox	544
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	214,544
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE EVELYN

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	579-610
WATER BOARD	North Canterbury	LONG AXIS (km)	1.1 (NW)
MAP REF (NZMS1)	S66 033904	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K34 912715	MAX DEPTH (m)	3 (351)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.15
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	3.26
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	685074
LEVEL CHANGES	-	DATA BASE CODE (MAF)	552 EVELYN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	94.8	undulating (4–7°)	4.9	sheet	2.8	13.8	-	2.1	-
cropland	-	lakes	5.2	rolling (8–15°)	23.0	wind	4.9	30.1	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	2.8	scree creep	-	-	26.1	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	30.1	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	34.0	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	5.2	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	15.0	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	5.2				

GENERAL REMARKS

- SW of Craigieburn Forest (351)
- tributary of Lake Coleridge (544)
- used for fishing, camping (531)
- black teal habitat (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-282	ongoing	Chemistry Division	Water analyses.
	1970a	Hill	Current status.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Comparison of mountain lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE EVELYN

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 4.1	(surface) -	(bottom)	544
max 18.9	(surface) -	(bottom)	544
max difference top to bottom -			
stratification not stratified			544
Remarks: Single site sampled monthly 5/67-7/68 (544).			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.23 mg m^{-3}	date n.s.		544
max 0.95 mg m^{-3}	date n.s.		544
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Chlorophyll level particularly low (544).			

pH READINGS		REFS
min 6.7	date n.s.	544
max 7.2	date n.s.	544
Remarks: Monthly readings 5/67-7/68 (544).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Myriophyllum elatinoides	282
		Ranunculus fluitans	282
		Potamogeton sp.	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemical assay	531
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	544
macrophytes	282
zooplankton	544
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

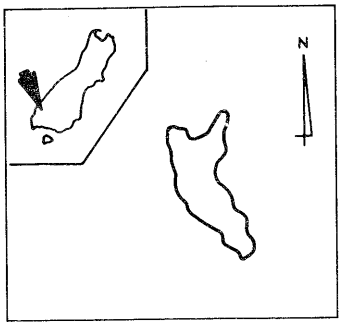
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	544	particulates	-
major ions	544	redox	544
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE EYLES

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	1036
WATER BOARD	Southland	LONG AXIS (km)	0.8
MAP REF (NZMS1)	S140 538394	MEAN DEPTH (m)	-
MAP REF (260 ser.)	C42 760364	MAX DEPTH (m)	43 (552)
LAKE TYPE	glacial	LAKE AREA (km^2)	0.41
MAIN INFLOW	-	CATCHMENT AREA (km^2) (land and lake)	2.78
MAIN OUTFLOW	Chester Burn	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	803 EYLES

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	85.3	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	14.7	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	85.3	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	85.3	slump	-	-	-	-	-
				lakes	14.7	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	14.7				

GENERAL REMARKS

- not listed in checklist (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-552	ongoing 1975a	Chemistry Division Stout	Water analyses. Comparison of southern lakes at different altitudes (1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE EYLES

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min > 60%	t°C n.s.	date n.s.			552
max -	t°C -	date -			
mean -	n -	period -			
period of lowest oxygen -					
Remarks:					

TEMPERATURE (°C)				REFS
min -	(surface) -	(bottom)		
max 14 (2/74)	(surface) 5.5 (2/74)	(bottom)		552
max difference top to bottom 8.5°C				552
stratification stratified in summer				552
Remarks: Single visit (552).				

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 10.0	date February 1974		552
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Slightly green (552).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 1.2 mg m^{-3}	n 1	date 2/74	552
period of blooms -			
algae -			
Remarks:			

pH READINGS		REFS
min 5.0	date 2/74	552
max 5.4	date 2/74	552
Remarks: Single visit (552).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biology, water chemistry	552
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	-
zooplankton	552
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Dominant zooplankton species *Macrocyclops albidus*.	

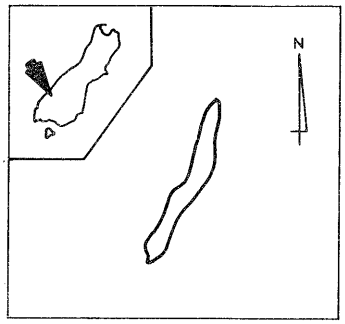
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	552
optical properties	-	other	-
Remarks: Extremely low conductivity (552).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE FERGUS

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	500
WATER BOARD	Southland	LONG AXIS (km)	2.1 (NNE)
MAP REF (NZMS1)	S122 071917	MEAN DEPTH (m)	30 (246)
MAP REF (260 ser.)	D41 238851	MAX DEPTH (m)	60 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	0.42
MAIN INFLOW	from swamp to north & 2 seasonal streams to west	CATCHMENT AREA (km²) (land and lake)	8.75
MAIN OUTFLOW	stream to Lake Gunn	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	727 FERGUS

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	44.2
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	55.8	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	3.0
rolling (8–15°)	2.7
strongly rolling (16–20°)	-
moderately steep (21–25°)	-
steep (26–35°)	38.5
very steep (>35°)	55.8
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	4.0	-	-	-	-
wind	-	-	-	-	-
scree creep	5.4	34.9	-	-	-
soil slip	31.9	21.0	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	3.0				
lakes	n.d.				

GENERAL REMARKS

- NNE of Glade House, N end of Lake Wakatipu at head of Eglinton Valley (351)
- used for camping, tourism (246)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
246	1973	Green	Plankton distribution.
351	1975a	Irwin	Checklist of NZ lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE FERGUS

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 82.6%	t°C n.d.	date May 1973			246
max 33.5%	t°C n.d.	date February 1973			246
mean -	n -	period -			
period of lowest oxygen -					
Remarks: 2 samples only (246).					

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max -	(surface) -	(bottom)	
max difference top to bottom -			
stratification -			
Remarks: Shallow lake, susceptible to mixing (246).			

SECCHI DISC DEPTH (m)			REFS
min 5.5	date n.s.		246
max 6.5	date n.s.		246
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min 1.47	date February 1973	246
max 3.01	date May 1973	246
mean -	n - date -	
period of blooms -		
algae *Cyclotella, Tabellaria, Gomphosphaeria*		196
Remarks: Algae cont.- *Gleotila, Asterionella, Gymnodinium, Rhizosolenia* (246). Chlorophyll readings at 1, 5, 10, 15, 30 metre depths (246).		

pH READINGS		REFS
min 6.8	date n.s.	246
max -	date -	
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,246
macrophytes	-
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

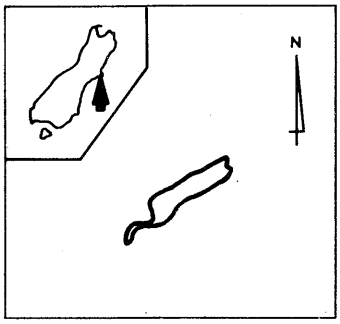
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE FORSYTH

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wairewa	ALTITUDE (m a.s.l.)	0-73
WATER BOARD	North Canterbury	LONG AXIS (km)	7.6 (NE)
MAP REF (NZMS1)	S94 092229	MEAN DEPTH (m)	-
MAP REF (260 ser.)	M36 892116	MAX DEPTH (m)	-
LAKE TYPE	riverine/beach	LAKE AREA (km^2)	5.62
MAIN INFLOW	Okana River	CATCHMENT AREA (km^2) (land and lake)	109.21
MAIN OUTFLOW	to Lake Ellesmere	CATCHMENT No. (MWD)	676000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	603 FORSYTH

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1972-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	39.4	flat (0–3°)	5.9	type \ severity	1	2	3	4	5
sand dune	-	tussock	55.5	undulating (4–7°)	-	sheet	29.5	-	0.7	-	-
cropland	-	lakes	5.1	rolling (8–15°)	0.2	wind	-	1.5	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	26.3	soil slip	28.5	26.5	-	-	-
native forest	-	urban	-	steep (26–35°)	58.7	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	3.7	slump	-	-	-	-	-
				lakes	5.1	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	0.1	-	-	-	-
						streambank	4.4	-	-	-	-
						deposition	-	-	-	-	-
						negligible	3.7				
						lakes	5.1				

GENERAL REMARKS

- SW of Little River (351)
- adjacent to sea, separated by end of Kaitorete Spit (351)
- water brackish, occasional trout kills (51)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout conditions (1969-70).
52	1975	Burnet & Wallace	Productivity and trout conditions.
92	1975	Chapman *et al*	Zooplankton.
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
553	1975b	Stout	General description of water quality.
609	1975	Winterbourn & Lewis	Littoral fauna.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE FORSYTH

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t°C	date	
max	t°C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)				REFS
min	0.33	date	n.s.	Irwin p.c.
max	0.4	date	n.s.	Irwin p.c.
mean	-	n -	period -	
period of worst clarity	-			
causes	-			
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	77.6 g m^{-3}	n 8	date 4/69-10/70	51
period of blooms	blue green occasionally			51,52
algae	*Gomphosphaeria, Nodularia, Dictyosphaerium*			196
Remarks: Algae cont.- *Cyclotella* (196).				

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
highly eutrophic	algae	51
eutrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	51,52,196
macrophytes	-
zooplankton	92
macroinvertebrates	609
fish	51,52
wildlife	-
Remarks:	

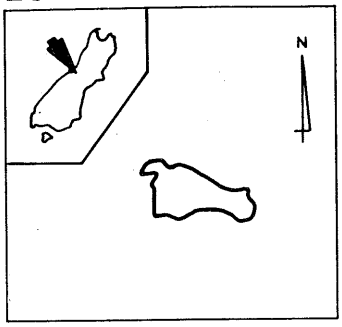
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51	particulates	-
major ions	-	redox	51
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Pmax	51
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE GAULT

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	305-355
WATER BOARD	Westland	LONG AXIS (km)	1.0 (WNW)
MAP REF (NZMS1)	S71 658678	MEAN DEPTH (m)	-
MAP REF (260 ser.)	H35 659486	MAX DEPTH (m)	16.0 (196)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.30
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	4.86
MAIN OUTFLOW	pipeline via power stn to Clearwater River	CATCHMENT No. (MWD)	882050
LEVEL CHANGES	-	DATA BASE CODE (MAF)	569 GAULT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	-
sand dune	-	tussock	-	undulating (4–7°)	-
cropland	-	lakes	6.4	rolling (8–15°)	85.4
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	93.6	urban	-	steep (26–35°)	1.4
exotic forest	-	other	-	very steep (>35°)	6.8
				lakes	6.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	1.4	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	6.8	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	85.4				
lakes	6.4				

GENERAL REMARKS

- NW of Fox Glacier township (351)
- used for HEP

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
198	1979	Flint	Phytoplankton and chemistry (very brief mention).
351	1975a	Irwin	Checklist of NZ lakes.
553	1975b	Stout	General description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE GAULT

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t°C	date	
max	t°C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)				REFS
min -		date -		
max -		date -		
mean -	n -		period -	
period of worst clarity -				
causes organic matter				198
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -		date -	
max -		date -	
mean -	n -	date -	
period of blooms -			
algae *Synura, Gymnodinium, Mougeotia*			196
Remarks:			

pH READINGS		REFS
min 4.5	date spring'69, summer'70	198
max 4.8	date spring'69, summer'70	198
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
dystrophic	n.s.	198
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,198
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

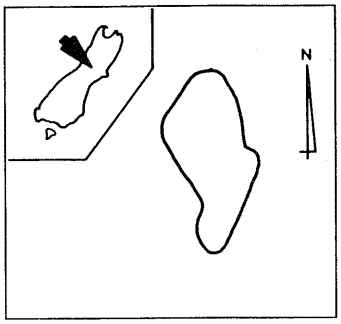
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	198	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE GEORGINA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	545
WATER BOARD	North Canterbury	LONG AXIS (km)	0.75 (N)
MAP REF (NZMS1)	S74 062827	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K35 940645	MAX DEPTH (m)	10.0 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	0.2
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	428
MAIN OUTFLOW	Scamander Stream	CATCHMENT No. (MWD)	685072
LEVEL CHANGES	-	DATA BASE CODE (MAF)	560 GEORGINA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-74)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	54.4	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	45.6	undulating (4–7°)	11.9	sheet	-	66.4	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	54.4	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	33.6	earth slip	-	-	33.6	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	n.d.				

GENERAL REMARKS

- ESE of Lake Coleridge (351)
- used for fishing, boating, camping (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout conditions (1969-70).
52	1975	Burnet & Wallace	Productivity and trout conditions.
109-	ongoing	Chemistry Division	Water analysis.
196	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Comparison of NZ lakes (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE GEORGINA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 0 (winter) (surface) - (bottom)	51
max 17.6 (n.s.) (surface) - (bottom)	544
max difference top to bottom -	
stratification not stratified	544
Remarks: 14 samples taken 5/67-7/68 (544). Surface temp = 13.2° 2/76 (531).	

SECCHI DISC DEPTH (m)			REFS
min		date	
max		date	
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0.22 mg m^{-3} date n.s.	544
max 2.67 mg m^{-3} date n.s.	544
mean - n - date -	
period of blooms -	
algae *Botryococcus, Sphaerocystis, Volvox, Cyclotella*	196
Remarks:	

pH READINGS		REFS
min 6.8	date n.s.	544
max 8.36	date February 1976	531
Remarks: Single value only (531).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	282
		Myriophyllum elatinoides	282
		Characeae	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algal productivity	51
mesotrophic	algae	196
oligotrophic	biochemistry	531
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	51,52,196,531,544
macrophytes	282
zooplankton	544
macroinvertebrates	-
fish	51,52
wildlife	-
Remarks:	

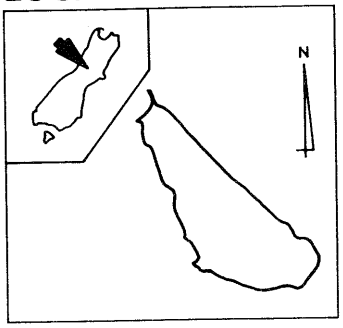
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,531,544	particulates	-
major ions	531,544	redox	51
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other Vmax,ATP	531
Remarks: Pmax (51). See Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE GRASMERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	583
WATER BOARD	North Canterbury	LONG AXIS (km)	1.5 (NW)
MAP REF (NZMS1)	S66 242138	MEAN DEPTH (m)	7.8 (256)
MAP REF (260 ser.)	L34 100933	MAX DEPTH (m)	15 (351)
LAKE TYPE	n.d.	LAKE AREA (km^2)	0.67
MAIN INFLOW	one stream	CATCHMENT AREA (km^2) (land and lake)	8.83
MAIN OUTFLOW	Grasmere Stream to Cass River	CATCHMENT No. (MWD)	664190
LEVEL CHANGES	about 1 m natural variation	DATA BASE CODE (MAF)	532 GRASMERE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	12.1
sand dune	-	tussock	65.1	undulating (4–7°)	25.4
cropland	-	lakes	7.6	rolling (8–15°)	25.8
lowland scrub	2.9	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	16.9	ice and snow	-	moderately steep (21–25°)	3.1
native forest	-	urban	-	steep (26–35°)	26.0
exotic forest	-	other	-	very steep (>35°)	-
				lakes	7.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	25.8	9.5	-	-	-
wind	37.5	-	-	-	-
scree creep	-	-	5.5	7.5	3.5
soil slip	-	3.1	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	7.6				

GENERAL REMARKS

- NW of Craigieburn (351)
- NW shore partly bush-covered (351)
- wildlife reserve (531)
- used for fishing, boating, swimming, camping (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-196	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
227	1959	Gage	Origin of lake.
256	1976	Greig	Zooplankton ecology.
329	1969d	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
366	1976	Jamin	Benthic fauna.
416	1971	Mason	Zooplankton distribution.
500	1970	Ramsay	Bacteria.
501	1972	Ramsay	Microbiology.
502	1973	Ramsay	Heterotrophic bacteria.
503	1976	Ramsay	Heterotrophic bacteria and plankton (1969-71).
531*	1978b	Spencer	Trophic status (1976).
544*	1969a	Stout	Comparison of mountain lakes (1967-68).
549	1972b	Stout	Plankton and nutrients.
551	1973b	Stout	Lake report.
553*	1975b	Stout	General description of lakes near Cass township (up to 1974).
556	1977b	Stout	Faunal biology (1977).
573*	1983	Timms	Benthic macroinvertebrates (1978-79).
609	1975	Winterbourn & Lewis	Littoral fauna.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data*pertaining to this lake.

LAKE GRASMERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	36%	t°C	n.d.	date	n.d.	256
max	-	t°C	-	date	-	
mean	-	n	-	period	-	
period of lowest oxygen	-					
Remarks:						

TEMPERATURE (°C)				REFS
min	0 (winter)	(surface) -	(bottom)	553
max	21 (summer)	(surface) -	(bottom)	553
max difference top to bottom	-			
stratification	stratifies briefly in summer			556
Remarks:				

SECCHI DISC DEPTH (m)						REFS
min	0.42		date	September		556
max	8.2		date	n.s.		556
mean	2.8	n 13		period	n.d.	573
period of worst clarity	-					
causes	silt					
Remarks:						

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	6.3 mg m^{-3}	date	February 1976	531
max	14.0 mg m^{-3}	date	spring	553
mean	4.9	n n.s.	date n.s.	556
period of blooms	-			
algae	*Diatoma, Asterionella, Melosira, Mougeotia, Cyclotella*			196,503
Remarks: Diatoms prevalent in plankton (553). Single visit (531).				

pH READINGS				REFS
min	6.4	date	July 1964	256
max	8.9	date	summer	553
Remarks: Single visit (256).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	544,553
		Ranunculus fluitans	544,553
		Myriophyllum propinquum	544,553
Remarks: Extensive beds of *Elodea* (553).			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemistry, phytoplankton	531
mesotrophic	range of parameters	573
mesotrophic	algae	196
Remarks: Nutrients low (256).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	500,501,502,503,531,553
phytoplankton (algae)	196,503,549,553,556
macrophytes	503,544,553,556
zooplankton	92,256,416,544,553,556
macroinvertebrates	366,503,553,556,573,609
fish	553,556
wildlife	553,556
Remarks: Chironomidae dominate benthos (573).	

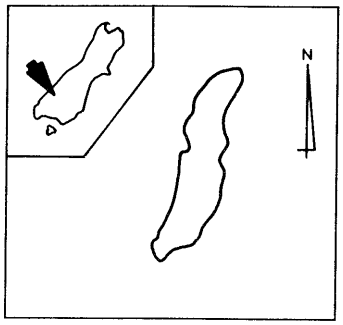
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531,544	particulates	-
major ions	531,544	redox	544,573
trace elements	-	salinity	-
organic matter	-	alkalinity	531,556
toxic organics	-	hardness	544
pigments	-	silica	544,556
optical properties	-	other Vmax, ATP	531
Remarks: High conductivity and alkalinity (256). High silica input from rock (256).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE GUNN

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	500
WATER BOARD	Southland	LONG AXIS (km)	3.8 (NNE)
MAP REF (NZMS1)	S122 053869	MEAN DEPTH (m)	-
MAP REF (260 ser.)	D41 222807	MAX DEPTH (m)	60 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	1.69
MAIN INFLOW	two streams	CATCHMENT AREA (km²) (land and lake)	21.83
MAIN OUTFLOW	Eglinton River to Lake Te Anau	CATCHMENT No. (MWD)	797490
LEVEL CHANGES	-	DATA BASE CODE (MAF)	733 GUNN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	-
sand dune	-	tussock	45.7	undulating (4–7°)	4.9
cropland	-	lakes	12.4	rolling (8–15°)	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	42.0	urban	-	steep (26–35°)	34.7
exotic forest	-	other	-	very steep (>35°)	48.1
				lakes	12.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	4.1	-	-	-	-
wind	-	-	-	-	-
scree creep	4.7	30.2	2.0	4.7	-
soil slip	4.2	32.9	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	4.9				
lakes	12.4				

GENERAL REMARKS

- NNE of Glade House, N end of Lake Te Anau (351)
- used for camping and picnicking

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
246	1975	Flint	Phytoplankton.
351	1973	Green	Plankton distribution.
	1975a	Irwin	Checklist of NZ lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE GUNN

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	75%	t°C n.d.	date	February 1973	246
max	83%	t°C n.d.	date	May 1973	246
mean	-	n -	period	-	
period of lowest oxygen	-				
Remarks: 2 readings total, one for each month (246).					

TEMPERATURE (°C)			REFS
min	- (surface) -	(bottom)	
max	- (surface) -	(bottom)	
max difference top to bottom	-		
stratification	-		
Remarks: In February a thermocline was apparent (246).			

SECCHI DISC DEPTH (m)				REFS
min	8.0	date	February 1973	246
max	8.9	date	May 1973	246
mean	- n -	period	-	
period of worst clarity	-			
causes	-			
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	0.61 mg m^{-3}	date	May 1973	246
max	2.29 mg m^{-3}	date	May 1973	246
mean	- n -	date	-	
period of blooms	-			
algae	*Cyclotella, Tabellaria, Gomphosphaeria*			196
Remarks: Maximum chlorophyll *a* at 15 m depth, minimum at 10 m depth (246).				

pH READINGS				REFS
min	6.4	date	May 1973	246
max	6.8	date	February 1973	246
Remarks:				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Potamogeton cheesemanii	246
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,246
macrophytes	246
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

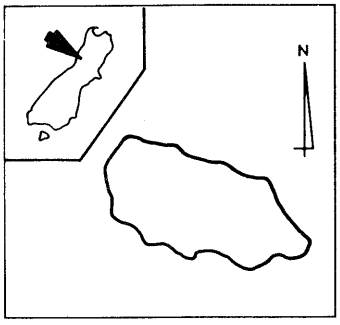
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAUPIRI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	152-183
WATER BOARD	Westland	LONG AXIS (km)	2.6 (NW)
MAP REF (NZMS1)	S52 168738	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K32 022480	MAX DEPTH (m)	20 (211)
LAKE TYPE	riverine	LAKE AREA (km²)	2.10
MAIN INFLOW	via swamp S and W sides	CATCHMENT AREA (km²) (land and lake)	53.91
MAIN OUTFLOW	Haupiri River	CATCHMENT No. (MWD)	914195
LEVEL CHANGES	-	DATA BASE CODE (MAF)	484 HAUPIRI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	6.5	pasture	10.3	flat (0–3°)	30.3
sand dune	-	tussock	1.2	undulating (4–7°)	5.2
cropland	-	lakes	4.3	rolling (8–15°)	40.7
lowland scrub	2.1	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	4.0
native forest	75.7	urban	-	steep (26–35°)	15.5
exotic forest	-	other	-	very steep (>35°)	-
				lakes	4.3

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	4.8	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	9.1	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	0.4	5.3	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	76.2				
lakes	4.3				

GENERAL REMARKS

- NW of Rotomanu township (351)
- used for fishing (211)
- wildlife refuge (211)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-211	ongoing	Chemistry Division	Water analyses.
	1963a	FFAS	Fisheries survey (1963).
302	1975b	Hughes	Review of data available.
351	1975a	Irwin	Checklist of NZ lakes.
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characterisation of beech forest lakes (1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE HAUPIRI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 6.6 g m^{-3}	t°C 13.3	date autumn		211
max 15.0 g m^{-3}	t°C 15	date March 1976		486
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single visit, profile graph (486).				

TEMPERATURE (°C)				REFS
min 15.5	(surface) 13.3	(bottom)		211
max 17.5 (3/76)	(surface) 15 (3/76)	(bottom)		486
max difference top to bottom 2.5°C				486
stratification mixed				486
Remarks: Single visit, profile graph (486). 3 depths sampled once; probably never stratified (211).				

SECCHI DISC DEPTH (m)			REFS
min 2.75	date autumn 1963		211
max -	date -		
mean 2.5	n 1	period 3/76	486
period of worst clarity -			
causes organic matter, flood			486,211
Remarks: Heavily stained with organic matter, mainly allocthonous (486).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 0.68	n 3	date March 1976	486
period of blooms -			
algae *Cyclotella, Chroomonas, Cryptomanas*			486
Remarks: Sampled with Ruttner Tube (486).			

pH READINGS		REFS
min 6.4 (surface)	date autumn	211
max "near neutral"	date March 1976	486
Remarks: Single site, 2 depths (211).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Myriophyllum sp.	486
		Characeae	486
Remarks: Macrophytes discussed in ref 302.			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters except pH	486
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	486
phytoplankton (algae)	211,486
macrophytes	211,302
zooplankton	211
macroinvertebrates	211
fish	211
wildlife	211
Remarks:	

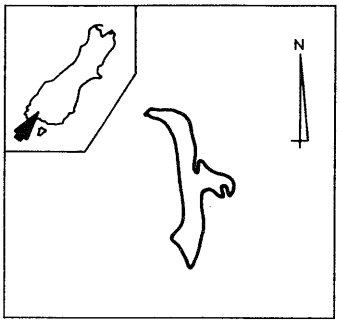
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	211,486	particulates	211,486
major ions	211	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	211
optical properties	486	other	-
Remarks: Reactive phosphate very low (486). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAUROKO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	157
WATER BOARD	Southland	LONG AXIS (km)	33.7 (N)
MAP REF (NZMS1)	S167 451478	MEAN DEPTH (m)	-
MAP REF (260 ser.)	C45 695527	MAX DEPTH (m)	462 (Irwin p.c.)
LAKE TYPE	glacial	LAKE AREA (km²)	68.30
MAIN INFLOW	-	CATCHMENT AREA (km²) (land and lake)	554.21
MAIN OUTFLOW	Wairaurahiri River	CATCHMENT No. (MWD)	809050
LEVEL CHANGES	-	DATA BASE CODE (MAF)	935 HAUROKO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-78)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	28.9
cropland	-	lakes	12.9
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	58.1	urban	-
exotic forest	-	other	0.1

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	1.8
undulating (4–7°)	3.2
rolling (8–15°)	2.1
strongly rolling (16–20°)	4.9
moderately steep (21–25°)	5.8
steep (26–35°)	8.1
very steep (>35°)	61.2
lakes	12.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	3.2	11.8	9.3	-	-
wind	-	-	-	-	-
scree creep	0.2	6.5	0.7	-	-
soil slip	24.3	8.4	0.6	-	-
earth slip	0.6	-	-	-	0.1
slump	-	-	-	-	-
debris avalanche	7.0	6.4	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	0.3	2.9	-	-	-
deposition	0.3	0.5	0.3	-	-
negligible	3.7				
lakes	12.9				

GENERAL REMARKS

- NW of Tuatapere township
- in Fjordland National Park
- several small islands, one large - Mary Island.

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
490	1882	Paulin	Account of visit.
525	1910	Smith	Notes on botany.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE HAUROKO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t°C	date	
max	t°C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)					REFS
min 14.0		date n.s.			Irwin p.c.
max 16.0		date n.s.			Irwin p.c.
mean 15.1	n n.s.		period n.s.		Irwin p.c.
period of worst clarity -					
causes -					
Remarks:					

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min		date	
max		date	
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	525
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

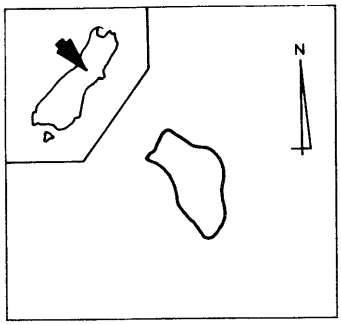
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: No data found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAWDON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	576
WATER BOARD	North Canterbury	LONG AXIS (km)	1.0 (NNW)
MAP REF (NZMS1)	S66 311086	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L34 164886	MAX DEPTH (m)	4.0 (351)
LAKE TYPE	n.d.	LAKE AREA (km^2)	0.30
MAIN INFLOW	swampland stream	CATCHMENT AREA (km^2) (land and lake)	2.08
MAIN OUTFLOW	Slovens Stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	535 HAWDON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	82.2
sand dune	-	tussock	-
cropland	-	lakes	17.8
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	1.0
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	36.1
moderately steep (21–25°)	-
steep (26–35°)	45.2
very steep (>35°)	-
lakes	17.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	44.2	-
wind	-	36.1	-	-	-
scree creep	-	-	-	-	1.0
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	1.0				
lakes	17.8				

GENERAL REMARKS

- W of Craigieburn (351)
- used for boating and fishing (531)
- limited access (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-227	ongoing	Chemistry Division	Water analyses.
227	1959	Gage	Lake origin.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Comparison of mountain lakes (1967-68).
556	1977b	Stout	Faunal biology (up to 1977).
573	1983	Timms	Benthic macroinvertebrates (1978-79).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE HAWDON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min	t °C	date		
max	t °C	date		
mean	n	period		
period of lowest oxygen				
Remarks: No data found.				

TEMPERATURE (°C)			REFS
min 0 (winter)	(surface) -	(bottom)	556
max 18.2	(surface) -	(bottom)	544
max difference top to bottom -			
stratification rarely, if ever stratified			531,544,556
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.32 mg m^{-3}	date n.s.		544
max 1.46 mg m^{-3}	date n.s.		544
mean -	n -	date -	
period of blooms -			
algae unicellular blue-greens			544
Remarks: Chlorophyll particularly low (544). Almost no phytoplankton (556).			

pH READINGS		REFS
min 6.7	date n.s.	544
max 8.04	date February 1976	531
Remarks: Monthly readings 5/67-7/68 (544). Single reading only (531).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biochemical assay	531
oligotrophic	various	573
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	544,556
macrophytes	556
zooplankton	544,556
macroinvertebrates	556,573
fish	556
wildlife	556
Remarks: Snails dominate benthos, unusual species *Calopsectra funebris* present (573). Brief review of previous biological work (556).	

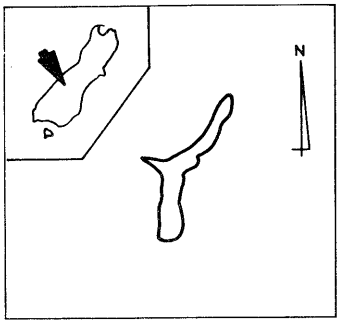
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531,544	particulates	-
major ions	531,544	redox	544,556, 573
trace elements	-	salinity	556
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other ATP, Vmax	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAWEA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Vincent	ALTITUDE (m a.s.l.)	347
WATER BOARD	Otago	LONG AXIS (km)	41.9 (N-NNW)
MAP REF (NZMS1)	S115 069297	MEAN DEPTH (m)	-
MAP REF (260 ser.)	G39 144214	MAX DEPTH (m)	384 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	137.60
MAIN INFLOW	Hunter River	CATCHMENT AREA (km²) (land and lake)	1394.17
MAIN OUTFLOW	Hawea River	CATCHMENT No. (MWD)	752980
LEVEL CHANGES	324-347	DATA BASE CODE (MAF)	671 HAWEA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	2.4
sand dune	-	tussock	52.5
cropland	-	lakes	11.0
lowland scrub	6.3	rivers	-
subalpine scrub	8.3	ice and snow	-
native forest	17.1	urban	-
exotic forest	-	other	2.4

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	1.5
undulating (4–7°)	1.6
rolling (8–15°)	1.7
strongly rolling (16–20°)	1.3
moderately steep (21–25°)	6.0
steep (26–35°)	51.7
very steep (>35°)	22.8
lakes	11.0

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	12.4	21.9	4.2	-	-
wind	1.4	0.1	-	-	-
scree creep	1.8	16.2	10.8	5.4	1.2
soil slip	0.7	2.6	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	0.3	3.0	0.9	0.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	1.0	-	-	0.7	-
tunnel gully	-	-	-	-	-
streambank	1.1	-	-	-	-
deposition	0.2	-	-	-	-
negligible	0.6				
lakes	11.0				

GENERAL REMARKS

- NNW of Lake Hawea township (351)
- one island, Silver Island (351)
- "The Neck" 1.6 km wide separates Lakes Wanaka and Hawea (351)
- used for recreational purposes, HEP

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
26	1981	Borlase	Water quality baseline survey.
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
-	-	Freshwater Section	DSIR pers comm.
196	1975	Flint	Phytoplankton.
235	1974	Glasby & Edgerly	Water geochemistry with regard to marine aerosols (1971).
253	1975b	Green	Water clarity.
282	1970a	Hill	Current status (1970).
347	1974a	Irwin	Water clarity (1971).
351	1975a	Irwin	Checklist of NZ lakes.
424	1979	McBride	Water quality (up to 1979).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE HAWEA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 5 g m^{-3}	t°C n.s.	date n.s.		Freshwater Section p.c.
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks:				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 14 (4/70)	(surface) -	(bottom)	282
max difference top to bottom -			
stratification -			
Remarks: Single reading only (282).			

SECCHI DISC DEPTH (m)			REFS
min 8.9	date April 1970		282
max 21.5	date August 1971		347
mean 18.8	n 5	period 1971	347
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Asterionella, Mougeotia, Dinobryon*			196
Remarks:			

pH READINGS		REFS
min 7.4	date n.s.	26
max -	date -	
Remarks: Single reading only (26).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Characeae	282
Remarks: Few macrophytes because of variation in lake level (282).			

TROPHIC STATUS	BASIS	REFS
"pristine and unpolluted"	water chemistry	424
oligotrophic	water chemistry	Irwin p.c.
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	26,424
phytoplankton (algae)	196
macrophytes	282
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

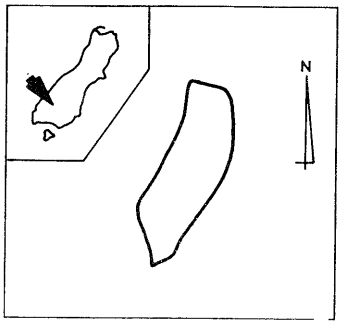
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	26,282,424	particulates	424
major ions	235,424	redox	26,424
trace elements	235,424	salinity	26,424
organic matter	424	alkalinity	424
toxic organics	-	hardness	424
pigments	-	silica	235,282, 424
optical properties	-	other	
Remarks: Chemistry Division (109). For history of lake water quality see ref 424. Taken at various depth ranges but no trends obvious (234).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAYES

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	329
WATER BOARD	Otago	LONG AXIS (km)	3.1 (NNE)
MAP REF (NZMS1)	S132 678767	MEAN DEPTH (m)	18.7 (56)
MAP REF (260 ser.)	F41 795724	MAX DEPTH (m)	35 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	2.03
MAIN INFLOW	two streams	CATCHMENT AREA (km²) (land and lake)	43.91
MAIN OUTFLOW	creek to Kawarau River	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	744 HAYES

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	81.6	flat (0–3°)	10.0
sand dune	-	tussock	12.4	undulating (4–7°)	21.0
cropland	-	lakes	6.1	rolling (8–15°)	25.4
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	29.9
native forest	-	urban	-	steep (26–35°)	7.7
exotic forest	-	other	-	very steep (>35°)	-
				lakes	6.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	34.6	12.5	-	-	-
wind	37.6	-	-	-	-
scree creep	-	0.4	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	8.8				
lakes	6.1				

GENERAL REMARKS

- NE of Frankton
- 40 residences around lake with septic tanks (458)
- topdressing airstrip on shore; cheese factory effluent (378)
- in a Reserve
- popular for swimming, fishing, camping, boating (128)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
26*	1981	Borlase	Water quality baseline survey.
39	1974	Brosnan	Zooplankton.
53	1974a	Burns	General report.
55	1975	Burns	Quantitative phytoplankton study.
56	1974	Burns & Mitchell	Phytoplankton distribution and succession (1969-72).
57	1980	Burns & Mitchell	Zooplankton distribution and succession.
92	1975	Chapman *et al*	Zooplankton.
128	1973	Cook	Geolimnology and eutrophication.
222	1973a	Freshwater Section	Lake restoration.
253	1975b	Green	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
372	1952	Jolly	Preliminary study of limnology.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
382	1975	Jolly & Irwin	Thermal conditions.
439	1972	McKenzie	Nitrogen fixing organisms.
453	1972	Mitchell	Eutrophication.
457	1972	Mitchell & Burns	Discussion of eutrophication.
458*	1979	Mitchell & Burns	Oxygen consumption (1969-72).
459*	1981	Mitchell & Burns	Phytoplankton and nutrients (1969-72).
554	1975c	Stout	Brief description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data*pertaining to this lake.

LAKE HAYES

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	0 g m^{-3}	t°C	9	date	1/69-4/69	458
max	112%	t°C	7.5	date	11/53	378
mean	50%	n	7	period	up to 1957	378
period of lowest oxygen	summer/autumn					378,458
Remarks: 4 seasonal visits (378). Monthly samples at 1 site for 2 years 12/69-2/72 (458).						

TEMPERATURE (°C)					REFS
min	5.75	(surface)	5.6	(bottom)	378
max	21 (2/71)	(surface)	9 (summer)	(bottom)	458
max difference top to bottom	12°C				458
stratification	stratified				378,458,554
Remarks:					

SECCHI DISC DEPTH (m)					REFS
min	1.9	date	n.s.		458
max	7.6	date	April 1953		378
mean	6.0	n	7	period up to 1957	378
period of worst clarity	autumn				378
causes	-				
Remarks:					

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	2 mg m^{-3}	date	August 1971	459
max	29 mg m^{-3}	date	December 1971	459
mean	8	n 20	date 12/69-2/72	459
period of blooms	summer			56
algae	*Melosira, Closteriopsis, Closterium, Cyclotella, Staurastrum, Anabaena*			554
Remarks:				

pH READINGS				REFS
min	7.1	date	August 1953	378
max	9.4	date	November	458
Remarks: Surface sample (458).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	56	*Elodea canadensis*	56
		Ranunculus fluitans	56
		Myriophyllum elatinoides	56
Remarks:			

TROPHIC STATUS	BASIS	REFS
mesotrophic (1947-54)	n.s.	554
eutrophic	algae	56,458
Remarks: Has become more eutrophic since 1954-55 (458).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	26,56,439
phytoplankton (algae)	55,56,459,554
macrophytes	56,222
zooplankton	39,57,92,554
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

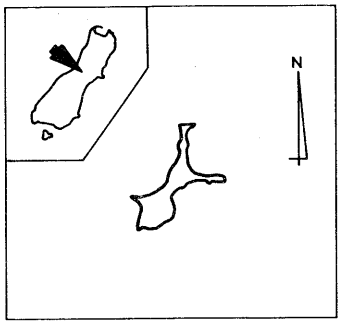
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	26,56,378, 459,554	particulates	-
major ions	378,459,554	redox	26,459
trace elements	-	salinity	-
organic matter	-	alkalinity	378,554
toxic organics	-	hardness	-
pigments	-	silica	378,554
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HERON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ashburton	ALTITUDE (m a.s.l.)	694
WATER BOARD	North Canterbury	LONG AXIS (km)	6.6 (NNE)
MAP REF (NZMS1)	S73 705622	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J35 617452	MAX DEPTH (m)	37 (ref 351)
LAKE TYPE	riverine	LAKE AREA (km^2)	6.30
MAIN INFLOW	Swin River	CATCHMENT AREA (km^2) (land and lake)	124.39
MAIN OUTFLOW	to Rakaia River	CATCHMENT No. (MWD)	685167
LEVEL CHANGES	679-688	DATA BASE CODE (MAF)	571 HERON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	3.9
sand dune	-	tussock	85.3	undulating (4–7°)	19.7
cropland	-	lakes	5.6	rolling (8–15°)	13.7
lowland scrub	-	rivers	1.0	strongly rolling (16–20°)	0.4
subalpine scrub	8.1	ice and snow	-	moderately steep (21–25°)	11.8
native forest	-	urban	-	steep (26–35°)	43.9
exotic forest	-	other	-	very steep (>35°)	-
				lakes	5.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	5.2	8.9	8.6	0.6	-
wind	10.9	18.8	-	-	-
scree creep	-	2.5	1.3	5.4	27.3
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	1.3	-	-	-	-
negligible	2.5				
lakes	5.6				

GENERAL REMARKS

- SW of Lake Coleridge (351)
- swamp on west side of lake (351)
- used for fishing, irrigation

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout conditions (1969-70).
109	ongoing	Chemistry Division	Water analyses.
351	1975a	Irwin	Checklist of NZ lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE HERON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min -		date -		
max -		date -		
mean 3.5 mg m^{-3}	n 3	date 2/69-3/70		51
period of blooms -				
algae sparse				51
Remarks:				

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	51
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	51
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

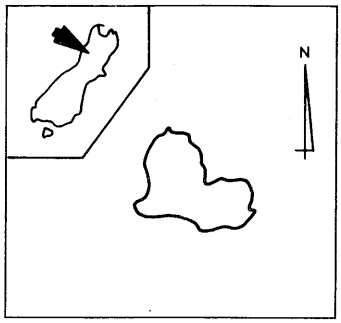
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51	particulates	-
major ions	-	redox	51
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Pmax	51
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HOCHSTETTER

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	256
WATER BOARD	Westland	LONG AXIS (km)	4.9 (NE)
MAP REF (NZMS1)	S45 139893	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K31 993621	MAX DEPTH (m)	-
LAKE TYPE	glacial?	LAKE AREA (km²)	6.60
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	17.75
MAIN OUTFLOW	Nelson Creek	CATCHMENT No. (MWD)	914150
LEVEL CHANGES	-	DATA BASE CODE (MAF)	480 HOCHSTTR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-74)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	2.9	pasture	-
sand dune	-	tussock	-
cropland	-	lakes	28.5
lowland scrub	3.8	rivers	-
subalpine scrub	-	ice and snow	-
native forest	64.8	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	15.3
undulating (4–7°)	3.8
rolling (8–15°)	43.8
strongly rolling (16–20°)	-
moderately steep (21–25°)	-
steep (26–35°)	8.6
very steep (>35°)	-
lakes	28.5

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	8.4	0.2	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	62.9				
lakes	28.5				

GENERAL REMARKS

- SE of Ahaura (351)
- bush surrounded, dam at SE end (351)
- general recreation use

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
302	1975b	Hughes	Review of information available.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characteristic of beech forest lakes (1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE HOCHSTETTER

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min - t°C - date -	
max - t°C - date -	
mean 8.0 g m^{-3} n single profile graph period March 1976	486
period of lowest oxygen n.s.	
Remarks:	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 19 (3/76) (surface) 17 (3/76) (bottom)	486
max difference top to bottom 2°C	486
stratification mixed	486
Remarks: Single visit, single profile graph (486).	

SECCHI DISC DEPTH (m)	REFS
min 1.0 date n.s.	Irwin p.c.
max 2.5 date March 1976	486
mean - n - period -	
period of worst clarity -	
causes organic matter	486
Remarks: Heavily stained with mainly allocthonous matter (486).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean 3.82 n 3 date March 1976	486
period of blooms -	
algae *Synura, Dinobryon, Gymnodinium*	486
Remarks: Greater bacterial than algal mass (486).	

pH READINGS	REFS
min date	
max date	
Remarks: Near neutral (486).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse macrophytes, species not listed (486).			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters other than pH	486
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	486
phytoplankton (algae)	486
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

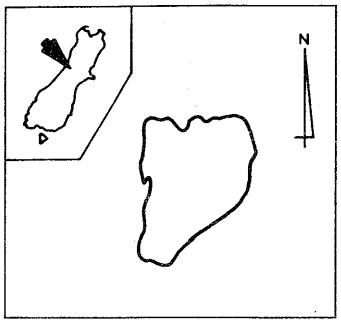
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	486	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	486	other	-
Remarks: Reactive P very low (486).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE IANTHE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	30
WATER BOARD	Westland	LONG AXIS (km)	3.4 (NE)
MAP REF (NZMS1)	S64 217140	MEAN DEPTH (m)	-
MAP REF (260 ser.)	I34 163918	MAX DEPTH (m)	-
LAKE TYPE	riverine	LAKE AREA (km^2)	4.42
MAIN INFLOW	3 creeks	CATCHMENT AREA (km^2) (land and lake)	18.37
MAIN OUTFLOW	Ianthe Creek to Wanganui River	CATCHMENT No. (MWD)	897060
LEVEL CHANGES	-	DATA BASE CODE (MAF)	531 IANTHE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975-76)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	10.2	pasture	4.0	flat (0–3°)	14.4	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	10.5	sheet	22.0	-	-	-	-
cropland	-	lakes	25.3	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	14.9	rivers	-	strongly rolling (16–20°)	4.4	scree creep	-	-	-	-	-
subalpine scrub	0.4	ice and snow	-	moderately steep (21–25°)	21.4	soil slip	38.2	0.2	-	-	-
native forest	45.1	urban	-	steep (26–35°)	6.9	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	17.3	slump	-	-	-	-	-
				lakes	25.3	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	4.0	-	-	-
						deposition	-	-	-	-	-
						negligible	10.3				
						lakes	25.3				

GENERAL REMARKS

- NNE of Harihari (351)
- surrounded by bush (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
347	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
553	1975b	Stout	Brief description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE IANTHE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)				REFS
min 2.5	date n.d.			347
max 2.8	date n.d.			347
mean 2.65	n n.d.	period n.d.		347
period of worst clarity -				
causes -				
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Gymnodinium, Cyclotella, Chlamydomonas, Dynobryon*			196
Remarks:			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks: See 553 also.	

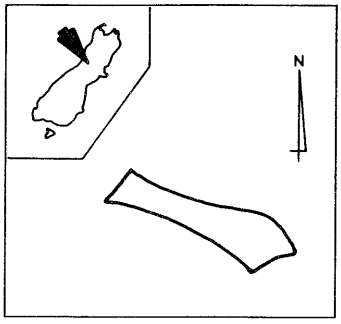
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: No data found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE IDA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	671-700
WATER BOARD	North Canterbury	LONG AXIS (km)	1.2 (WNW)
MAP REF (NZMS1)	S66 035927	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K34 914736	MAX DEPTH (m)	9.0 (351)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.10
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	4.13
MAIN OUTFLOW	Ida Burn to Ryton River	CATCHMENT No. (MWD)	685074
LEVEL CHANGES	-	DATA BASE CODE (MAF)	n.d.

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	100
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	1.2
steep (26–35°)	98.8
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	32.2	-	-	-
wind	-	1.2	-	-	-
scree creep	-	0.7	-	41.9	24.0
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- SW of Craigieburn Forest (351)
- usually freezes in winter (544)
- used for fishing, camping, skating (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Comparison of mountain lakes (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE IDA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t°C	date	
max	t°C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 0 (winter) (surface) - (bottom)	544
max 17.8 (summer) (surface) - (bottom)	544
max difference top to bottom n.s.	544
stratification mixed	531,544
Remarks: Monthly readings, one site, 5/67-7/68 (544).	

SECCHI DISC DEPTH (m)			REFS
min		date	
max		date	
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0.7 mg m^{-3} date n.s.	544
max 6.38 mg m^{-3} date n.s.	544
mean - n - date -	
period of blooms -	
algae *Botryococcus, Chlorella, Cyclotella*	196
Remarks: Algae cont.- *Oocystis, Chodatella* (196).	

pH READINGS		REFS
min 6.8	date n.s.	544
max 8.23	date February 1976	531
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemical assay	531
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	196,544
macrophytes	-
zooplankton	544
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

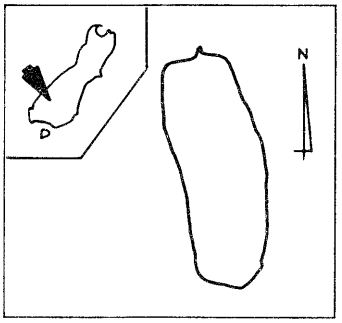
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531,544	particulates	-
major ions	531,544	redox	544
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other Vmax	531
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE JOHNSON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	392
WATER BOARD	Otago	LONG AXIS (km)	0.9 (NNW)
MAP REF (NZMS1)	S132 613737	MEAN DEPTH (m)	-
MAP REF (260 ser.)	F41 736695	MAX DEPTH (m)	27 (351)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.20
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	1.9
MAIN OUTFLOW	To Shotover River	CATCHMENT No. (MWD)	752745
LEVEL CHANGES	1 m fluctuation due to irrigation	DATA BASE CODE (MAF)	746 JOHNSTN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	45.8
sand dune	-	tussock	54.2
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	45.8
steep (26–35°)	54.2
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	55.3	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	44.7				
lakes	n.d.				

GENERAL REMARKS

- N of Frankton (351)
- also known as L Johnstone (351)
- level artificially raised in winter by 1 m to allow for summer irrigation (458)
- coolest bottom water of any NZ lake (458)
- used for fishing, wildfowl

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
55	1975	Burns	Quantitative phytoplankton study.
56	1974	Burns & Mitchell	Phytoplankton distribution and succession (1969-72).
57	1980	Burns & Mitchell	Zooplankton distribution and succession.
92	1975	Chapman *et al*	Zooplankton.
222	1973a	Freshwater Section	Lake restoration.
253	1975b	Green	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
439	1972	Mckenzie	Nitrogen fixing organisms.
453	1972	Mitchell	Eutrophication.
457	1972	Mitchell & Burns	Discussion of eutrophication.
458	1979	Mitchell & Burns	Oxygen consumption (1969-72).
459	1981	Mitchell & Burns	Phytoplankton and nutrients (1969-72).
484	1977a	Paerl	Ultraplankton biomass and production (1975-76).

Refer to introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE JOHNSON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 0 g m^{-3} **t°C** 6 **date** Nov-June	458
max 8.0 g m^{-3} **t°C** 5.3 **date** July 1971	458
mean - **n** - **period** -	
period of lowest oxygen summer/autumn	56,458,459
Remarks: Monthly samples for 2 years, 12/69-2/72, and presented as isopleth diagrams (458).	

TEMPERATURE (°C)	REFS
min 0 (winter) **(surface)** 5.3(9/71,72) **(bottom)**	56,458
max 21 (1/71) **(surface)** 6 (summer) **(bottom)**	458
max difference top to bottom 15°C	458
stratification strongly stratified	458
Remarks: Monthly samples for 2 years, isotherm diagrams (458).	

SECCHI DISC DEPTH (m)	REFS
min 0.9 **date** n.d.	253
max 6.6 **date** n.d.	253
mean 2.95 **n** n.d. **period** n.d.	253
period of worst clarity -	
causes algae	253
Remarks: Quote of data from Burns & Mitchell (56).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 1.0 mg m^{-3} **date** March 1970	459
max 60.0 mg m^{-3} **date** December 1970	459
mean @ 8.0 mg m^{-3} **n** 20 **date** 12/69-2/72	459
period of blooms summer	56
algae *Anabaena, Clostrium, Peridinium, Staurastrum*	56
Remarks: Ultraplankton a large proportion of total phytoplankton (484). *Anabaena* blooms since 1962 (56).	

pH READINGS	REFS
min 6.8 (26 metres) **date** n.s.	459
max 9.8 (0 metres) **date** n.s.	459
Remarks: Number of readings not determined but taken at surface and 26 m depth (459).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		Ranunculus fluitans	56
		Myriophyllum sp.	56
		Characeae	56
Remarks:			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	458
highly eutrophic	algae	56
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	56,439
phytoplankton (algae)	55,56,459
macrophytes	56
zooplankton	57,92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

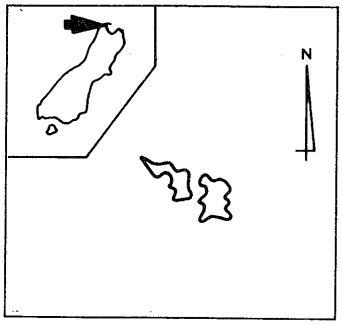
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	56,459	**particulates**	-
major ions	459	**redox**	459
trace elements	-	**salinity**	-
organic matter	-	**alkalinity**	-
toxic organics	-	**hardness**	-
pigments	-	**silica**	-
optical properties	-	**other** ATP	484
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KAIHOKA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Golden Bay	ALTITUDE (m a.s.l.)	30-61
WATER BOARD	Nelson	LONG AXIS (km)	0.6
MAP REF (NZMS1)	S3 022178	MEAN DEPTH (m)	6.5 (213)
MAP REF (260 ser.)	M24 764724	MAX DEPTH (m)	14.8 (213)
LAKE TYPE	beach	LAKE AREA (km^2)	0.03
MAIN INFLOW	-	CATCHMENT AREA (km^2) (land and lake)	1.09
MAIN OUTFLOW	-	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	387 KAIHOKA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-77)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	72.5
sand dune	27.5	tussock	-
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	27.5
strongly rolling (16–20°)	60.6
moderately steep (21–25°)	11.9
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	11.9	-	-	-	-
wind	27.5	-	-	-	-
scree creep	-	-	-	-	-
soil slip	60.6	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- SW of Camp Farewell (351)
- also called Tinawho
- used for stock watering
- wildlife and scenic reserve

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
213	1963c	FFAS	Fisheries survey (1963).
351	1975a	Irwin	Checklist of NZ lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE KAIHOKA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 1.4 g m^{-3} t°C 12.75 date 3/63	213
max - t°C - date -	
mean - n - period -	
period of lowest oxygen autumn	213
Remarks: Single visit, 1 sample (213).	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 17.75(3/63) (surface) 12.75(3/63) (bottom)	213
max difference top to bottom 5.0°C	213
stratification stratified	213
Remarks: Single visit (213).	

SECCHI DISC DEPTH (m)	REFS
min date	
max date	
mean n period	
period of worst clarity	
causes	
Remarks: No data found.	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min date	
max date	
mean n date	
period of blooms	
algae	
Remarks: No data found.	

pH READINGS	REFS
min 6.8 (at 13.3 m) date 3/63	213
max 8.2 (surface) date 3/63	213
Remarks:	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Isoetes sp.	213
		Myriophyllum sp.	213
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	213
zooplankton	213
macroinvertebrates	213
fish	213
wildlife	-
Remarks:	

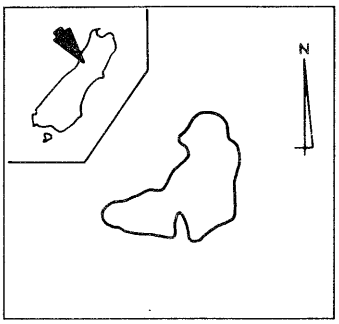
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	213	particulates	-
major ions	213	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	213
pigments	-	silica	213
optical properties	-	other	-
Remarks: Very high CO_2 level at bottom (213).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KANGAROO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	100
WATER BOARD	Westland	LONG AXIS (km)	2.0 (NE)
MAP REF (NZMS1)	S52 043682	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K32 909427	MAX DEPTH (m)	-
LAKE TYPE	n.d.	LAKE AREA (km²)	1.10
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	6.05
MAIN OUTFLOW	no surface outflow apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	488 KANGAROO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	18.0	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	18.0	sheet	59.3	-	-	-	-
cropland	-	lakes	19.2	rolling (8–15°)	3.5	wind	-	-	-	-	-
lowland scrub	3.5	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	59.3	soil slip	-	-	-	-	-
native forest	59.3	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	19.2	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	21.5				
						lakes	19.2				

GENERAL REMARKS

- NNW of Rotomanu township

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
302	1975b	Hughes	Review of information available.
351	1975a	Irwin	Checklist of NZ lakes.
484	1977a	Paerl	Ultraplankton and production 91975-76).
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characterisation of beech forest lakes (1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE KANGAROO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 5.0 g m^{-3} t°C 16.5 date March 1976	486
max - t°C - date -	
mean - n - period -	
period of lowest oxygen -	
Remarks: Single visit, profile graph of 1 site (486).	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 20.5 (3/76) (surface) 16.5 (3/76) (bottom)	486
max difference top to bottom 4°C	486
stratification stratified	486
Remarks: Thermocline at about 3.5 m, single visit, profile graph 1 site (486).	

SECCHI DISC DEPTH (m)	REFS
min - date -	
max - date -	
mean 4.0 n 1 period 3/76	486
period of worst clarity -	486
causes heavily stained by organic matter	486
Remarks:	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean 3.87 mg m^{-3} n 3 date March 1976	486
period of blooms -	
algae *Dictyosphaerium, Synura, Chroomonas*	486
Remarks: Greater bacterial than algal biomass (486). Some unidentifiable algal colonies (486).	

pH READINGS	REFS
min - date -	
max - date -	
Remarks: Near neutral (486).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse macrophytes (486).			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters except pH	486
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	486
macrophytes	486
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks: See ref 302.	

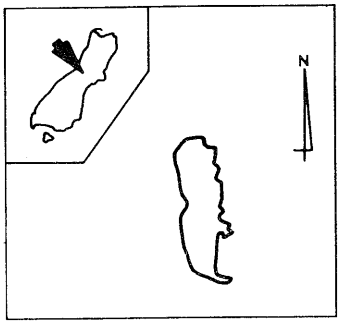
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	486	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Reactive P very low (486).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KANIERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	132
WATER BOARD	Westland	LONG AXIS (km)	8.6 (NNW)
MAP REF (NZMS1)	S58 683406	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J33 584168	MAX DEPTH (m)	197 (Irwin p.c.)
LAKE TYPE	glacial	LAKE AREA (km²)	14.65
MAIN INFLOW	7 creeks	CATCHMENT AREA (km²) (land and lake)	54.50
MAIN OUTFLOW	Kaniere River	CATCHMENT No. (MWD)	906015
LEVEL CHANGES	-	DATA BASE CODE (MAF)	516 KANIERE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975-77)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	8.6
sand dune	-	tussock	0.3
cropland	-	lakes	26.9
lowland scrub	-	rivers	-
subalpine scrub	1.9	ice and snow	-
native forest	62.4	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	2.9
undulating (4–7°)	12.2
rolling (8–15°)	7.7
strongly rolling (16–20°)	7.0
moderately steep (21–25°)	3.0
steep (26–35°)	22.0
very steep (>35°)	17.9
lakes	26.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	16.6	-	-	-	-
wind	-	-	-	-	-
scree creep	0.3	-	-	-	-
soil slip	21.1	18.9	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	16.2				
lakes	26.9				

GENERAL REMARKS

- E of Kokatahi township (351)
- bush surrounded; one island, Hans Island (351)
- retention period 8.7 years (474)
- used for fishing, boating, swimming

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-302	ongoing	Chemistry Division	Water analyses.
	1975b	Hughes	Review of information available.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
-	-	Jolly pers comm	Temperature.
474	1979	Noonan & Mulcock	Possible eutrophication after inflow diversion (1977).
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characterisation of beech forest lakes (1976).
553	1975b	Stout	Brief description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE KANIERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min -	t°C -	date -			
max 8.0	t°C 1.5	date March 1976			486
mean -	n -	period -			
period of lowest oxygen -					
Remarks: Single visit, profile graph of 1 site (486).					

TEMPERATURE (°C)			REFS
min 10.2 (n.s.)	(surface) -	(bottom)	Jolly p.c.
max 22.2 (n.s.)	(surface) 11.5 (3/76)	(bottom)	Jolly p.c. 486
max difference top to bottom 7.5°C			486
stratification stratified			486
Remarks: Thermocline > 50 m (486). Single visit, profile graph of 1 site (486).			

SECCHI DISC DEPTH (m)			REFS
min 7.0	date 3/76		486
max 8.5	date n.d.		Irwin p.c.
mean -	n -	period -	
period of worst clarity -			
causes lightly stained by organic matter			486
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.09 mg m^{-3}	date March 1976		486
max 2.64 mg m^{-3}	date February 1979		474
mean 2.64	n 6	date 9/77,10/77	474
period of blooms -			
algae *Cyclotella, Melosira, Dinobryon, Cryptomonas*			486
Remarks:			

pH READINGS		REFS
min -	date -	
max -	date -	
Remarks: Near neutral (486).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Little macrophyte growth (486).			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters except pH	486
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	474,486
phytoplankton (algae)	486
macrophytes	486
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Check 302.	

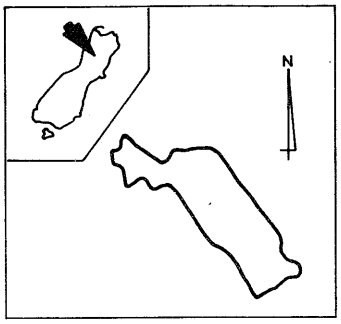
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	474,486	particulates	-
major ions	474	redox	474
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	486	other	-
Remarks: Reactive P very low (486). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KATRINE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hurunui	ALTITUDE (m a.s.l.)	518-549
WATER BOARD	North Canterbury	LONG AXIS (km)	2.1
MAP REF (NZMS1)	S53 626552	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L32 444317	MAX DEPTH (m)	28 (531)
LAKE TYPE	glacial	LAKE AREA (km²)	0.75
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	14.24
MAIN OUTFLOW	stream to Lake Sumner via swamp	CATCHMENT No. (MWD)	651230
LEVEL CHANGES	-	DATA BASE CODE (MAF)	502 KATRINE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	3.0	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	75.4	undulating (4–7°)	16.6	sheet	5.1	19.2	-	-	7.2
cropland	-	lakes	5.8	rolling (8–15°)	6.0	wind	19.9	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	19.2	15.7	4.4	0.8	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	5.1	soil slip	-	-	-	-	-
native forest	15.7	urban	-	steep (26–35°)	66.5	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	5.8	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	2.7	-	-	-	-
						negligible	-				
						lakes	5.8				

GENERAL REMARKS

- SW of Lake Sumner (351)
- used for general recreation purposes (531)
- limited access (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-	ongoing	Chemistry Division	Water analyses.
347	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1975, 1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE KATRINE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 13.5(12/75) (surface) - (bottom)	531
max 14.8(3/76) (surface) - (bottom)	531
max difference top to bottom -	
stratification mixed	531
Remarks: 2 visits, single readings (531).	

SECCHI DISC DEPTH (m)			REFS
min 3.25	date n.d.		347
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 1.6 mg m^{-3} date December 1975	531
max 2.37 mg m^{-3} date March 1976	531
mean @ 2 mg m^{-3} n 4 date 12/75,3/76	531
period of blooms -	
algae -	
Remarks: Sparse algae (531).	

pH READINGS		REFS
min 7.4	date March 1976	531
max 7.7	date December 1975	531
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biochemistry	531
Remarks: Some biochemical parameters indicate mesotrophy (531).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	531
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

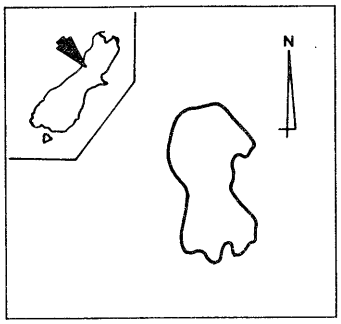
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE LADY

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	91-122
WATER BOARD	Westland	LONG AXIS (km)	1.8 (N)
MAP REF (NZMS1)	S52 066699	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K32 930443	MAX DEPTH (m)	23 (196)
LAKE TYPE	n.d.	LAKE AREA (km²)	1.25
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	17.91
MAIN OUTFLOW	Lady Creek to Crooked River	CATCHMENT No. (MWD)	914067
LEVEL CHANGES	-	DATA BASE CODE (MAF)	478 LADY

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	10.7	pasture	-
sand dune	-	tussock	-
cropland	-	lakes	7.6
lowland scrub	1.5	rivers	-
subalpine scrub	-	ice and snow	-
native forest	80.3	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	10.7
undulating (4–7°)	1.5
rolling (8–15°)	3.2
strongly rolling (16–20°)	10.6
moderately steep (21–25°)	42.2
steep (26–35°)	24.3
very steep (>35°)	-
lakes	7.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	52.8	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	9.2	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	15.1	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	15.4				
lakes	7.6				

GENERAL REMARKS

- N of Rotomanu township (351)
- bush on W side (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
302	1975b	Hughes	Review of information available.
351	1975a	Irwin	Checklist of NZ lakes.
485	1977b	Paerl	Summary of limnology.
486	1979	Paerl *et al*	Characterisation of beech forest lakes (1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE LADY

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 2.5 g m^{-3}	t°C 11	date March 1976		486
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single visit, single profile graph (486).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 18 (3/76)	(surface) 11 (3/76)	(bottom)	486
max difference top to bottom 7°C			486
stratification stratified			486
Remarks: Thermocline at about 12 m depth (486). Single visit, single profile graph (486).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 3.4	n 1	period 3/76	486
period of worst clarity -			
causes heavily stained by organic matter			486
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 1.19	n 3	date March 1976	486
period of blooms -			
algae *Chroomonas, Cryptomonas, Schroederia*			196,486
Remarks: Bacterial biomass greater than algal biomass (486). Ultraplankton biomass @ 24% of total phytoplankton (486).			

pH READINGS		REFS
min -	date -	
max -	date -	
Remarks: Near neutral (486).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse (486).			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters except pH	486
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	486
phytoplankton (algae)	196,486
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

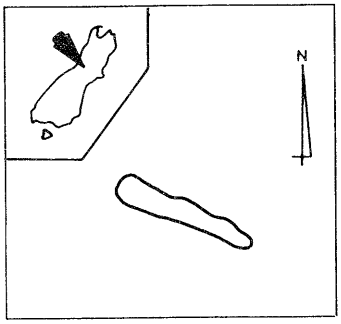
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	486	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	486	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE LETITIA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	589
WATER BOARD	North Canterbury	LONG AXIS (km)	1.5 (WNW)
MAP REF (NZMS1)	S66 398146	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L34 242942	MAX DEPTH (m)	16 (531)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.28
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	1.82
MAIN OUTFLOW	Letitia Stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	530 LETITIA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	2.2	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	50.5	undulating (4–7°)	-	sheet	-	50.5	31.3	-	-
cropland	-	lakes	15.9	rolling (8–15°)	12.1	wind	-	2.2	-	-	-
lowland scrub	31.3	rivers	-	strongly rolling (16–20°)	31.3	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	40.7	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	15.9	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	15.9				

GENERAL REMARKS

- NE of Craigieburn (351)
- bush on NW side (351)
- the most sheltered of the Cass vicinity lakes (556)
- limited access; used for fishing (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-227	ongoing 1959	Chemistry Division Gage	Water analyses. Lake origin.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
556	1977b	Stout	Faunal biology (up to 1977).
573	1983	Timms	Benthic macroinvertebrates (1978-79).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE LETITIA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN		REFS
min -	t°C - date -	
max -	t°C - date -	
mean -	n - period -	
period of lowest oxygen summer		556
Remarks: Occasionally deoxygenates (573).		

TEMPERATURE (°C)		REFS
min 0 (winter) (surface) -	(bottom)	556
max 19.4 (2/76) (surface) -	(bottom)	573
max difference top to bottom -		
stratification mixed (531) stratified 1/76		556
Remarks:		

SECCHI DISC DEPTH (m)		REFS
min	date	
max	date	
mean	n period	
period of worst clarity		
causes		
Remarks: No data found.		

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min 2.30 mg m^{-3}	date -	531
max 2.65 mg m^{-3}	date -	531
mean 2.52 mg m^{-3} n n.d.	date 12/75-3/76	531
period of blooms -		
algae -		
Remarks:		

pH READINGS		REFS
min -	date -	
max 8.12	date February 1976	531
Remarks: Near neutral (556). Single value only (531).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Extensive areas of weed growths (573).			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemical assay	531
oligo-mesotrophic	water quality, biology	573
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	556
macrophytes	556
zooplankton	556
macroinvertebrates	556,573
fish	556
wildlife	556
Remarks: Very brief review of previous work (556). Chironomids dominate macrobenthos (573).	

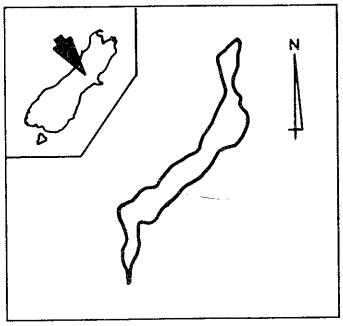
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	531
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax, ATP	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE LYNDON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	841
WATER BOARD	North Canterbury	LONG AXIS (km)	3.9 (NE)
MAP REF (NZMS1)	S74 182851	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K35 050669	MAX DEPTH (m)	28 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	1.11
MAIN INFLOW	no major streams	CATCHMENT AREA (km²) (land and lake)	15.55
MAIN OUTFLOW	intermittent stream	CATCHMENT No. (MWD)	685054
LEVEL CHANGES	drops in winter due to evaporation (487)	DATA BASE CODE (MAF)	558 LYNDON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED -)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	5.1
sand dune	-	tussock	91.8	undulating (4–7°)	-
cropland	-	lakes	8.2	rolling (8–15°)	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	8.8
native forest	-	urban	-	steep (26–35°)	77.9
exotic forest	-	other	-	very steep (>35°)	-
				lakes	8.2

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	2.2	1.2	35.4	16.9	-
wind	-	2.9	-	-	-
scree creep	-	-	-	-	22.8
soil slip	-	-	-	10.4	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	8.2				

GENERAL REMARKS

- WNW of Springfield (351)
- used for boating, camping, fishing, ice skating (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout conditions (1969-70).
52	1975	Burnet & Wallace	Productivity and trout conditions.
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
227	1959	Gage	Lake origin.
239	1964	Goldman	Productivity limiting nutrients (1962).
351	1975a	Irwin	Checklist of NZ lakes.
487	1948	Parry	Chemical survey (1947-48).
491	1948	Percival	Brief description.
492	1949	Percival	Summary of chemical survey.
493	1951	Percival	Zooplankton.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Comparison of mountain lakes (1967-68).
573	1983	Timms	Benthic macroinvertebrates (1978-79).
580	1984	Vant & Davies-Colley	Water clarity (1983).
609	1975	Winterbourn & Lewis	Littoral fauna.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE LYNDON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 6.47 g m^{-3} t °C n.s. date 12/47	487
max 10.2 g m^{-3} t °C n.s. date 10/47	487
mean - n - period -	
period of lowest oxygen always fairly high	487
Remarks: 20 visits, 20 samples 3/47-10/48 (487). Same data discussed by Percival 1949 (492).	

TEMPERATURE (°C)	REFS
min 0 (7/47) (surface) 2.8 (7/47) (bottom)	487
max 18 (2/48) (surface) 18.0 (2/48) (bottom)	487
max difference top to bottom 0°C	487
stratification mixed	487,531, 544
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min 6.8 date March 1983	580
max - date -	
mean - n - period -	
period of worst clarity -	
causes wind stirred silt	487
Remarks: Single value only (580).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0.25 mg m^{-3} date n.s.	544
max 1.35 mg m^{-3} date n.s.	544
mean 1.1 n 8 date 2/69-7/70	51
period of blooms blooms uncommon	544
algae *Botryococcus, Cyclotella*	196
Remarks: No diatoms (487). Chlorophyll particularly low (544).	

pH READINGS	REFS
min 6.6 date n.s.	544
max 9.1 date n.s.	487
Remarks: 14 monthly readings (544). 20 monthly readings (487).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Bed weedy all over, *Nitella* sp (487).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biochemical assay	531
oligotrophic	water quality, biology	573
oligotrophic	algae	51,196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	51,52,196,487,544
macrophytes	487
zooplankton	92,493,544
macroinvertebrates	200,573,609
fish	51,52
wildlife	-
Remarks:	

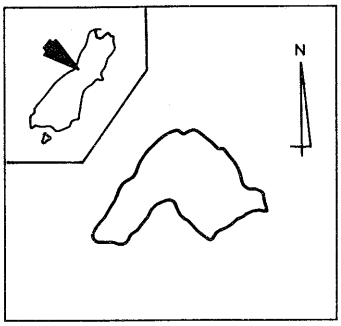
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,487,531, 544	particulates	580
major ions	239,487,531, 544	redox	51,544, 573
trace elements	-	salinity	-
organic matter	544	alkalinity	487,531
toxic organics	-	hardness	-
pigments	580	silica	487,544
optical properties	580	other Pmax	51
Remarks: Check Chemistry Division (109). Lists micronutinent limiting factors (239). Experiment reported in ref. 51 repeated by Burnet & Wallace (52). Silica limited lake (487). Vmax, ATP (531).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MAHINAPUA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	20
WATER BOARD	Westland	LONG AXIS (km)	3.8 (NE)
MAP REF (NZMS1)	S57 480461	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J33 398215	MAX DEPTH (m)	-
LAKE TYPE	glacial	LAKE AREA (km²)	3.40
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	31.31
MAIN OUTFLOW	Mahinapua Creek	CATCHMENT No. (MWD)	905000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	511 MAHINP

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	1.7	flat (0–3°)	25.9
sand dune	-	tussock	-	undulating (4–7°)	21.0
cropland	-	lakes	12.2	rolling (8–15°)	40.8
lowland scrub	32.8	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	53.2	urban	-	steep (26–35°)	-
exotic forest	-	other	-	very steep (>35°)	-
				lakes	12.2

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	26.3	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	0.3	-	-	-	-
deposition	-	-	-	-	-
negligible	61.1				
lakes	12.2				

GENERAL REMARKS

- NE of Ross near coast (351)
- W shore is an old sea beach (351)
- surrounded by bush (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MAHINAPUA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)					REFS
min	-	date	-		
max	-	date	-		
mean	1.25	n	n.d.	period n.d.	Irwin p.c.
period of worst clarity	-				
causes	-				
Remarks:					

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min		date	
max		date	
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	
phytoplankton (algae)	
macrophytes	
zooplankton	
macroinvertebrates	
fish	
wildlife	
Remarks: No data found.	

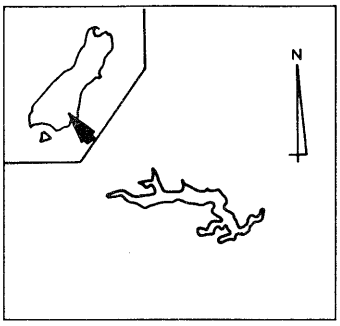
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: No data found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MAHINERANGI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Dunedin	ALTITUDE (m a.s.l.)	391
WATER BOARD	Otago	LONG AXIS (km)	21.5 (W)
MAP REF (NZMS1)	S163 755660	MEAN DEPTH (m)	6.2 (196)
MAP REF (260 ser.)	H44 497729	MAX DEPTH (m)	31.2 (351)
LAKE TYPE	reservoir	LAKE AREA (km²)	18.6
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	318.6
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	controlled over 10 m range for HEP	DATA BASE CODE (MAF)	915 MAHINRNG

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	8.1	flat (0–3°)	1.2	type \ severity	1	2	3	4	5
sand dune	-	tussock	80.4	undulating (4–7°)	4.8	sheet	49.0	-	-	-	-
cropland	-	lakes	6.4	rolling (8–15°)	34.6	wind	19.5	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	29.1	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	23.6	soil slip	9.7	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	5.1	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	6.4	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	15.5				
						lakes	6.4				

GENERAL REMARKS

- NNW of Outram Central (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
351	1975	Irwin	Checklist of NZ lakes.
452	1971	Mitchell	Phytoplankton productivity.
454	1975a	Mitchell	Effects of agricultural development and level fluctuations on plankton.
-	-	Mitchell pers comm	Low oxygen data.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MAHINERANGI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min *0 g m^{-3}	t °C n.s.	date n.d.		Mitchell p.c.
max -	t °C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: *Recently occurred in a small deep basin.				

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min 2.1	date -		452
max 4.4	date -		452
mean 3.1	n n.d.	period n.d.	452
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.5 mg m^{-3}	date -		452,454
max 14.5 mg m^{-3}	date -		452,454
mean @ 5 mg m^{-3} n -		date -	
period of blooms -			
algae *Cyclotella*, *Gymnodinium*			196
Remarks:			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	452	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

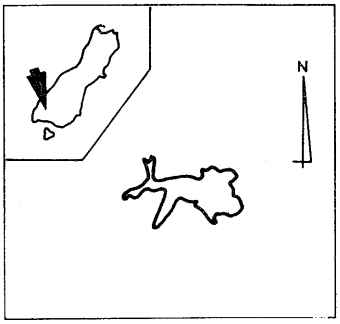
BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,452,454
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MANAPOURI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	179
WATER BOARD	Southland	LONG AXIS (km)	28.3 (EW)
MAP REF (NZMS1)	S149 637074	MEAN DEPTH (m)	-
MAP REF (260 ser.)	C43 855074	MAX DEPTH (m)	444 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	143.33
MAIN INFLOW	Waiau River	CATCHMENT AREA (km²) (land and lake)	1428.06
MAIN OUTFLOW	Waiau River	CATCHMENT No. (MWD)	797450
LEVEL CHANGES	determined by HEP	DATA BASE CODE (MAF)	865 MANAPR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.6	pasture	2.9	flat (0–3°)	6.4
sand dune	-	tussock	32.8	undulating (4–7°)	3.7
cropland	-	lakes	10.4	rolling (8–15°)	4.0
lowland scrub	1.4	rivers	0.2	strongly rolling (16–20°)	5.2
subalpine scrub	2.4	ice and snow	-	moderately steep (21–25°)	7.2
native forest	49.4	urban	-	steep (26–35°)	15.3
exotic forest	-	other	-	very steep (>35°)	47.6
				lakes	10.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	15.6	13.5	0.6	-	-
wind	2.8	0.1	-	-	-
scree creep	3.9	11.7	2.3	0.2	0.1
soil slip	19.0	3.7	0.1	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	5.2	2.4	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	4.7	1.6	-	-	-
deposition	0.4	-	-	-	-
negligible	1.4				
lakes	10.4				

GENERAL REMARKS

- WNW of Manapouri township (351)
- several islands (351)
- used for HEP, swimming, boating, fishing, tourism
- monthly mean discharge 405 m^3 sec^{-1}
- example of a piedmont lake (378)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
10	1966	Axbey	Macrophyte distribution.
92	1975	Chapman *et al*	Zooplankton.
108	1969	Chemistry Division	Submerged timber and oxygen content of water.
109-	ongoing	Chemistry Division	Water analyses.
156	1970	Ecology Division	Effects of raising lake level.
196	1975	Flint	Phytoplankton.
282*	1970a	Hill	Current status (1970).
330	1969e	Irwin	Bathymetric chart.
338*	1971c	Irwin	Limnological exploration (1968).
351	1975a	Irwin	Checklist of NZ lakes.
368	1972	Johnson	Ecology of shoreline vegetation.
373	1953	Jolly	Brief description.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology of NZ lakes (up to 1967).
382	1975	Jolly & Irwin	Thermal conditions.
438	1970	McKellar	Summary of reports available.
550	1973a	Stout	Preliminary report.
554	1975c	Stout	Brief description.
601	1970	Wildlife Division	Weed map.
609	1975	Winterbourn & Lewis	Littoral fauna.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data*pertaining to this lake.

LAKE MANAPOURI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min -	t°C -	date -		
max 112%	t°C 9	date April 1953		378
mean -	n -	period -		
period of lowest oxygen	none recorded			378
Remarks:				

TEMPERATURE (°C)	REFS
min 8.0 (11/68) (surface) 7.9 (11/68) (bottom)	338
max 17.75(2/53) (surface) 9.2 (2/53) (bottom)	382
max difference top to bottom 8.5°C	382
stratification stratified, January-June	338,382,378
Remarks: 8 profile graphs (338). Mixing to at least 400 m (338).	

SECCHI DISC DEPTH (m)			REFS
min 7.0	date January 1953		378
max 10.0	date April 1970		282
mean 6.5	n 3	period pre 1967	378
period of worst clarity autumn			378
causes humic material			378
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.3 mg m^{-3}	date n.d.		554
max 2.5 mg m^{-3}	date n.d.		554
mean -	n -	date -	
period of blooms -			
algae *Closterium, Staurastrum, Melosira*			196
Remarks:			

pH READINGS		REFS
min 6.5	date April 1953	378
max -	date -	
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	10
		Myriophyllum elatinoides	10
		Potamogeton spp.	10
		Isoetes alpinus	10
Remarks: Lake in two zones; zone 2 with Hope Arm is shallower and more suited to macrophyte growth (10).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,282
macrophytes	10,282,601
zooplankton	92
macroinvertebrates	609
fish	-
wildlife	-
Remarks:	

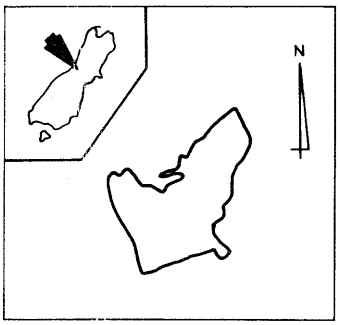
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	282,378	particulates	378
major ions	378	redox	-
trace elements	-	salinity	-
organic matter	378	alkalinity	378
toxic organics	-	hardness	-
pigments	-	silica	282,378
optical properties	-	other tritium	338
Remarks: Relatively high phosphate (282). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MAPOURIKA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	61-91
WATER BOARD	Westland	LONG AXIS (km)	5.3 (NNE)
MAP REF (NZMS1)	S71 840816	MEAN DEPTH (m)	-
MAP REF (260 ser.)	H35 823615	MAX DEPTH (m)	114 (196)
LAKE TYPE	riverine	LAKE AREA (km²)	8.30
MAIN INFLOW	9 main streams	CATCHMENT AREA (km²) (land and lake)	66.31
MAIN OUTFLOW	Okarito River	CATCHMENT No. (MWD)	891210
LEVEL CHANGES	-	DATA BASE CODE (MAF)	561 MAPOURK

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	8.5	flat (0–3°)	9.9	type \ severity	1	2	3	4	5
sand dune	-	tussock	1.5	undulating (4–7°)	2.5	sheet	18.0	-	-	-	-
cropland	-	lakes	13.3	rolling (8–15°)	4.7	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	1.8	0.6	-	-
subalpine scrub	6.0	ice and snow	-	moderately steep (21–25°)	19.6	soil slip	39.7	1.1	-	-	-
native forest	69.7	urban	-	steep (26–35°)	1.7	earth slip	-	-	-	-	-
exotic forest	-	other	1.1	very steep (>35°)	47.3	slump	-	-	-	-	-
				lakes	13.3	debris avalanche	5.1	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	19.5				
						lakes	13.3				

GENERAL REMARKS

- N of Franz Josef Glacier township (351)
- bush surrounded (351)
- lake originated 11-14 thousand years ago (198)
- used for fishing
- in Westland National Park

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-196	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
198	1979	Flint	Phytoplankton and chemistry (1933, 1965-75).
298	1974a	Hughes	Description of *Elodea* infestation (1974).
299	1974b	Hughes	Analytical results of *Elodea* infestation (1974).
302	1975b	Hughes	Review of data.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
546	1969c	Stout	Limnological data.
552	1975a	Stout	Comparison of lakes at different altitudes.
553	1975b	Stout	Brief description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MAPOURIKA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max -	(surface) -	(bottom)	
max difference top to bottom -			
stratification shallow thermocline			198
Remarks: Usually stratifies in summer (198).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 7	date October 1974		299,302
mean -	n -	period -	
period of worst clarity -			
causes weakly stained by organic matter			198
Remarks: Single reading (299,302).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Cyclotella, Dinobryon, Melosira*			196,198
Remarks:			

pH READINGS		REFS
min 6.6	date autumn 1965-71	198
max 7.1	date spring, summer	198
Remarks: 7 visits (198).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		*Elodea canadensis**	299
Remarks: *Infested lake after introduction in 1972 (299).			

TROPHIC STATUS	BASIS	REFS
oligo-mesotrophic	algae	196,198
oligo-mesotrophic	physico-chemical	198,552
oligo-mesotrophic	PO_4, conductivity, algae	299
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,198
macrophytes	198,299,302
zooplankton	92,198
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

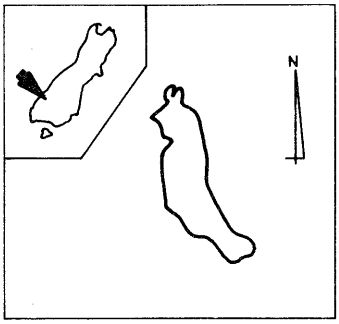
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	198,299,302	particulates	-
major ions	198	redox	198,299, 302
trace elements	-	salinity	-
organic matter	-	alkalinity	198
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	198	other	-
Remarks: Nitrogen levels high, but conspicuous P limitation to production (299,302). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MARCHANT

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	55
WATER BOARD	Southland	LONG AXIS (km)	3.7 (NNW)
MAP REF (NZMS1)	S130 408607	MEAN DEPTH (m)	-
MAP REF (260 ser.)	C42 637557	MAX DEPTH (m)	100 (552)
LAKE TYPE	glacial	LAKE AREA (km^2)	2.50
MAIN INFLOW	Stillwater River	CATCHMENT AREA (km^2) (land and lake)	174.37
MAIN OUTFLOW	Stillwater River to Caswell Sound	CATCHMENT No. (MWD)	914050
LEVEL CHANGES	-	DATA BASE CODE (MAF)	768 MARCHANT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	4.2
sand dune	-	tussock	30.7	undulating (4–7°)	3.1
cropland	-	lakes	2.1	rolling (8–15°)	4.1
lowland scrub	-	rivers	-	strongly rolling (16–20°)	1.5
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	67.3	urban	-	steep (26–35°)	-
exotic forest	-	other	-	very steep (>35°)	85.0
				lakes	2.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	-	-	-	-
scree creep	9.4	21.3	-	-	-
soil slip	8.5	4.8	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	10.7	31.1	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	11.9	-	-	-	-
deposition	-	-	-	-	-
negligible	0.3				
lakes	2.1				

GENERAL REMARKS

- E of head of Caswell Sound (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
552	1975a	Stout	Comparison of lakes at different altitudes (1973).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MARCHANT

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min > 60%	t °C 10	date 2/73			552
max -	t °C -	date -			
mean -	n -	period -			
period of lowest oxygen -					
Remarks:					

TEMPERATURE (°C)				REFS
min -	(surface) -		(bottom)	
max 15.1 (2/73)	(surface) 10.0 (2/73)		(bottom)	552
max difference top to bottom 5.1°C				552
stratification stratified				552
Remarks: Single visit, 1 site (552).				

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 4.0	n 1	period 2/73	552
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 0.3	n 1	date 2/73	552
period of blooms -			
algae *Cyclotella, Tabellaria, Sphaerocystis*			196
Remarks:			

pH READINGS		REFS
min 6.2	date 2/73	552
max 6.7	date 2/73	552
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	n.s.	552
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196
macrophytes	-
zooplankton	552
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Dominant zooplankton *Boeckella bonata* (522).	

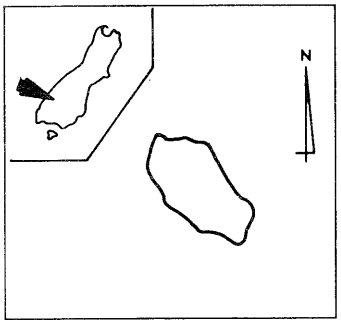
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	552
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MARION

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hurunui	ALTITUDE (m a.s.l.)	640-671
WATER BOARD	North Canterbury	LONG AXIS (km)	0.75 (NNE)
MAP REF (NZMS1)	S53 595522	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L33 416289	MAX DEPTH (m)	-
LAKE TYPE	n.d.	LAKE AREA (km^2)	0.15
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	1.16
MAIN OUTFLOW	Marion Stream to Lake Sumner	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	494 MARION

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	31.9	undulating (4–7°)	-	sheet	31.9	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	31.9	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	19.0	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	49.1	-	-	-
native forest	68.1	urban	-	steep (26–35°)	49.1	earth slip	-	-	-	-	-
exotic forest		other		very steep (>35°)	n.d.	slump	-	-	-	-	-
				lakes		debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	19.0				
						lakes	n.d.				

GENERAL REMARKS

- N of Lake Sumner (351)
- bush surrounded (351)
- limited access (531)
- fauna reserve (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1975-76).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MARION

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 15.3 (3/76) (surface) - (bottom)	531
max 16.0 (12/75) (surface) - (bottom)	531
max difference top to bottom -	
stratification mixed	531
Remarks: 2 visits, 1 site (531).	

SECCHI DISC DEPTH (m)			REFS
min		date	
max		date	
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 3.13 mg m^{-3} date December 1975	531
max 3.76 mg m^{-3} date March 1976	531
mean 3.5 mg m^{-3} n 4 date 12/75,3/76	531
period of blooms -	
algae -	
Remarks:	

pH READINGS		REFS
min 7.65	date March 1976	531
max 8.36	date December 1975	531
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemical assay	531
oligotrophic	reported in earlier work	531
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	-
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

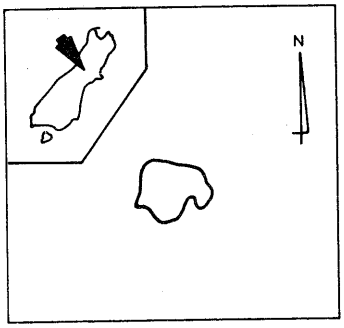
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	531
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax, ATP	531
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MARYMERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	616
WATER BOARD	North Canterbury	LONG AXIS (km)	0.7 (E)
MAP REF (NZMS1)	S66 314072	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L34 167873	MAX DEPTH (m)	2.0 (351)
LAKE TYPE	n.d.	LAKE AREA (km^2)	0.23
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	3.37
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	-
LEVEL CHANGES	several metres (ref 556)	DATA BASE CODE (MAF)	536 MARYMERE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	100	undulating (4–7°)	-	sheet	-	-	-	41.5	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	42.4	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	42.4	scree creep	-	-	-	-	16.0
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	57.6	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	n.d.				

GENERAL REMARKS

- WSW of Craigieburn (351)
- popular for boating, fishing (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-227	ongoing	Chemistry Division	Water analyses.
	1959	Gage	Lake origin.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Brief description of mountain lakes (1967-68).
556	1977b	Stout	Faunal biology (up to 1977), brief review of previous work.
573	1983	Timms	Benthic invertebrates (1978-79).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MARYMERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 0 (winter)	(surface) -	(bottom)	556
max 18.9	(surface) -	(bottom)	544
max difference top to bottom -			
stratification rarely, if ever, stratified			531,544, 556
Remarks: 14 samples, 5/67-7/68 (544).			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.62 mg m^{-3}	date n.s.		544
max 3.2 mg m^{-3}	date n.s.		544
mean -	n -	date -	
period of blooms -			
algae *Diatoma, Mougeotia, Staurastrum*			544
Remarks: Chlorophyll a, single sample 2.07 mg m^{-3}, February 1976 (531).			

pH READINGS			REFS
min 6.7	date n.s.		544
max 7.7	date n.s.		544
Remarks: 14 readings 5/67-7/68 (544).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemical assay	531
oligo-mesotrophic	various	573
Remarks: Relatively low ATP, high in all other parameters (531).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	544,556
macrophytes	556
zooplankton	544,556
macroinvertebrates	556,573
fish	556
wildlife	556
Remarks: Dominant macroinvertebrates - snails (573).	

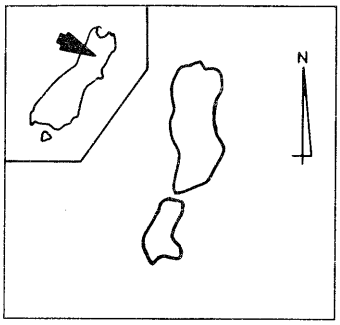
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531,544	particulates	-
major ions	531,544	redox	544
trace elements	531	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other Vmax,ATP	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MASON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hurunui	ALTITUDE (m a.s.l.)	617-700
WATER BOARD	North Canterbury	LONG AXIS (km)	2.2 (N)
MAP REF (NZMS1)	S53 598535	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L32 419301	MAX DEPTH (m)	38.5 (531)
LAKE TYPE	glacial	LAKE AREA (km²)	1.00
MAIN INFLOW	-	CATCHMENT AREA (km²) (land and lake)	8.38
MAIN OUTFLOW	-	CATCHMENT No. (MWD)	651153
LEVEL CHANGES	-	DATA BASE CODE (MAF)	505 MASON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	7.9
sand dune	-	tussock	54.9	undulating (4–7°)	-
cropland	-	lakes	8.0	rolling (8–15°)	12.1
lowland scrub	-	rivers	-	strongly rolling (16–20°)	0.1
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	37.1	urban	-	steep (26–35°)	72.0
exotic forest	-	other	-	very steep (>35°)	-
				lakes	8.0

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	15.5	12.3	-	11.0	-
wind	19.9	-	-	-	-
scree creep	-	33.2	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	0.1				
lakes	8.0				

GENERAL REMARKS

- SW of Lake Sumner (351)
- lake divided almost in 2 by east-west spits. Maximum depth in South Basin only 1.9 m (531)
- South Basin 18 hectares, North Basin 35 hectares (531)
- popular for fishing, camping (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
531	1978b	Spencer	Trophic status (1975, 1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MASON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 11.9(12/75) (surface) - (bottom)	531
max 13.5 (3/76) (surface) - (bottom)	531
max difference top to bottom -	
stratification mixed (both lakes)	531
Remarks: Figures given are for N Basin. Temperature range in S Basin 12.5-13.0 (531). Data based on two visits (531).	

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 9.0	date n.d.		Irwin p.c.
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Clarity of South Basin (Irwin p.c.).			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 1.04 mg m^{-3} date December 1975	531
max 1.56 mg m^{-3} date March 1976	531
mean @ 1.3 mg m^{-3} n 4 date 12/75,3/76	531
period of blooms -	
algae -	
Remarks: Sparse algae (531). Chlorophyll *a* range in South Basin = 3.46 - 3.59 mg m^{-3} (531).	

pH READINGS		REFS
min 7.5	date March 1976	531
max 7.78	date December 1975	531
Remarks: South Basin has similar pH (531).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
North Basin oligotrophic	biochemical assay	531
South Basin Mesotrophic	biochemical assay	531
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	-
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

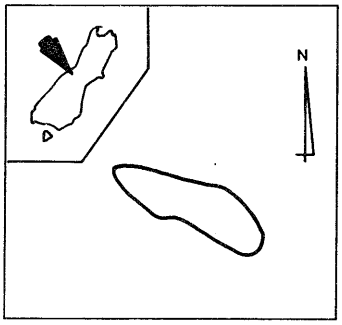
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	-
trace elements	531	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax,ATP	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MATHESON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	-
WATER BOARD	Westland	LONG AXIS (km)	0.7 (NW)
MAP REF (NZMS1)	S70 638668	MEAN DEPTH (m)	-
MAP REF (260 ser.)	H35 641477	MAX DEPTH (m)	12 (553)
LAKE TYPE	riverine	LAKE AREA (km²)	0.3
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	2.35
MAIN OUTFLOW	via Clearwater River to Cook River	CATCHMENT No. (MWD)	882050
LEVEL CHANGES	-	DATA BASE CODE (MAF)	570 MATHESON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	1.3	flat (0–3°)	1.3	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	11.9	sheet	-	-	-	-	-
cropland	-	lakes	6.4	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	80.4	-	-	-	-
native forest	92.3	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	80.4	slump	-	-	-	-	-
				lakes	6.4	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	13.2				
						lakes	6.4				

GENERAL REMARKS

- SE of Cook River (351)
- surrounded by bush (351)
- originated 14,000 years ago (198)
- in Westland National Park
- highly scenic

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109–196	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
198	1979	Flint	Phytoplankton and chemistry of 3 Westland monomictic lakes (1933, 1965-75).
351	1975a	Irwin	Checklist of NZ lakes.
553	1975b	Stout	Brief description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MATHESON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN		REFS
min 3%	t°C n.d. date n.d.	553
max -	t°C - date -	
mean -	n - period -	
period of lowest oxygen	sometimes almost deoxygenated	198
Remarks:		

TEMPERATURE (°C)	REFS
min 0 (winter) (surface) - (bottom)	198
max - (surface) - (bottom)	
max difference top to bottom -	
stratification sometimes stratified	198
Remarks: Determined by irregular visits in 1933, 1965-75. Shallow thermocline (198).	

SECCHI DISC DEPTH (m)	REFS
min - date -	
max - date -	
mean - n - period -	
period of worst clarity -	
causes organic matter	198
Remarks:	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms -	
algae *Cryptomona, Synura, Vacuolaria*	196,198
Remarks:	

pH READINGS		REFS
min 5.1	date May 1969	198
max 7.1	date February 1970	198
Remarks: Irregular visits, 5 surface readings.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
dystrophic	conforms to Swedish definition	198
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,198
macrophytes	-
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Benthic algae also (198).	

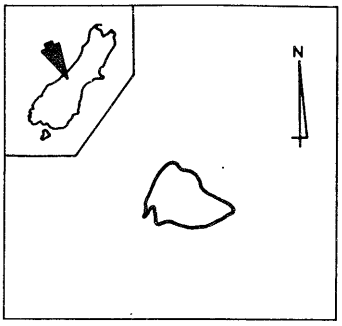
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	198	particulates	198
major ions	198	redox	198
trace elements	-	salinity	-
organic matter	-	alkalinity	198
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	198	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MCGREGOR

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mackenzie	ALTITUDE (m a.s.l.)	732-763
WATER BOARD	Waitaki	LONG AXIS (km)	0.9 (WNW)
MAP REF (NZMS1)	S89 095070	MEAN DEPTH (m)	-
MAP REF (260 ser.)	I37 069937	MAX DEPTH (m)	-
LAKE TYPE	glacial	LAKE AREA (km²)	0.4
MAIN INFLOW	from Lake Alexandrina	CATCHMENT AREA (km²) (land and lake)	2.10
MAIN OUTFLOW	to Lake Tekapo	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	620 McGREGOR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	100
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	13.3
undulating (4–7°)	86.7
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	-
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	64.3	35.7	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- N of Mt John (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing 1975a	Chemistry Division Irwin	Water analyses. Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MCGREGOR

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t°C	date	
max	t°C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min 5.0	date n.d.		Irwin p.c.
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	date		
max	date		
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	
phytoplankton (algae)	
macrophytes	
zooplankton	
macroinvertebrates	
fish	
wildlife	
Remarks: No data found.	

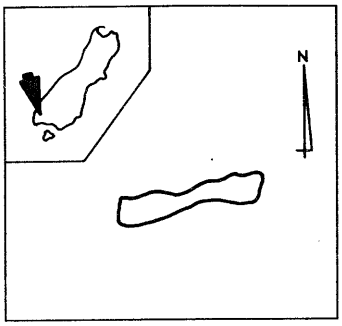
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MIKE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	488
WATER BOARD	Southland	LONG AXIS (km)	1.2 (E-W)
MAP REF (NZMS1)	S157 091666	MEAN DEPTH (m)	-
MAP REF (260 ser.)	B45 363693	MAX DEPTH (m)	30 (552)
LAKE TYPE	glacial	LAKE AREA (km^2)	0.83
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	8.50
MAIN OUTFLOW	To Fanny Bay, Dusky Sound	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	920 MIKE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	47.4	undulating (4–7°)	-	sheet	24.2	-	-	-	-
cropland	-	lakes	5.3	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	17.3	scree creep	19.9	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	24.2	soil slip	50.4	-	-	-	-
native forest	47.3	urban	-	steep (26–35°)	53.2	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	5.3	debris avalanche	0.2	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	5.3				

GENERAL REMARKS

- SE of head of Fanny Bay, Dusky Sound (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
	1975a	Irwin	Checklist of NZ lakes.
552	1975a	Stout	Comparison of lakes at different altitudes (1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MIKE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min > 60%	t°C n.s.	date n.s.		552
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Number of samples not specified (552).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 16.5 (2/74)	(surface) 9 (2/74)	(bottom)	552
max difference top to bottom 7.5°C			552
stratification stratified			552
Remarks: Single visit, 2 readings (552).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 4.5	date February 1974		552
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 0.2	n 1	date 2/74	552
period of blooms -			
algae -			
Remarks:			

pH READINGS		REFS
min 5.2	date 2/74	552
max 5.6	date 2/74	552
Remarks: One visit, 2 readings (552).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	n.s.	552
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	-
zooplankton	552
macroinvertebrates	-
fish	-
wildlife	-
Remarks: *Bosmina* dominant species (552).	

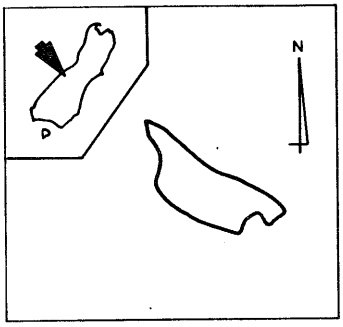
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MOERAKI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	93
WATER BOARD	Westland	LONG AXIS (km)	3.3 (NW)
MAP REF (NZMS1)	S77 049296	MEAN DEPTH (m)	-
MAP REF (260 ser.)	G36 109136	MAX DEPTH (m)	-
LAKE TYPE	n.d.	LAKE AREA (km^2)	2.20
MAIN INFLOW	Moeraki River	CATCHMENT AREA (km^2) (land and lake)	98.33
MAIN OUTFLOW	Moeraki River	CATCHMENT No. (MWD)	873000
LEVEL CHANGES	regulated for HEP	DATA BASE CODE (MAF)	597 MOERAKI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.3	pasture	-	flat (0–3°)	2.0
sand dune	-	tussock	20.9	undulating (4–7°)	16.9
cropland	-	lakes	2.4	rolling (8–15°)	1.0
lowland scrub	-	rivers	-	strongly rolling (16–20°)	4.0
subalpine scrub	6.2	ice and snow	-	moderately steep (21–25°)	3.1
native forest	70.0	urban	-	steep (26–35°)	11.2
exotic forest	-	other	0.2	very steep (>35°)	59.3
				lakes	2.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	27.0	-	-	-	-
wind	-	-	-	-	-
scree creep	25.9	-	-	-	-
soil slip	17.4	7.0	0.3	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	18.9	-	-	-	-
deposition	-	-	-	-	-
negligible	1.0				
lakes	2.4				

GENERAL REMARKS

- WSW of Lake Paringa township (351).
- bush surrounded (351)
- used for boating, HEP
- in Westland National Park

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
-	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MOERAKI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min 3.8	date n.d.		Irwin p.c.
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	date		
max	date		
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	
phytoplankton (algae)	
macrophytes	
zooplankton	
macroinvertebrates	
fish	
wildlife	
Remarks: No data found.	

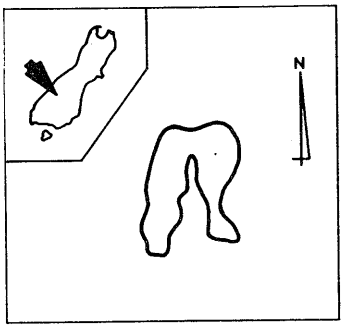
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MOKE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	840
WATER BOARD	Otago	LONG AXIS (km)	2.1 (N)
MAP REF (NZMS1)	S132 467734	MEAN DEPTH (m)	-
MAP REF (260 ser.)	E41 603690	MAX DEPTH (m)	44 (Irwin p.c.)
LAKE TYPE	glacial	LAKE AREA (km²)	0.83
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	18.65
MAIN OUTFLOW	Moke Creek to Shotover River	CATCHMENT No. (MWD)	752745
LEVEL CHANGES	-	DATA BASE CODE (MAF)	747 MOKE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	4.3	type \ severity	1	2	3	4	5
sand dune	-	tussock	95.6	undulating (4–7°)	8.6	sheet	23.8	39.9	0.4	-	-
cropland	-	lakes	4.4	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	3.8	scree creep	0.2	-	2.9	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	0.1	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	66.5	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	12.3	slump	-	-	-	-	-
				lakes	4.4	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	11.7	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	8.6	-	-	-	-
						negligible	8.1				
						lakes	4.4				

GENERAL REMARKS

- NW of Queenstown (351)
- in an uninhabited area of grazing country (378)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
378	1968	Jolly	Comparative limnology (up to 1967).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MOKE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 12.2 (11/52) (surface) 5.0 (11/52) (bottom)	378
max 16.7 (2/53) (surface) 6.3 (11/52) (bottom)	378
max difference top to bottom 10.5°C	378
stratification stratified, monomictic	378
Remarks: Sampling strategy not specified (378).	

SECCHI DISC DEPTH (m)				REFS
min 9.5		date n.d.		Irwin p.c.
max 10.7		date 11/52		378
mean 10.5	n 2	period before 1967		378
period of worst clarity -				
causes -				
Remarks: Two visits (378).				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min		date	
max		date	
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	-
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

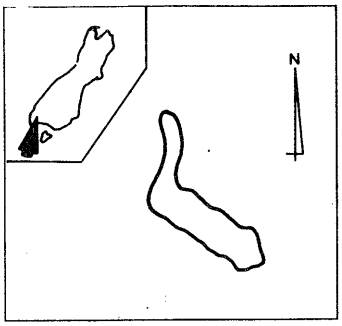
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MONK

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	579
WATER BOARD	Southland	LONG AXIS (km)	2.3 (NNW)
MAP REF (NZMS1)	S166 154339	MEAN DEPTH (m)	-
MAP REF (260 ser.)	B46 426395	MAX DEPTH (m)	100 (552)
LAKE TYPE	glacial	LAKE AREA (km^2)	1.62
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	12.90
MAIN OUTFLOW	Big River to L Hakapoua	CATCHMENT No. (MWD)	815000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	945 MONK 1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	38.7	undulating (4–7°)	3.7	sheet	19.8	-	-	-	-
cropland	-	lakes	16.4	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	0.1	scree creep	18.9	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	10.4	soil slip	-	-	-	-	-
native forest	44.9	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	69.4	slump	-	-	-	-	-
				lakes	16.4	debris avalanche	14.7	24.8	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	3.7	-	-	-	-
						deposition	1.7	-	-	-	-
						negligible	-				
						lakes	16.4				

GENERAL REMARKS

- SE of head of Long Sound (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
	1975a	Irwin	Checklist of NZ lakes.
515	1959	Riney	Ecological study.
552	1975a	Stout	Comparison of lakes at different altitudes (1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MONK

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min > 60%	t °C n.s.	date n.s.		552
max -	t °C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks:				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 15.5 (2/74)	(surface) 6 (2/74)	(bottom)	552
max difference top to bottom 9.5°C			552
stratification stratified			552
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 5.0	n 1	period 2/74	552
period of worst clarity -			
causes -			
Remarks: Single visit (552).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 0.4 mg m^{-3}	n 1	date 2/74	552
period of blooms -			
algae -			
Remarks:			

pH READINGS		REFS
min 6.2	date 2/74	552
max 5.9	date 2/74	552
Remarks: Single visit, 2 readings (552).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	water quality, biology	552
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	-
zooplankton	552
macroinvertebrates	-
fish	-
wildlife	-
Remarks: *Boeckella dolatata* dominant species (552). Check Riney (515).	

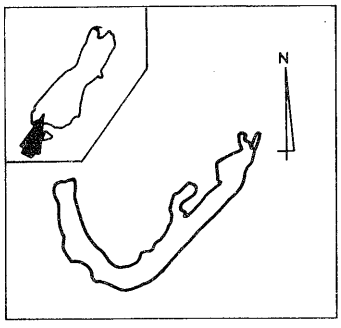
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: High total organic nitrogen (552). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MONOWAI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	n.d.
WATER BOARD	Southland	LONG AXIS (km)	20.6 (NE)
MAP REF (NZMS1)	S158 489629	MEAN DEPTH (m)	-
MAP REF (260 ser.)	C45 727665	MAX DEPTH (m)	161 (282)
LAKE TYPE	glacial	LAKE AREA (km²)	32.5
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	230.97
MAIN OUTFLOW	Monowai River	CATCHMENT No. (MWD)	797371
LEVEL CHANGES	-	DATA BASE CODE (MAF)	921 MONOWAI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	3.9
sand dune	-	tussock	27.1	undulating (4–7°)	-
cropland	-	lakes	14.0	rolling (8–15°)	4.8
lowland scrub	-	rivers	-	strongly rolling (16–20°)	1.3
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	11.9
native forest	58.9	urban	-	steep (26–35°)	23.7
exotic forest	-	other	-	very steep (>35°)	40.4
				lakes	14.0

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	25.7	4.2	14.0	-	-
wind	-	-	-	-	-
scree creep	0.8	1.9	-	-	-
soil slip	13.9	10.2	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	4.4	4.7	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	0.2	-	-
tunnel gully	-	-	-	-	-
streambank	4.9	0.3	-	-	-
deposition	-	0.6	-	-	-
negligible	0.5				
lakes	14.0				

GENERAL REMARKS

- SW of Monowai township (351)
- used for HEP

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status (1970).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
609	1975	Winterbourn & Lewis	Littoral fauna.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MONOWAI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 13 (4/70)	(surface) -	(bottom)	282
max difference top to bottom -			
stratification -			
Remarks: Single reading (282).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 7.8	n 1	period 4/1970	282
period of worst clarity -			
causes -			
Remarks: Single reading (282).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Melosira, Gomphosphaeria, Staurastrum*			196
Remarks: Algae cont.- *Dinobryon, Cyclotella, Synura* (196).			

pH READINGS		REFS
min 7.8	date n.d.	282
max 18.0	date n.d.	Irwin p.c.
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	282
		Myriophyllum spp.	282
		Potamogeton spp.	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,282
macrophytes	282
zooplankton	92,282
macroinvertebrates	609
fish	-
wildlife	-
Remarks:	

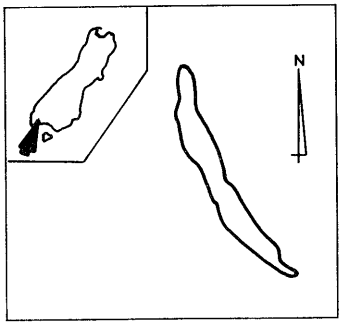
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MOUAT

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	213
WATER BOARD	Southland	LONG AXIS (km)	2.4 (NNW)
MAP REF (NZMS1)	S166 204436	MEAN DEPTH (m)	-
MAP REF (260 ser.)	B45 470485	MAX DEPTH (m)	17 (552)
LAKE TYPE	glacial	LAKE AREA (km^2)	1.50
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	49.24
MAIN OUTFLOW	to Lake Poteriteri	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	947 MOUAT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	28.2
cropland	-	lakes	2.7
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	69.1	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	1.5
rolling (8–15°)	4.4
strongly rolling (16–20°)	7.9
moderately steep (21–25°)	-
steep (26–35°)	4.2
very steep (>35°)	79.2
lakes	2.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	17.3	-	-	-	-
wind	-	-	-	-	-
scree creep	3.4	13.8	-	-	-
soil slip	39.4	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	15.0	0.8	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	1.5	6.2	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	2.7				

GENERAL REMARKS

- SE of Long Sound (351)
- tributary of Lake Monowai

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing	Chemistry Division	Water analyses.
	1975a	Irwin	Checklist of NZ lakes.
552	1975a	Stout	Comparison of lakes at different altitudes (1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE MOUAT

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min >60%	t°C 13.5	date 2/74		552
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single visit only (552).				

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 17.5 (2/74) (surface) 13.5 (2/74) (bottom)	552
max difference top to bottom 4°C	552
stratification stratified	552
Remarks: High maximum temperature (552).	

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 4.0	n 1	period 2/74	552
period of worst clarity -			
causes -			
Remarks: -			

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min -	date -	
max -	date -	
mean 0.3 mg m^{-3}	n 1 date 2/74	552
period of blooms -		
algae -		
Remarks:		

pH READINGS		REFS
min 5.8	date 2/74	552
max 5.9	date 2/74	552
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	water quality, biology	552
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	
phytoplankton (algae)	
macrophytes	
zooplankton	
macroinvertebrates	
fish	
wildlife	
Remarks: No data found.	

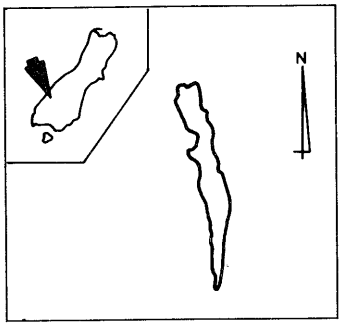
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

NORTH MAVORA LAKE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	619
WATER BOARD	Southland	LONG AXIS (km)	10.2
MAP REF (NZMS1)	S141 142438	MEAN DEPTH (m)	-
MAP REF (260 ser.)	E42 311414	MAX DEPTH (m)	-
LAKE TYPE	glacial	LAKE AREA (km^2)	10.83
MAIN INFLOW	Mararoa River	CATCHMENT AREA (km^2) (land and lake)	322.55
MAIN OUTFLOW	Mararoa River to S. Mavora Lake	CATCHMENT No. (MWD)	797424
LEVEL CHANGES	-	DATA BASE CODE (MAF)	792 N-MAVORA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-77)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	2.1	flat (0–3°)	4.5
sand dune	-	tussock	84.2	undulating (4–7°)	4.4
cropland	-	lakes	3.4	rolling (8–15°)	5.9
lowland scrub	1.9	rivers	-	strongly rolling (16–20°)	7.9
subalpine scrub	1.4	ice and snow	-	moderately steep (21–25°)	4.1
native forest	3.6	urban	-	steep (26–35°)	63.5
exotic forest	-	other	-	very steep (>35°)	6.3
				lakes	3.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.2	5.7	11.8	1.9	-
wind	4.4	0.3	-	-	-
scree creep	-	2.5	8.0	32.8	9.1
soil slip	0.2	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	0.7	-	-
tunnel gully	-	-	-	-	-
streambank	1.1	0.4	-	-	-
deposition	0.4	1.3	1.4	-	-
negligible	0.4				
lakes	3.4				

GENERAL REMARKS

- NE of Te Anau township (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

NORTH MAVORA LAKE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min	date		
max	date		
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min -		date -		
max -		date -		
mean -	n -		date -	
period of blooms -				
algae *Cyclotella, Tabellaria, Gymnodinium*				196
Remarks: Sparse algae (196).				

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

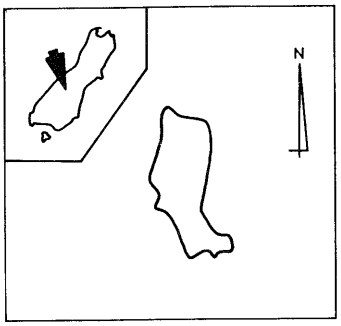
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: No data found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OHAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitaki/Mackenzie border	ALTITUDE (m a.s.l.)	517
WATER BOARD	Waitaki	LONG AXIS (km)	16.8 (N)
MAP REF (NZMS1)	S108 555685	MEAN DEPTH (m)	74.5 (382)
MAP REF (260 ser.)	H38 835799	MAX DEPTH (m)	129 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	53.85
MAIN INFLOW	Hopkins River and about 17 other streams	CATCHMENT AREA (km²) (land and lake)	1131.29
MAIN OUTFLOW	Ohau River	CATCHMENT No. (MWD)	711370
LEVEL CHANGES	518-520 (HEP)	DATA BASE CODE (MAF)	647 OHAU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	1.7	pasture	4.1	flat (0–3°)	3.3
sand dune	-	tussock	49.5	undulating (4–7°)	2.4
cropland	-	lakes	5.2	rolling (8–15°)	5.0
lowland scrub	-	rivers	-	strongly rolling (16–20°)	4.3
subalpine scrub	19.1	ice and snow	-	moderately steep (21–25°)	3.3
native forest	9.2	urban	-	steep (26–35°)	47.3
exotic forest	-	other	11.2	very steep (>35°)	19.1
				lakes	5.2

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	6.8	2.1	1.5	-	-
wind	1.9	2.5	0.1	-	-
scree creep	2.7	23.2	21.7	3.9	7.7
soil slip	-	1.8	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	0.3	3.2	-	0.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	1.0	1.0	-	-
tunnel gully	-	-	-	-	-
streambank	0.2	-	-	-	-
deposition	0.1	1.0	-	-	-
negligible	1.6				
lakes	5.2				

GENERAL REMARKS

- NE of Ahuriri River (351)
- used for HEP, boating, swimming, fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status (1970).
333	1970c	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Jolly pers comm	Temperature.
382	1975	Jolly & Irwin	Thermal conditions.
484	1977a	Paerl	Ultraplankton and production.
552	1975a	Stout	Comparison of lakes at different altitudes.
553	1975b	Stout	Brief description.
557	1978	Stout	Effects of silt loading (1975-78).
580	1984	Vant & Davies-Colley	Water clarity single reading only (1983).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE OHAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 7.1	(surface) -	(bottom)	Jolly p.c.
max 12.0	(surface) 6.8	(bottom)	Jolly p.c., 282
max difference top to bottom 5.2°C			Jolly p.c.
stratification weak, deep stratification			557
Remarks:			

SECCHI DISC DEPTH (m)				REFS
min 4.6	date April 1970			282
max 21.74	date n.s.			557
mean 9.6	n n.s.	period 12/75-78		557
period of worst clarity late spring				557
causes silt				557
Remarks: Single reading (282). Less turbid in 1970 than 1958 (282).				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 1.0 mg m^{-3}	n n.d.	date n.d.	553
period of blooms -			
algae *Synedra, Dinobryon, Staurastrum*			196,553
Remarks:			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Potamogeton cheesemanii	282
		Ranunculus fluitans	282
		Isoetes alpinus	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	484
phytoplankton (algae)	196,282,484,552
macrophytes	282
zooplankton	92,282,552
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

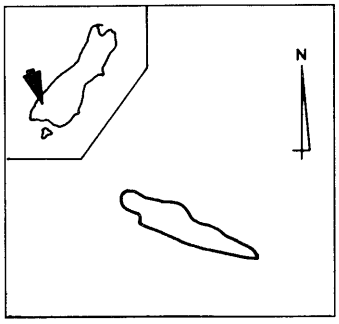
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	282	particulates	580
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	580	silica	282
optical properties	580	other ATP	484
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ORBELL

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	890
WATER BOARD	Southland	LONG AXIS (km)	1.0 (E)
MAP REF (NZMS1)	S140 713349	MEAN DEPTH (m)	-
MAP REF (260 ser.)	D42 920326	MAX DEPTH (m)	17.0 (552)
LAKE TYPE	glacial	LAKE AREA (km^2)	0.42
MAIN INFLOW	Takahe Stream	CATCHMENT AREA (km^2) (land and lake)	7.53
MAIN OUTFLOW	Tunnel Burn	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	813 ORBELL

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	56.2	undulating (4–7°)	14.9	sheet	-	-	-	-	-
cropland	-	lakes	2.8	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	41.3	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	41.0	-	-	-	-
native forest	41.0	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	82.3	slump	-	-	-	-	-
				lakes	2.8	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	14.9	-	-	-	-
						negligible	-				
						lakes	2.8				

GENERAL REMARKS

- E of head of South Fjord, Lake Te Anau (351)
- tributary to Lake Te Anau (552)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-	ongoing	Chemistry Division	Water analyses.
351	1975a	Irwin	Checklist of NZ lakes.
552	1975a	Stout	Comparison of lakes at different altitudes (1973, 1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ORBELL

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 60%	t °C n.s.	date 2/74		552
max -	t °C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks:				

TEMPERATURE (°C)			REFS
min 6.1 (5/73)	(surface) 6.0 (5/73)	(bottom)	552
max 15 (2/74)	(surface) 7 (2/74)	(bottom)	552
max difference top to bottom 8°C			552
stratification stratified			552
Remarks: 3 visits, 1 site, single readings (552).			

SECCHI DISC DEPTH (m)			REFS
min 4.5	date May 1973		552
max 6.0	date February 1974		552
mean -	n -	period -	
period of worst clarity May			
causes -			
Remarks: 3 visits, 1 site, single readings (552).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.2 mg m^{-3}	date February 1974		552
max 1.7 mg m^{-3}	date May 1973		552
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: 3 visits, 3 samples (552).			

pH READINGS		REFS
min 5.5	date February 1974	552
max 6.1	date February 1974	552
Remarks: 3 visits, samples on each occasion (552).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	water quality, biology	552
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	-
zooplankton	552
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Dominant zooplankton - *Boeckella, Ceriodaphnia* (552).	

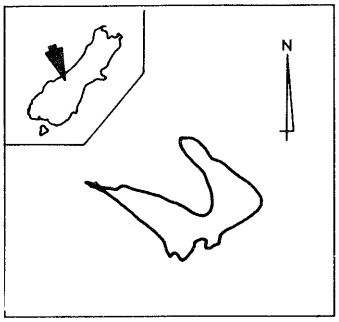
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PARINGA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	0-30
WATER BOARD	Westland	LONG AXIS (km)	3.2 (NW)
MAP REF (NZMS1)	S77 141315	MEAN DEPTH (m)	-
MAP REF (260 ser.)	G36 193146	MAX DEPTH (m)	-
LAKE TYPE	n.d.	LAKE AREA (km^2)	4.80
MAIN INFLOW	-	CATCHMENT AREA (km^2) (land and lake)	78.91
MAIN OUTFLOW	Paringa River	CATCHMENT No. (MWD)	875000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	596 PARINGA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	5.0	pasture	-	flat (0–3°)	5.1	type \ severity	1	2	3	4	5
sand dune	-	tussock	2.5	undulating (4–7°)	13.3	sheet	19.9	-	-	-	-
cropland	-	lakes	6.0	rolling (8–15°)	4.0	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	2.3	scree creep	2.5	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	7.0	soil slip	21.2	21.4	6.4	-	-
native forest	86.4	urban	-	steep (26–35°)	0.4	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	61.9	slump	-	-	-	-	-
				lakes	6.0	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	0.2	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	13.4	-	-	-	-
						deposition	-	-	-	-	-
						negligible	9.0				
						lakes	6.0				

GENERAL REMARKS

- SW of Lake Paringa township (351)
- bush surrounded, swamp at SE end (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-351	ongoing 1975a	Chemistry Division Irwin	Water analyses. Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE PARINGA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 4.5	n n.d.	period n.d.	Irwin p.c.
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	date		
max	date		
mean	n	date	
period of blooms			
algae			
Remarks: No data found.			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	
phytoplankton (algae)	
macrophytes	
zooplankton	
macroinvertebrates	
fish	
wildlife	
Remarks: No data found.	

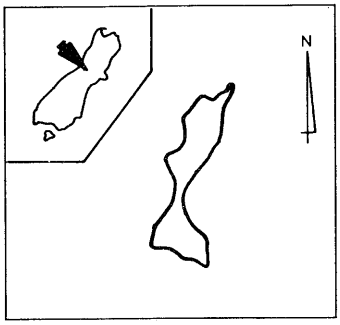
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PEARSON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	607
WATER BOARD	North Canterbury	LONG AXIS (km)	3.7 (NNE)
MAP REF (NZMS1)	S66 253096	MEAN DEPTH (m)	7.3 (556)
MAP REF (260 ser.)	L34 110894	MAX DEPTH (m)	17.0 (351)
LAKE TYPE	n.d.	LAKE AREA (km²)	1.79
MAIN INFLOW	-	CATCHMENT AREA (km²) (land and lake)	51.60
MAIN OUTFLOW	-	CATCHMENT No. (MWD)	664132
LEVEL CHANGES	-	DATA BASE CODE (MAF)	534 PEARSON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	11.5	flat (0–3°)	4.6
sand dune	-	tussock	58.2	undulating (4–7°)	5.8
cropland	-	lakes	3.7	rolling (8–15°)	10.0
lowland scrub	1.9	rivers	-	strongly rolling (16–20°)	1.2
subalpine scrub	1.7	ice and snow	-	moderately steep (21–25°)	3.0
native forest	17.6	urban	-	steep (26–35°)	71.7
exotic forest	-	other	5.4	very steep (>35°)	-
				lakes	3.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	6.8	7.4	5.1	7.7	-
wind	9.8	0.6	1.2	-	-
scree creep	2.1	15.1	3.1	1.7	32.0
soil slip	-	-	2.6	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	1.0	-	-	-	-
negligible	-				
lakes	3.7				

GENERAL REMARKS

- W of Craigieburn (351)
- lake divided into 2 basins by large talus fan (351)
- used for fishing, boating, camping (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
133	1968	Crumpton	Bully feeding.
196	1975	Flint	Phytoplankton.
227	1959	Gage	Lake origin.
245	1973	Graynoth & Skrzynski	Fisheries report.
334	1970d	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
487	1948	Parry	Chemical survey (1947-48).
491	1948	Percival	Brief description (1947-48).
492	1949	Percival	Summary of chemical survey (1947-48).
493	1951	Percival	Zooplankton.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Brief description (1967-68).
551	1973b	Stout	Lake report.
553	1975b	Stout	Brief description.
556	1977b	Stout	Faunal biology (up to 1977).
573	1983	Timms	Benthic macroinvertebrates (1978-79).
580	1984	Vant & Davies-Colley	Water clarity (1983).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE PEARSON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN		REFS
min 6.74 g m^{-3} **t°C** n.s.	**date** 2/48	487,492
max 13.2 g m^{-3} **t°C** n.s.	**date** 4/48	491,492
mean - **n** -	**period** -	
period of lowest oxygen none reported		491,492
Remarks: Same data sets (487,492). Based on 20 samples, 3/47 - 10/48 (487,492).		

TEMPERATURE (°C)	REFS
min 4.5 (6/48, 6/49) **(surface)** - **(bottom)**	487,492
max 17.5 (2/76) **(surface)** - **(bottom)**	531
max difference top to bottom -	
stratification mixed	487,531, 544
Remarks: Surface reaches zero in winter (544).	

SECCHI DISC DEPTH (m)		REFS
min -	**date** -	
max -	**date** -	
mean 4.4 **n** 1	**period** 2/83	580
period of worst clarity -		
causes wind stirred silt		487
Remarks:		

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min 1.16 mg m^{-3}	**date** February 1976	531
max 4.58 mg m^{-3}	**date** n.s.	544
mean 1.3 mg m^{-3} **n** 2	**date** 2/76	531
period of blooms diatom outburst in 1/48		487
algae -		
Remarks:		

pH READINGS		REFS
min 6.4	**date** n.s.	544
max 7.73	**date** February 1976	531
Remarks: Monthly samples 5/67-7/68 (544). Single visit, 2 samples (531).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biochemical assay	531
oligo-mesotrophic	water quality, biology	573
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	196,531,544,556
macrophytes	556
zooplankton	92,493,544,556
macroinvertebrates	556,573
fish	133,245,556
wildlife	556
Remarks: Dominant benthic species Chironomidae (573). Dominant zooplankton species *Nitella* (487), *Crucigenia* (544).	

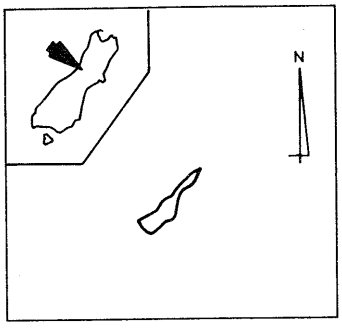
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	487,531,544	**particulates**	580
major ions	487,531,544	**redox**	544
trace elements	-	**salinity**	-
organic matter	-	**alkalinity**	487,531
toxic organics	-	**hardness**	-
pigments	580	**silica**	487,544
optical properties	580	**other** Vmax, ATD	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE POERUA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Grey	ALTITUDE (m a.s.l.)	124
WATER BOARD	Westland	LONG AXIS (km)	4.2 (NE)
MAP REF (NZMS1)	S51 988566	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K32 860320	MAX DEPTH (m)	7.75 (Irwin p.c.)
LAKE TYPE	riverine	LAKE AREA (km^2)	2.15
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	26.04
MAIN OUTFLOW	Arnold River	CATCHMENT No. (MWD)	914060
LEVEL CHANGES	-	DATA BASE CODE (MAF)	499 POERUA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	5.8	pasture	14.4
sand dune	-	tussock	3.5
cropland	-	lakes	9.6
lowland scrub	-	rivers	-
subalpine scrub	12.3	ice and snow	-
native forest	54.3	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	7.4
undulating (4–7°)	12.8
rolling (8–15°)	-
strongly rolling (16–20°)	1.0
moderately steep (21–25°)	8.6
steep (26–35°)	50.6
very steep (>35°)	10.0
lakes	9.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	9.6	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	3.5	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	6.5	50.6	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	20.2				
lakes	9.6				

GENERAL REMARKS

- NE of Inchbonnie (351)
- bush at each side (351)
- used for fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-302	ongoing	Chemistry Division	Water analyses.
	1975b	Hughes	Review of data available.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin pers comm	Water clarity.
486	1979	Paerl *et al*	Limnology of beech forest lakes (1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE POERUA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	-	t°C	-	date -	
max	7.5 g m^{-3}	t°C	17	date 3/76	486
mean	-	n	-	period -	
period of lowest oxygen	-				
Remarks: Single profile graph (486).					

TEMPERATURE (°C)				REFS
min	-	(surface) -	(bottom)	
max	23 (3/76)	(surface) 17 (3/76)	(bottom)	486
max difference top to bottom	5°C			486
stratification	mixed			486
Remarks:				

SECCHI DISC DEPTH (m)				REFS
min	4.0	date	n.d.	Irwin p.c.
max	6.5	date	March 1976	486
mean	-	n -	period -	
period of worst clarity	-			
causes	lightly stained with organic matter			486
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	1.64 mg m^{-3}	n 3	date 3/76	486
period of blooms	-			
algae	*Eudorina, Chroomonas*			486
Remarks: Sparse algae (486).				

pH READINGS				REFS
min	-	date	-	
max	-	date	-	
Remarks: Near neutral (486).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse macrophytes (486).			

TROPHIC STATUS	BASIS	REFS
dystrophic	characters except pH	486
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	486
phytoplankton (algae)	486
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

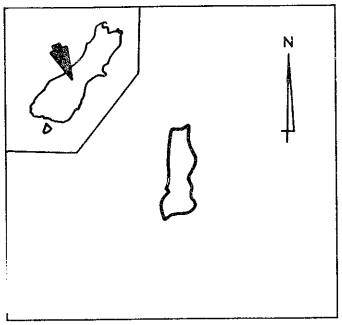
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	486	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	486	other	-
Remarks: Very low reactive P (486). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PUKAKI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mackenzie	ALTITUDE (m a.s.l.)	494
WATER BOARD	Waitaki	LONG AXIS (km)	22.9 (N)
MAP REF (NZMS1)	S100 837923	MEAN DEPTH (m)	-
MAP REF (260 ser.)	H38 835799	MAX DEPTH (m)	70.0 (335)
LAKE TYPE	glacial	LAKE AREA (km²)	98.90
MAIN INFLOW	Tasman River and about 17 streams	CATCHMENT AREA (km²) (land and lake)	405.19
MAIN OUTFLOW	Pukaki River	CATCHMENT No. (MWD)	711380
LEVEL CHANGES	477-480 (HEP)	DATA BASE CODE (MAF)	634 PUKAKI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.3	pasture	6.1	flat (0–3°)	1.2
sand dune	-	tussock	32.9	undulating (4–7°)	7.3
cropland	-	lakes	7.9	rolling (8–15°)	6.8
lowland scrub	0.4	rivers	9.1	strongly rolling (16–20°)	5.8
subalpine scrub	24.1	ice and snow	16.6	moderately steep (21–25°)	3.8
native forest	0.6	urban	-	steep (26–35°)	21.7
exotic forest	-	other	2.0	very steep (>35°)	19.8
				lakes	7.9

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	7.2	1.9	1.5	0.3	-
wind	5.9	7.6	0.9	-	-
scree creep	0.3	6.1	20.0	2.6	7.3
soil slip	-	-	0.2	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	0.4	1.2	0.3	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	1.7	0.3	0.1	0.1
tunnel gully	-	-	-	-	-
streambank	-	-	0.3	-	-
deposition	-	-	-	-	-
negligible	0.7				
lakes	7.9				

GENERAL REMARKS

- NNE of Lake Pukaki township (351)
- lake level raised in 1979-80 for HEP and has increased surface area by 30%

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
-	-	Freshwater Section	DSIR Taupo pers comm; dissolved oxygen.
282	1970a	Hill	Current status (1970).
335	1970e	Irwin	Bathymetric chart.
341	1972c	Irwin	Sediments.
347	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
380	1975	Jolly & Brown	New Zealand lakes.
484	1977a	Paerl	Ultraplankton and production (1975-76).
526	1963	Speight	Geomorphology.
553	1975b	Stout	Brief description.
557	1978	Stout	Silt loading (1975-78).
580	1984	Vant & Davies-Colley	Water clarity (1983).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE PUKAKI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min > 5 g m^{-3} t°C n.d. date n.d.	Freshwater Section p.c.
max - t°C - date -	
mean - n - period -	
period of lowest oxygen -	
Remarks:	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 11 (4/70) (surface) - (bottom)	282
max difference top to bottom -	
stratification weak and deep stratification	557
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min 0.2 date April 1970	282
max 1.0 date n.s.	557
mean 0.5 n 19 period n.s.	347
period of worst clarity late spring	557
causes glacial rock flour	282,347
Remarks:	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms -	
algae *Diatoma, Synedra, Cyclotella*	557
Remarks: Algae sparse (Freshwater Section, pers comm, 557).	

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse (282).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	484
phytoplankton (algae)	282,484
macrophytes	282
zooplankton	92,282
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Biota extremely sparse (282).	

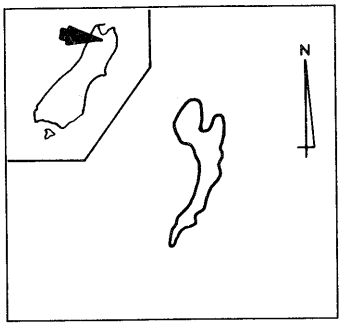
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	282	particulates	580
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	580	silica	282
optical properties	580	other ATP	484
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOITI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waimea	ALTITUDE (m a.s.l.)	609
WATER BOARD	Westland	LONG AXIS (km)	8.5 (N)
MAP REF (NZMS1)	S33 218626	MEAN DEPTH (m)	49.2 (196)
MAP REF (260 ser.)	N29 968309	MAX DEPTH (m)	82.0 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	9.20
MAIN INFLOW	Travers River	CATCHMENT AREA (km²) (land and lake)	192.97
MAIN OUTFLOW	Buller River	CATCHMENT No. (MWD)	932620
LEVEL CHANGES	-	DATA BASE CODE (MAF)	451 rITI 2

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	2.8	flat (0–3°)	1.8
sand dune	-	tussock	30.8	undulating (4–7°)	3.4
cropland	-	lakes	4.9	rolling (8–15°)	6.1
lowland scrub	2.1	rivers	-	strongly rolling (16–20°)	3.8
subalpine scrub	13.1	ice and snow	-	moderately steep (21–25°)	2.4
native forest	46.3	urban	-	steep (26–35°)	57.4
exotic forest	-	other	-	very steep (>35°)	20.1
				lakes	4.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	9.5	2.5	1.0	-	-
wind	1.0	-	-	-	-
scree creep	0.5	12.5	6.2	23.1	0.7
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	0.8	2.0	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	11.8	11.8	1.9	0.6	-
tunnel gully	-	-	-	-	-
streambank	2.8	-	-	-	-
deposition	3.8	-	-	-	-
negligible	2.6				
lakes	4.9				

GENERAL REMARKS

- near St Arnaud on N shore of lake (351)
- in Nelson Lakes National Park
- used for boating, swimming, tramping, camping

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbial parameters and trophic status (1973).
43	1975	Brown	Ecology of macrophytes.
46*	1979	Brown	Aquatic weeds (1971-1973).
47*	1973	Brown *et al*	Aquatic macrophytes (1973).
49	1965	Bulfin	Vegetation.
50	1965	Bulfin & Moss	Macrophyte studies.
109-	ongoing	Chemistry Division	Water analyses.
115	1976	Chittenden *et al*	Sediments.
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
220	1972b	Freshwater Section	Lake report.
232*	1976	Gillespie	Heterotrophic potential and trophic status (1973).
297	1972	Hughes	Water weeds.
347	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
356*	1978b	Irwin	Seasonal water temperatures (1972-1975).
402	1970	MacArthur	Macrophytes.
476	1973	Noxious Weed Advisory Committee	Aquatic macrophytes.
484	1977a	Paerl	Ultraplankton and productivity (1975-76).
553	1975b	Stout	Brief Description.
566	1971	Taylor	Biological survey (1969, 1971).
571	1975	Thornton	Aquatic plants.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data*pertaining to this lake.

LAKE ROTOITI (S.I.)

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 77%	**t °C** n.s.	**date** January 1971		566
max 85%	**t °C** n.s.	**date** 1973		47
mean -	**n** -	**period** -		
period of lowest oxygen -				
Remarks: Other values are 78% 2/73 (47), 80% 1/71 (566). Based on few samples (47,566).				

TEMPERATURE (°C)			REFS
min 0 (winter)	**(surface)** 6.3 (August)	**(bottom)**	566,356
max 20 (1/71)	**(surface)** 15.5 (Feb.)	**(bottom)**	566,46
max difference top to bottom 4°C			46
stratification stratified in summer			46,47,232, 356,566
Remarks: Most extensive study (356). Summer unusually hot and calm in 1972/73 (46).			

SECCHI DISC DEPTH (m)			REFS
min 9.0	**date** June 1972		347
max 16	**date** 1973		47
mean 12.2	**n** 8	**period** n.s.	347
period of worst clarity -			
causes ? humic substances, silt			347,47
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.2 mg m^{-3}	**date** January 1971		47
max 0.37 mg m^{-3}	**date** January 1971		566
mean -	**n** -	**date** -	
period of blooms -			
algae *Gymnodinium, Rhizoselenia, Cosmarium*			196,232
Remarks: Algae cont - *Staurastrum, Cosmocladium* (232, 196).			

pH READINGS		REFS
min 6.55	**date** August 1969	566
max 7.5	**date** March 1973	232
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		Elodea canadensis	46,566
		Isoetes alpinus	46
		Myriophyllum elatinoides	46
Remarks: Hydrosere diagram (47). Extremely dense beds of *Elodea* (566). *Myriophyllum* a problem species (47). Weed problems noted from 1965 on (47).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	heterotrophic potential	232
mesotrophic	algae, biochemical assay	566
oligotrophic	SDH,ATP	35
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232,484
phytoplankton (algae)	196,484,566
macrophytes	43,46,47,49,50,297,402,553,566, 571
zooplankton	566
macroinvertebrates	200,566
fish	-
wildlife	-
Remarks:	

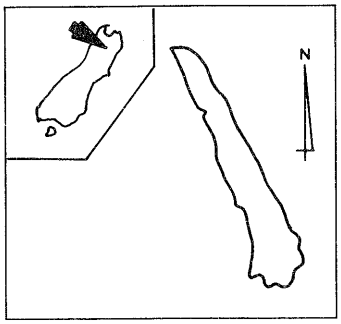
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	46,566	**particulates**	-
major ions	46,566	**redox**	46,47,566
trace elements	566	**salinity**	-
organic matter	-	**alkalinity**	566
toxic organics	-	**hardness**	-
pigments	-	**silica**	46
optical properties	-	**other** ATP	35,484
Remarks: Succinate dehydrogenase (35). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOROA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waimea	ALTITUDE (m a.s.l.)	444
WATER BOARD	Westland	LONG AXIS (km)	14.4 (NNW)
MAP REF (NZMS1)	S33 053550	MEAN DEPTH (m)	96.5 (46)
MAP REF (260 ser.)	M29 482923	MAX DEPTH (m)	152 (46)
LAKE TYPE	glacial	LAKE AREA (km²)	21.40
MAIN INFLOW	Durville & Sabine Rivers	CATCHMENT AREA (km²) (land and lake)	363.08
MAIN OUTFLOW	Gowan River	CATCHMENT No. (MWD)	932521
LEVEL CHANGES	-	DATA BASE CODE (MAF)	452 rOA 1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	0.3	flat (0–3°)	1.1
sand dune	-	tussock	22.9	undulating (4–7°)	1.0
cropland	-	lakes	6.5	rolling (8–15°)	-
lowland scrub	0.2	rivers	-	strongly rolling (16–20°)	3.5
subalpine scrub	15.1	ice and snow	-	moderately steep (21–25°)	5.2
native forest	55.1	urban	-	steep (26–35°)	39.2
exotic forest	-	other	-	very steep (>35°)	43.6
				lakes	6.5

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	4.6	1.0	2.1	-	-
wind	-	-	-	-	-
scree creep	-	3.2	11.1	18.9	-
soil slip	14.6	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	20.9	10.0	1.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	2.8	0.1	-	0.6	-
tunnel gully	-	-	-	-	-
streambank	0.9	-	-	-	-
deposition	-	-	-	-	-
negligible	1.6				
lakes	6.5				

GENERAL REMARKS

- SW of St Arnaud (351)
- popular for fishing, boating
- Nelson Lakes National Park (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbial parameters and trophic status (1973).
43	1975	Brown	Ecology of macrophytes.
46*	1979	Brown	Aquatic weeds (1971, 1973).
47*	1973	Brown *et al*	Aquatic macrophytes (up to 1973).
109-	ongoing	Chemistry Division	Water analyses.
115	1976	Chittenden *et al*	Sediments.
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
220	1972b	Freshwater Section	Lake report.
232*	1976	Gillespie	Heterotrophic potential and trophic status (1972, 1973).
297	1972	Hughes	Water weeds.
347	1974a	Irwin	Water clarity (1972).
351	1975a	Irwin	Checklist of NZ lakes.
356*	1978b	Irwin	Seasonal water temperatures (1972-1975).
402	1970	MacArthur	Macrophytes.
476	1973	Noxious Weed Advisory Committee	Aquatic macrophytes.
553	1975b	Stout	Brief description.
566*	1971	Taylor	Biological survey (1971).
571	1975	Thornton	Aquatic plants.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data*pertaining to this lake.

LAKE ROTOROA (S.I.)

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	63%	t°C	8.5	date	2/73	47
max	-	t°C	-	date	-	
mean	-	n	-	period	-	
period of lowest oxygen	-					
Remarks: Sampling strategy not specified (47).						

TEMPERATURE (°C)				REFS
min	7 (August)	(surface) 7.5 (August)	(bottom)	356
max	21 (January)	(surface) 15.5 (March)	(bottom)	356
max difference top to bottom	10.3°C			232
stratification	stratified in summer			35,47,232, 356,566
Remarks: Weekly readings taken 1972-75 (356).				

SECCHI DISC DEPTH (m)						REFS
min	12.0			date	June 1972	347
max	16.0			date	June 1972	347
mean	13.9	n	8	period	June 1972	347
period of worst clarity	-					
causes	? humic substances					347
Remarks: Sampling strategy not specified (347).						

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	2.9 mg m^{-3}	date	January 1971	566
max	3.0 mg m^{-3}	date	January 1971	47
mean	-	n -	date -	
period of blooms	-			
algae	*Cyclotella, Asterionella, Synedra*			566
Remarks: At 30 m depth (566).				

pH READINGS				REFS
min	6.6	date	April 1971	566
max	7.5	date	March 1973	232
Remarks: 3 visits, 2 sites, 5 samples (566). 3 visits, 3 depths, 12 samples (232).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	46
		Isoetes alpinus	46
		Lilaeopsis lacustris	46
Remarks: Extensive *Elodea* beds in early 1970's (46,566).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	SDH, ATP	35
mesotrophic	algae, zooplankton	566
mesotrophic	algae, conductivity	47,196
oligotrophic	heterotrophic potential	232
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35
phytoplankton (algae)	46,196,566
macrophytes	43,46,47,297,402,566,571
zooplankton	566
macroinvertebrates	200,566
fish	-
wildlife	-
Remarks:	

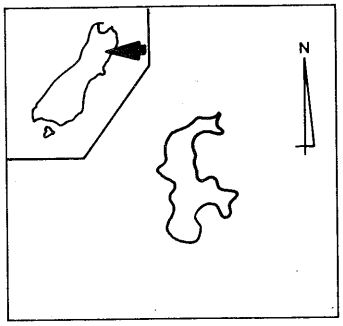
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	46,566	particulates	-
major ions	46,566	redox	46,47, 566
trace elements	-	salinity	-
organic matter	-	alkalinity	566
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109). ATP, SDH (35).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTORUA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Kaikoura	ALTITUDE (m a.s.l.)	0-30
WATER BOARD	Marlborough	LONG AXIS (km)	1.8 (N)
MAP REF (NZMS1)	S49 873907	MEAN DEPTH (m)	-
MAP REF (260 ser.)	031 578662	MAX DEPTH (m)	3 (196)
LAKE TYPE	riverine	LAKE AREA (km^2)	0.55
MAIN INFLOW	-	CATCHMENT AREA (km^2) (land and lake)	4.2
MAIN OUTFLOW	-	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	478 rRUA 2

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-1977)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	-	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	-	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	-				

GENERAL REMARKS

- W of Kaikoura township, near coast
- also known as Lake Kaikoura
- rich agricultural catchment (553)
- large shag population (553)
- NZLRI data not determined prior to publication

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
553	1975b	Stout	Brief description (up to 1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ROTORUA (S.I.)

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 50% t°C n.s. date n.s.	553
max - t°C - date -	
mean - n - period -	
period of lowest oxygen -	
Remarks:	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max - (surface) - (bottom)	
max difference top to bottom 8°C	553
stratification probably temporary in calm weather	553
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min - date -	
max - date -	
mean - n - period -	
period of worst clarity -	
causes organic matter and silt	553
Remarks:	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms frequent	553
algae *Anabaena, Micractinium, Closterium*	196
Remarks: Algae cont.- *Staurastrum, Melosira* (196).	

pH READINGS	REFS
min date	
max date	
Remarks: No data found.	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
eutrophic	nutrients	553
Remarks: High nitrogen content (553).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,553
macrophytes	-
zooplankton	553
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

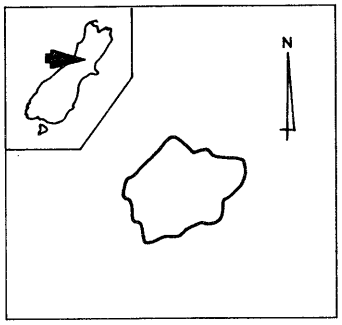
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	553	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: High ion content which show pronounced variations (553). Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROUNDABOUT

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Ashburton	ALTITUDE (m a.s.l.)	658
WATER BOARD	South Canterbury	LONG AXIS (km)	0.5 (NE)
MAP REF (NZMS1)	S81 642454	MEAN DEPTH (m)	-
MAP REF (260 ser.)	J36 562297	MAX DEPTH (m)	2 (351)
LAKE TYPE	glacial	LAKE AREA (km^2)	0.13
MAIN INFLOW	-	CATCHMENT AREA (km^2) (land and lake)	2.1
MAIN OUTFLOW	to Lake Emma	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	588 ROUNDBT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	28.7	pasture	5.3	flat (0–3°)	28.7	type \ severity	1	2	3	4	5
sand dune	-	tussock	60.3	undulating (4–7°)	-	sheet	65.7	-	-	-	-
cropland	-	lakes	5.7	rolling (8–15°)	65.6	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	5.7	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	28.7				
						lakes	5.7				

GENERAL REMARKS

- SE of Lake Clearwater (351)
- swamp on SW side (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
544	1969a	Stout	Brief description (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ROUNDABOUT

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min	t °C	date		
max	t °C	date		
mean	n	period		
period of lowest oxygen				
Remarks: No data found.				

TEMPERATURE (°C)				REFS
min 0 (winter)	(surface)	-	(bottom)	544
max 19.8	(surface)	-	(bottom)	544
max difference top to bottom	-			
stratification not stratified				544
Remarks: 7 readings, 5/67-7/68 (544).				

SECCHI DISC DEPTH (m)				REFS
min -	date	-		
max -	date	-		
mean -	n -	period	-	
period of worst clarity	-			
causes suspended silt				
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.12	date	n.s.	544
max 3.8	date	n.s.	544
mean -	n -	date -	
period of blooms -			
algae *Anabaena, Chlorella, Pediastrum, Closterium*			196
Remarks:			

pH READINGS			REFS
min 6.7	date	n.s.	544
max 8.4	date	n.s.	544
Remarks: 7 readings 5/67-7/68 (544).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,544
macrophytes	-
zooplankton	544
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

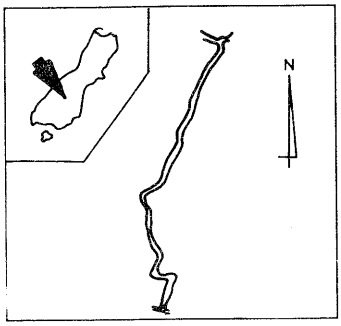
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	544	particulates	-
major ions	544	redox	544
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROXBURGH

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Tuapeka	ALTITUDE (m a.s.l.)	133
WATER BOARD	Otago	LONG AXIS (km)	27.8
MAP REF (NZMS1)	S143 124275	MEAN DEPTH (m)	-
MAP REF (260 ser.)	G43 210281	MAX DEPTH (m)	-
LAKE TYPE	reservoir	LAKE AREA (km^2)	4.5
MAIN INFLOW	Clutha River	CATCHMENT AREA (km^2) (land and lake)	8785.90
MAIN OUTFLOW	Clutha River	CATCHMENT No. (MWD)	752000
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	827 ROXBURGH

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	26.0
sand dune	-	tussock	64.5
cropland	0.2	lakes	0.2
lowland scrub	0.5	rivers	0.5
subalpine scrub	3.6	ice and snow	+
native forest	0.4	urban	+
exotic forest	-	other	4.0

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	8.4
undulating (4–7°)	10.4
rolling (8–15°)	11.3
strongly rolling (16–20°)	9.5
moderately steep (21–25°)	20.4
steep (26–35°)	35.0
very steep (>35°)	3.8
lakes	0.2

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	24.6	24.7	3.6	0.1	-
wind	18.2	11.0	1.2	+	-
scree creep	0.7	4.3	3.2	2.0	0.3
soil slip	+	0.7	0.2	-	-
earth slip	+	0.1	-	-	-
slump	+	0.1	-	-	-
debris avalanche	+	0.4	0.4	0.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	0.2	0.2	0.1	+	-
tunnel gully	-	-	-	-	-
streambank	0.5	+	+	-	-
deposition	+	-	-	-	-
negligible	1.2				
lakes	0.2				

GENERAL REMARKS

- WSW of Alexandra (351)
- 3 islands (351)
- used for HEP (424)
- NZLRI + sign means < 1

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
-	-	Biggs MWD pers comm	Miscellaneous data - part of Clutha development studies.
26	1981	Borlase	Water quality baseline survey.
282	1970a	Hill	Current status (1970).
301	1975a	Hughes	Weed infestation.
351	1975a	Irwin	Checklist of NZ lakes.
424	1979	McBride	Water quality survey and review of historical water quality data (1979).
606	1964	Winter	Biological baseline survey (1962).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE ROXBURGH

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t°C	date	
max	t°C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 6 (winter)	(surface) -	(bottom)	606
max 21.5	(surface) 17.5	(bottom)	606
max difference top to bottom 4°C			606
stratification mixed			424,606
Remarks:			

SECCHI DISC DEPTH (m)		REFS
min 0.3	date January 1962	606
max 5.0	date April 1970	282
mean -	n - period -	
period of worst clarity -		
causes glacial flour		
Remarks: 2 readings at each of 2 sites (606). Single value only (606).		

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min 0.28 mg m^{-3}	date July 1979	424
max 0.82 mg m^{-3}	date July 1979	424
mean @ 0.45 ms m^{-3} n 6	date 7/79	424
period of blooms -		
algae *Cryptomonas, Melosira, Navicula,*		Biggs p.c.
Remarks:		

pH READINGS		REFS
min 6.4	date n.s.	424
max 7.8	date July 1979	424
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	Biggs p.c.	*Lagarosiphon major*	Biggs p.c.
		Elodea canadensis	Biggs p.c.
		Ranunculus fluitans	Biggs p.c.
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	physico-chemical	424
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	26,424
phytoplankton (algae)	282,424,606
macrophytes	282,301,606
zooplankton	-
macroinvertebrates	606
fish	606
wildlife	-
Remarks:	

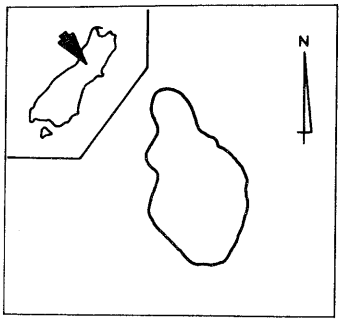
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	26,282,424	particulates	26,424
major ions	424	redox	26
trace elements	424	salinity	26
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	282
optical properties	424	other BOD,COD	424
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE SARAH

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	549-579
WATER BOARD	North Canterbury	LONG AXIS (km)	0.7 (N)
MAP REF (NZMS1)	S66 246153	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L34 103946	MAX DEPTH (m)	6.7 (351)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.20
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	1.45
MAIN OUTFLOW	Grasmere Stream	CATCHMENT No. (MWD)	664191
LEVEL CHANGES	-	DATA BASE CODE (MAF)	529 SARAH

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	9.7	flat (0–3°)	9.7	type \ severity	1	2	3	4	5
sand dune	-	tussock	75.2	undulating (4–7°)	-	sheet	37.2	-	-	-	-
cropland	-	lakes	15.2	rolling (8–15°)	37.2	wind	9.7	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	35.2	2.8	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	37.9	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	15.2	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	15.2				

GENERAL REMARKS

- NW of Craigieburn (351)
- used for fishing, camping, swimming (531)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-	ongoing	Chemistry Division	Water analyses.
191	1935	Flint	Phytoplankton periodicity.
192	1938	Flint	Phytoplankton (1934, 1935).
196	1975	Flint	Phytoplankton.
227	1959	Gage	Lake origin.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Brief description (1967-68).
556	1977b	Stout	Biology of lakes near Cass.
573	1983	Timms	Benthic macroinvertebrates (1978-79).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE SARAH

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min - t°C - date -	
max - t°C - date -	
mean - n - period -	
period of lowest oxygen -	
Remarks: 13 surface samples taken (192).	

TEMPERATURE (°C)	REFS
min 0 (winter) (surface) - (bottom)	556
max 21 (surface) - (bottom)	192,544
max difference top to bottom -	
stratification mixed	531,544, 556
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min 6.7 date n.s.	556
max 6.7 date "usually"	556
mean - n - period -	
period of worst clarity -	
causes silt and/or plankton	556
Remarks: Minimum > 7 m in 1934-35 (192).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0.96 mg m^{-3} date n.s.	544
max 5.43 mg m^{-3} date n.s.	544
mean - n - date -	
period of blooms -	
algae most abundant in November, only 10 species counted	192
Remarks: Sampling strategy not given (544).	

pH READINGS	REFS
min 6.6 date n.s.	544
max 8.4 date Feb/March	556,192
Remarks:	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	biochemical assay	531
mesotrophic	water quality/biology	573
oligotrophic	presence of desmids	192
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	191,192,196,531,544
macrophytes	-
zooplankton	556
macroinvertebrates	573
fish	-
wildlife	-
Remarks:	

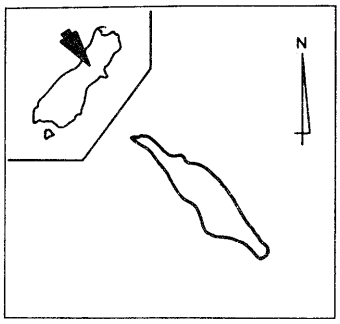
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	192,531,544	particulates	192
major ions	531	redox	544
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	192,544
optical properties	-	other Vmax	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE SELFE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	579-610
WATER BOARD	North Canterbury	LONG AXIS (km)	2.1 (NW)
MAP REF (NZMS1)	S66 014925	MEAN DEPTH (m)	-
MAP REF (260 ser.)	K34 895734	MAX DEPTH (m)	30 (351)
LAKE TYPE	n.d.	LAKE AREA (km²)	0.33
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	5.72
MAIN OUTFLOW	to Lake Hamilton	CATCHMENT No. (MWD)	685074
LEVEL CHANGES	-	DATA BASE CODE (MAF)	551 SELFE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1973-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	-
sand dune	-	tussock	89.0	undulating (4–7°)	-
cropland	-	lakes	11.0	rolling (8–15°)	17.5
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	1.4
native forest	-	urban	-	steep (26–35°)	70.1
exotic forest	-	other	-	very steep (>35°)	-
				lakes	11.0

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	11.4	22.0	-	-	-
wind	-	1.4	-	-	-
scree creep	-	-	25.3	7.2	4.2
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	17.5	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	11.0				

GENERAL REMARKS

- SW of Craigieburn Forest (351)
- bush on NW shore (351)
- easily accessible, used for boating, fishing, camping

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout environment (1969-70).
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status.
351	1975a	Irwin	Checklist of NZ lakes.
531	1978b	Spencer	Trophic status (1976).
544	1969a	Stout	Brief description (1967-68).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE SELFE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 4.8	(surface) -	(bottom)	544
max 19.8	(surface) -	(bottom)	544
max difference top to bottom -			
stratification not stratified			544
Remarks: Based on monthly readings 5/67-7/68 (544).			

SECCHI DISC DEPTH (m)			REFS
min		date	
max		date	
mean	n	period	
period of worst clarity			
causes			
Remarks: No data found.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.55 mg m^{-3}		date n.s.	544
max 2.64 mg m^{-3}		date February 1976	531
mean 3.6 mg m^{-3}	n 6	date 6/69-6/70	51
period of blooms -			
algae *Asterionella, Cyclotella, Diatoma, Mougeotia*			196
Remarks:			

pH READINGS		REFS
min 6.7	date n.s.	544
max 8.06	date February 1976	531
Remarks: Single visit (531). Monthly readings 5/67-7/68 (544).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Myriophyllum elatinoides	282
		Ranunculus fluitans	282
		Lilaeopsis sp.	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	biochemical	531
oligotrophic	productivity	51
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	51,196,544
macrophytes	282
zooplankton	544
macroinvertebrates	-
fish	51
wildlife	-
Remarks:	

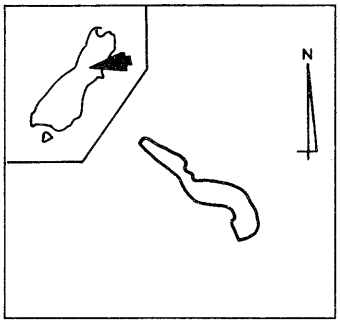
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,531,544	particulates	-
major ions	531,544	redox	51,544
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	544
optical properties	-	other	51
Remarks: Check Chemistry Division (109). Vmax, ATP (531).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE SHEPPARD

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	534-609
WATER BOARD	North Canterbury	LONG AXIS (km)	2.3 (NW)
MAP REF (NZMS1)	S60 674498	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L33 489269	MAX DEPTH (m)	21 (531)
LAKE TYPE	glacial	LAKE AREA (km²)	1.15
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	11.91
MAIN OUTFLOW	to Raupo Pond then via Sisters Str to Hurunui R	CATCHMENT No. (MWD)	651181
LEVEL CHANGES	-	DATA BASE CODE (MAF)	507 SHEPPARD

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	0.4	flat (0–3°)	-
sand dune	-	tussock	68.9	undulating (4–7°)	9.8
cropland	-	lakes	9.2	rolling (8–15°)	14.8
lowland scrub	-	rivers	-	strongly rolling (16–20°)	0.1
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	26.8
native forest	21.4	urban	-	steep (26–35°)	39.2
exotic forest	-	other	-	very steep (>35°)	-
				lakes	9.2

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	11.6	-	-	-	-
wind	0.5	-	-	-	-
scree creep	-	21.4	11.9	3.6	-
soil slip	26.8	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	14.8	-	-	-	-
negligible	-				
lakes	9.2				

GENERAL REMARKS

- W of the Sisters (351)
- used for fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
531	1978b	Spencer	Trophic status (1975-76).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE SHEPPARD

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max - (surface) - (bottom)	
max difference top to bottom -	
stratification little, if any, stratification	531
Remarks: Based on 2 visits, 2 sites (531).	

SECCHI DISC DEPTH (m)			REFS
min 5.0	date n.d.		Irwin p.c.
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.3 mg m^{-3}	date 12/75,3/76		531
max 2.5 mg m^{-3}	date 12/75,3/76		531
mean 1.7 mg m^{-3}	n 4	date 12/75,3/76	531
period of blooms			
algae *Cyclotella, Nitzchia, Botryococcus*			196
Remarks: Wide range of algae present (196).			

pH READINGS			REFS
min 7.2	date n.s.		531
max 8.35	date n.s.		531
Remarks:			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	Vmax, ATP, chlorophyll	531
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	196
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

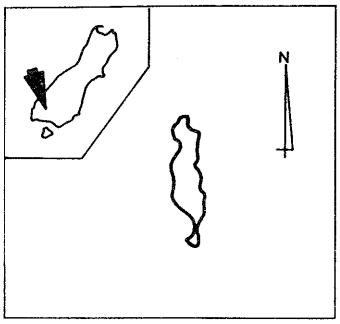
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax,ATP	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

SOUTH MAVORA LAKE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	613
WATER BOARD	Southland	LONG AXIS (km)	2.2 (NNW)
MAP REF (NZMS1)	S141 146353	MEAN DEPTH (m)	-
MAP REF (260 ser.)	E42 316337	MAX DEPTH (m)	30 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	1.23
MAIN INFLOW	surface stream from N Mavora Lake	CATCHMENT AREA (km²) (land and lake)	20.21
MAIN OUTFLOW	Mararoa River	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	812 S-MAVORA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	-	flat (0–3°)	-
sand dune	-	tussock	38.6	undulating (4–7°)	28.3
cropland	-	lakes	8.5	rolling (8–15°)	5.8
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	9.5
native forest	52.8	urban	-	steep (26–35°)	30.8
exotic forest	-	other	-	very steep (>35°)	17.0
				lakes	8.5

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	25.2	10.8	13.4	8.6	-
wind	9.6	-	-	-	-
scree creep	-	-	6.2	0.4	0.5
soil slip	16.8	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	8.5				

GENERAL REMARKS

_ ENE of Te Anau township (351)
- bush surrounded (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

SOUTH MAVORA LAKE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)			REFS
min		date	
max 10.0		date n.s.	Irwin p.c.
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -		date -	
max -		date -	
mean -	n -	date -	
period of blooms -			
algae *Cyclotella, Tabellaria, Gymnodinium*			196
Remarks: Wide range of taxa present (196).			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

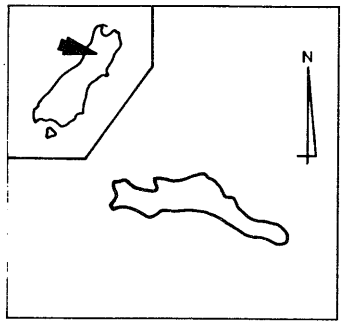
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE SUMNER

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hurunui	ALTITUDE (m a.s.l.)	521
WATER BOARD	North Canterbury	LONG AXIS (km)	9.8 (WNW)
MAP REF (NZMS1)	S53 633575	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L32 450338	MAX DEPTH (m)	134.5 (531)
LAKE TYPE	glacial	LAKE AREA (km²)	11.80
MAIN INFLOW	Hurunui River	CATCHMENT AREA (km²) (land and lake)	300.65
MAIN OUTFLOW	Hurunui River	CATCHMENT No. (MWD)	651000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	496 SUMNER

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	2.4
sand dune	-	tussock	39.0
cropland	-	lakes	4.6
lowland scrub	-	rivers	0.9
subalpine scrub	9.1	ice and snow	-
native forest	44.0	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	2.6
undulating (4–7°)	4.0
rolling (8–15°)	2.0
strongly rolling (16–20°)	6.9
moderately steep (21–25°)	3.5
steep (26–35°)	73.4
very steep (>35°)	2.1
lakes	4.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	7.9	5.5	-	-	-
wind	3.8	-	-	-	-
scree creep	0.3	6.9	5.9	4.5	5.9
soil slip	5.9	3.2	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	14.2	9.2	3.6	1.9	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	2.1	2.1	3.5	-
tunnel gully	-	-	-	-	-
streambank	2.9	-	-	-	-
deposition	-	-	-	-	-
negligible	5.1				
lakes	4.6				

GENERAL REMARKS

- SW of State Highway 7, Lewis Pass Road (351)
- mostly surrounded by bush (351)
- used for tramping, fishing, boating
- in State Forest Park

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Productivity and trout environment.
109-351	ongoing	Chemistry Division	Water analyses.
	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
531	1978b	Spencer	Trophic status (1975, 1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE SUMNER

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 10.9 (3/76) (surface) - (bottom)	531
max 13.5 (3/76) (surface) - (bottom)	531
max difference top to bottom -	
stratification mixed	531
Remarks:	

SECCHI DISC DEPTH (m)				REFS
min -		date -		
max -		date -		
mean 4.0	n n.d.	period n.d.		Irwin p.c.
period of worst clarity -				
causes -				
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.83 mg m^{-3}	date 3/76		531
max 2.3 mg m^{-3}	date 12/75		531
mean 1.5 mg m^{-3}	n 4	date 12/75,3/76	531
period of blooms -			
algae -			
Remarks: Algae sparse (531).			

pH READINGS			REFS
min 7.2	date 3/76		531
max 7.66	date 12/75		531
Remarks: 2 visits, 2 readings at 2 sites each (531).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	Vmax	531
oligotrophic	productivity	51
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	51
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	51
wildlife	-
Remarks:	

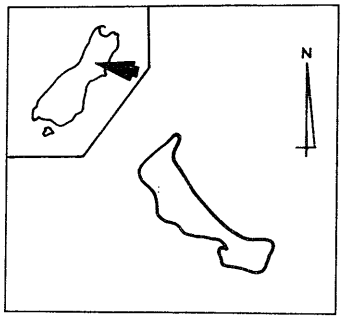
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax,ATP	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TAYLOR

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Malvern	ALTITUDE (m a.s.l.)	534-609
WATER BOARD	North Canterbury	LONG AXIS (km)	3.1 (NW)
MAP REF (NZMS1)	S60 653493	MEAN DEPTH (m)	-
MAP REF (260 ser.)	L33 470264	MAX DEPTH (m)	40.5 (531)
LAKE TYPE	glacial	LAKE AREA (km²)	1.85
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	14.80
MAIN OUTFLOW	to Raupo Pond then via Sisters Str to Hurunui R	CATCHMENT No. (MWD)	651182
LEVEL CHANGES	-	DATA BASE CODE (MAF)	509 TAYLOR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	4.4
sand dune	-	tussock	65.1
cropland	-	lakes	14.1
lowland scrub	8.1	rivers	-
subalpine scrub	-	ice and snow	-
native forest	8.2	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	0.1
undulating (4–7°)	7.5
rolling (8–15°)	4.0
strongly rolling (16–20°)	-
moderately steep (21–25°)	18.8
steep (26–35°)	55.5
very steep (>35°)	-
lakes	14.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	21.1	33.6	1.9	0.4	-
wind	7.6	-	-	-	-
scree creep	0.1	-	-	-	-
soil slip	7.1	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	14.1	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	14.1				

GENERAL REMARKS

- WSW of The Sisters (351)
- easily accessible, used for fishing, camping, boating, swimming

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
351	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
531	1978b	Spencer	Trophic status (1975, 1976).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE TAYLOR

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 12.3 (12/75) (surface) - (bottom)	531
max 14.3 (3/76) (surface) - (bottom)	531
max difference top to bottom -	
stratification -	
Remarks:	

SECCHI DISC DEPTH (m)			REFS
min 6.0	date n.d.		Irwin p.c.
max 6.25	date n.d.		Irwin p.c.
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 1.7 mg m^{-3} date March 1976	531
max 2.51 mg m^{-3} date December 1975	531
mean 2.1 mg m^{-3} n 4 date 12/75,3/76	531
period of blooms -	
algae *Anacystis, Gomphosphaeria, Mougeotia, Asterionella*	196
Remarks: 2 visits only (531).	

pH READINGS		REFS
min 7.5	date March 1976	531
max 7.8	date December 1975	531
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	Vmax	531
mesotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	531
phytoplankton (algae)	196
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

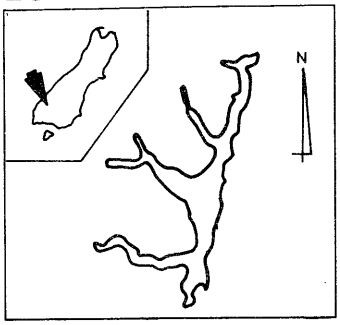
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	531	particulates	-
major ions	531	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	531
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other Vmax,ATP	531
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TE ANAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	203
WATER BOARD	Southland	LONG AXIS (km)	60 (NNE)
MAP REF (NZMS1)	S140 787417	MEAN DEPTH (m)	132 (337)
MAP REF (260 ser.)	D42 987389	MAX DEPTH (m)	417 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	347.50
MAIN INFLOW	surface streams	CATCHMENT AREA (km²) (land and lake)	2998.23
MAIN OUTFLOW	Waiau River	CATCHMENT No. (MWD)	797490
LEVEL CHANGES	201-204 m a.s.l.	DATA BASE CODE (MAF)	794 tANAU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-78)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	0.2	pasture	4.1
sand dune	-	tussock	30.8
cropland	-	lakes	11.9
lowland scrub	4.5	rivers	0.1
subalpine scrub	0.4	ice and snow	0.2
native forest	47.1	urban	-
exotic forest	-	other	0.7

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	3.6
undulating (4–7°)	7.8
rolling (8–15°)	6.8
strongly rolling (16–20°)	3.8
moderately steep (21–25°)	6.3
steep (26–35°)	16.3
very steep (>35°)	43.2
lakes	11.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	12.9	5.5	0.4	-	-
wind	2.0	0.3	-	-	-
scree creep	2.9	14.2	4.0	1.0	1.1
soil slip	14.6	3.5	0.6	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	6.1	5.3	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	0.1	-	0.2	-	-
tunnel gully	-	-	-	-	-
streambank	5.2	0.6	-	-	-
deposition	0.2	-	-	-	-
negligible	7.1				
lakes	11.9				

GENERAL REMARKS

- 23 km from Te Anau township (351)
- largest South Island lake; 26 islands (351)
- bush on W and NE shore, scrub and farmland on E and SE shores (351)
- upstream from Lake Manapouri (378)
- example of a "piedmont" lake (378)
- used for fishing, swimming, boating
- popular tourist lake

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-196	ongoing	Chemistry Division	Water analyses.
	1975	Flint	Phytoplankton.
282	1970a	Hill	Current status (1970).
337	1971b	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity (1968).
351	1975a	Irwin	Checklist of NZ lakes.
368	1972	Johnson	Ecology of shoreline vegetation.
376	1959	Jolly	Limnological study.
378	1968	Jolly	Comparative limnology of NZ lakes (up to 1967).
382	1975	Jolly & Irwin	Thermal conditions.
550	1973a	Stout	Preliminary report.
552	1975a	Stout	Comparison of lakes at different altitudes.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE TE ANAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN		REFS
min -	t°C - date -	
max -	t°C - date -	
mean -	n - period -	
period of lowest oxygen	none recorded	378
Remarks: No low oxygen, based on 4 seasonal visits (378).		

TEMPERATURE (°C)		REFS
min 8.8 (8/54)	(surface) 8.8 (8/54) (bottom)	378
max 16.85 (2/53)	(surface) - (bottom)	378
max difference top to bottom -		
stratification	probably not	378
Remarks: 4 visits prior to 1967 (378).		

SECCHI DISC DEPTH (m)		REFS
min 8.5	date April 1953	378
max 11.3	date August 1953	378
mean 10	n 4 period pre 1967	378
period of worst clarity	autumn	378
causes	glacial flour	378
Remarks:		

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min 0.3 mg m^{-3}	date n.d.	552
max 2.5 mg m^{-3}	date n.d.	552
mean -	n - date -	
period of blooms -		
algae *Melosira, Staurastrum*		196
Remarks: Wide range of taxa but sparse (196).		

pH READINGS		REFS
min 6.7	date April 1953	378
max -	date -	
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	282
		Ranunculus fluitans	282
		Myriophyllum elatinoides	282
Remarks: Sparse macrophytes (282).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
oligotrophic	physico-chemical	552
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,282
macrophytes	282
zooplankton	92,282
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

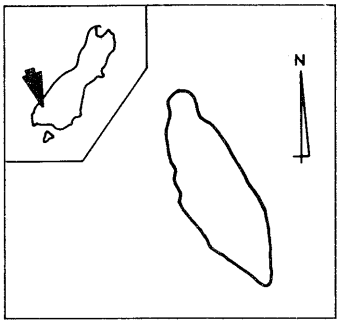
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	282,378	particulates	-
major ions	378	redox	-
trace elements	-	salinity	-
organic matter	378	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	282,378
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TE AU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wallace	ALTITUDE (m a.s.l.)	346
WATER BOARD	Southland	LONG AXIS (km)	2.4 (NNW)
MAP REF (NZMS1)	S140 462384	MEAN DEPTH (m)	-
MAP REF (260 ser.)	C42 690354	MAX DEPTH (m)	100 (552)
LAKE TYPE	glacial	LAKE AREA (km²)	2.5
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	50.34
MAIN OUTFLOW	to Lake Hilda, then Esk Burn to Lake Te Anau	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	802 tAU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-78)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	-	tussock	55.8
cropland	-	lakes	4.4
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	39.8	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	5.8
strongly rolling (16–20°)	6.1
moderately steep (21–25°)	4.4
steep (26–35°)	-
very steep (>35°)	79.3
lakes	4.4

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	2.2	21.0	-	-	-
wind	-	-	-	-	-
scree creep	-	32.1	2.8	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	26.2	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	6.1	-	-	-	-
deposition	5.3	-	-	-	-
negligible	-				
lakes	4.4				

GENERAL REMARKS

- NW of head of South Fjord (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
552	1975a	Stout	Comparison of lakes at different altitudes (1973, 1974).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE TE AU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 60%	t°C 5.8	date May 1974			552
max -	t°C -	date -			
mean -	n -	period -			
period of lowest oxygen -					
Remarks:					

TEMPERATURE (°C)			REFS
min 9 (5/74)	(surface) 5.51 (5/74)	(bottom)	552
max 13.3 (2/74)	(surface) 5.81 (2/73)	(bottom)	552
max difference top to bottom 7.3°C			552
stratification stratified			552
Remarks: 2 visits, 1 site (552).			

SECCHI DISC DEPTH (m)			REFS
min 6.0	date May 1974		552
max 7.5	date February 1973		552
mean -	n -	period -	
period of worst clarity May			552
causes algae			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 0.2	n 2	date 2/73,5/74	552
period of blooms -			
algae *Cyclotella, Tabellaria, Sphaerocystis*			196,552
Remarks:			

pH READINGS			REFS
min 6.1	date May 1974		552
max 6.8	date February 1973		552
Remarks:			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	physico-chemical	552
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,552
macrophytes	-
zooplankton	552
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Dominant zooplankton - *Boeckella dilatata* (552).	

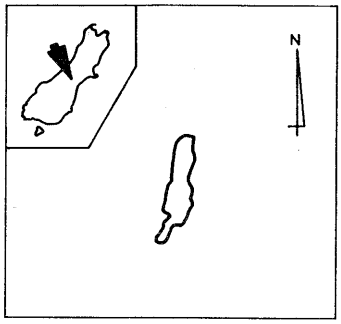
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	552	particulates	-
major ions	552	redox	552
trace elements	-	salinity	-
organic matter	-	alkalinity	552
toxic organics	-	hardness	-
pigments	-	silica	552
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TEKAPO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mackenzie	ALTITUDE (m a.s.l.)	708
WATER BOARD	Waitaki	LONG AXIS (km)	25.2 (N)
MAP REF (NZMS1)	S90 147133	MEAN DEPTH (m)	-
MAP REF (260 ser.)	I37 115996	MAX DEPTH (m)	120 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	86.80
MAIN INFLOW	Godley River and about 15 other streams	CATCHMENT AREA (km²) (land and lake)	1391.36
MAIN OUTFLOW	Tekapo River	CATCHMENT No. (MWD)	711390
LEVEL CHANGES	702-712 (HEP)	DATA BASE CODE (MAF)	610 TEKAPO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	5.6	flat (0–3°)	4.3
sand dune	-	tussock	51.3	undulating (4–7°)	4.4
cropland	-	lakes	6.8	rolling (8–15°)	8.9
lowland scrub	0.1	rivers	7.0	strongly rolling (16–20°)	5.3
subalpine scrub	20.7	ice and snow	6.6	moderately steep (21–25°)	8.7
native forest	-	urban	-	steep (26–35°)	35.6
exotic forest	-	other	1.8	very steep (>35°)	12.4
				lakes	6.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	0.8	10.1	1.3	0.1	-
wind	7.4	9.3	0.5	0.1	-
scree creep	-	6.8	20.0	5.6	14.8
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	0.4	0.6	0.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	0.4	0.5	0.4	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	0.1	-	-
negligible	0.4				
lakes	6.8				

GENERAL REMARKS

- NNE of Tekapo township (351)
- one main island, Motuariki (351)
- used for HEP, boating, general recreation
- outlet diverted
- mean monthly discharge 79 m^3 sec^{-1}

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
235	1974	Glasby & Edgerly	Geochemistry and lake water (1971).
282	1970a	Hill	Current status (1970).
347	1974a	Irwin	Water clarity (1971).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Temperature.
514	1974	Ridgeway	Seiches and internal waves.
553	1975b	Stout	Brief description.
557	1978	Stout	Effects of silt loading (1975-78).
580	1984	Vant & Davies-Colley	Water clarity (1983).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE TEKAPO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min 12.0 (4/70)	(surface) -	(bottom)	282
max 13.1	(surface) -	(bottom)	Irwin p.c.
max difference top to bottom -			
stratification weak and deep stratification			557
Remarks:			

SECCHI DISC DEPTH (m)		REFS
min 1.2	date March 1983	580
max 7.0	date April, May 1971	347
mean -	n - period -	
period of worst clarity late spring		557
causes glacial rock flow		235, 347, 557,580
Remarks: Sampling strategy not specified (557). 11 samples (347).		

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.4 mg m^{-3}	date n.d.		347
max 6.0 mg m^{-3}	date n.d.		347
mean 4.9	n n.d.	date n.d.	557
period of blooms -			
algae *Cyclotella, Gymnodinium*			196
Remarks:			

pH READINGS		REFS
min 7.0	date May 1971	235
max 7.2	date May 1971	235
Remarks: 3 surface, 2 subsurface readings (235).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Myriophyllum elatinoides	282
		Ranunculus fluitans	282
		Potamogeton cheesemanii	282
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	water quality	235
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,557
macrophytes	282
zooplankton	92,557
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

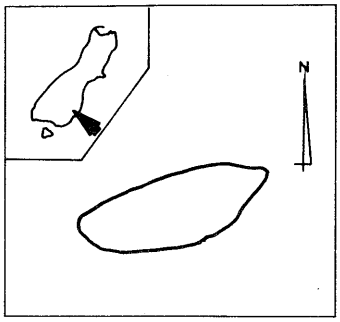
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	282	particulates	235,580
major ions	235	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	235
pigments	580	silica	235,282
optical properties	580	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

TOMAHAWK LAGOON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Dunedin	ALTITUDE (m a.s.l.)	0
WATER BOARD	Otago	LONG AXIS (km)	1.4 (NE)
MAP REF (NZMS1)	S164 190682	MEAN DEPTH (m)	0.9 (452)
MAP REF (260 ser.)	I44 194746	MAX DEPTH (m)	1.2 (452)
LAKE TYPE	beach	LAKE AREA (km²)	0.40
MAIN INFLOW	3 surface streams	CATCHMENT AREA (km²) (land and lake)	4.95
MAIN OUTFLOW	to sea	CATCHMENT No. (MWD)	739000
LEVEL CHANGES	alters with dredging	DATA BASE CODE (MAF)	908 TOMAHAWK

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	88.7	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	1.0	tussock	-	undulating (4–7°)	22.4	sheet	60.8	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	12.5	wind	-	1.0	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	53.7	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	1.0	soil slip	-	-	-	-	-
native forest	-	urban	10.3	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	27.9				
						lakes	n.d.				

GENERAL REMARKS

- SE of Dunedin (351)
- closed to sea at high tide (351)
- used for fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
439	1972	McKenzie	Nitrogen fixing organisms.
449	1965	Mitchell	Sampling report.
450	1967	Mitchell	Primary productivity.
452	1971	Mitchell	Phytoplankton productivity (1963-66).
455	1975b	Mitchell	Eutrophication (1964-73).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

TOMAHAWK LAGOON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 2.1 g m^{-3}	t °C n.d.	date n.d.		450
max -	t °C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks:				

TEMPERATURE (°C)		REFS
min 0.4 (6/64)	(surface) - (bottom)	452
max 22.0 (summer)	(surface) - (bottom)	452
max difference top to bottom -		
stratification -		
Remarks: 3 year study, numerous measurements (452).		

SECCHI DISC DEPTH (m)			REFS
min 0.15	date January 1964		452
max > 2.6	date after May 1965		452
mean -	n -	period -	
period of worst clarity summer			452
causes *Anabaena* or *Gymnodinium* blooms.			452
Remarks: At least 100 readings over 3 year period 7/63-1/66 (452).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.0 mg m^{-3}	date August 1965		452
max 60.0 mg m^{-3}	date February 1965		452
mean 20	n 30	date 3 years	452
period of blooms			
algae *Anabaena, Anacystis, Ankistrodesmus, Botryococcus*			196,452,455
Remarks:			

pH READINGS		REFS
min 7.1	date October 1964	452
max 9.8	date September 1965	452
Remarks: At least 100 readings over 3 year study (452).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Myriophyllum elatinoides	452
		Ranunculus fluitans	452
Remarks:			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	196
eutrophic	algae	452
highly eutrophic	algae, macrophytes	455
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,452,455
macrophytes	452,455
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

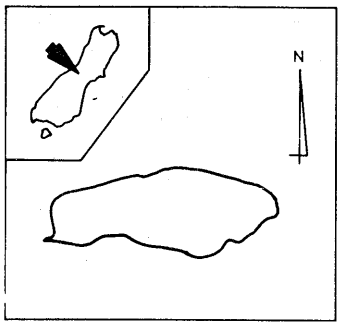
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	452,455	particulates	-
major ions	452,455	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	452,455
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAHAPO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Westland	ALTITUDE (m a.s.l.)	60
WATER BOARD	Westland	LONG AXIS (km)	3.2 (E)
MAP REF (NZMS1)	S63 903904	MEAN DEPTH (m)	-
MAP REF (260 ser.)	H35 879697	MAX DEPTH (m)	80 (196)
LAKE TYPE	glacial	LAKE AREA (km²)	2.25
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	16.03
MAIN OUTFLOW	Okarito River	CATCHMENT No. (MWD)	891100
LEVEL CHANGES	66-67 m a.s.l. (HEP)	DATA BASE CODE (MAF)	553 WAHAPO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	19.3	pasture	7.1	flat (0–3°)	35.4	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	19.2	sheet	13.7	-	-	-	-
cropland	-	lakes	17.3	rolling (8–15°)	0.6	wind	-	-	-	-	-
lowland scrub	9.2	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	5.6	soil slip	17.1	-	-	-	-
native forest	42.2	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	4.8	very steep (>35°)	17.1	slump	-	-	-	-	-
				lakes	17.3	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	8.7	-	-	-
						negligible	38.4				
						lakes	17.3				

GENERAL REMARKS

- SW of Rotokino (351)
- bush surrounded; held by a moraine ridge (351)
- used for HEP, recreation

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
109-196	ongoing	Chemistry Division	Water analyses.
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Irwin NZOI pers comm	Water clarity.
553	1975b	Stout	Brief description.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE WAHAPO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)			REFS
min	(surface)	(bottom)	
max	(surface)	(bottom)	
max difference top to bottom			
stratification			
Remarks: No data found.			

SECCHI DISC DEPTH (m)				REFS
min 1.0		date n.d.		Irwin p.c.
max 2.0		date n.d.		Irwin p.c.
mean -	n -		period -	
period of worst clarity -				
causes discoloured by organic content				Irwin p.c.
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -		date -	
max -		date -	
mean -	n -	date -	
period of blooms -			
algae *Synedra, Melosira, Chlorella*			196
Remarks:			

pH READINGS		REFS
min	date	
max	date	
Remarks: No data found.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: No data found.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196,553
macrophytes	-
zooplankton	553
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

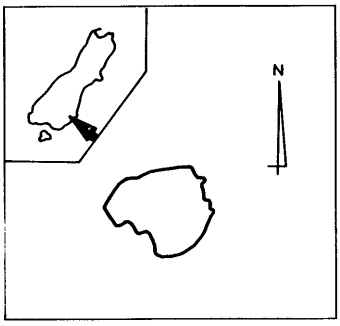
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIPORI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Dunedin	ALTITUDE (m a.s.l.)	0
WATER BOARD	Otago	LONG AXIS (km)	2.5 (W)
MAP REF (NZMS1)	S172 823594	MEAN DEPTH (m)	0.75 (452)
MAP REF (260 ser.)	I45 860670	MAX DEPTH (m)	1.0 (452)
LAKE TYPE	riverine/beach	LAKE AREA (km^2)	2.25
MAIN INFLOW	river/tide	CATCHMENT AREA (km^2) (land and lake)	222.37
MAIN OUTFLOW	Waipori River to Taieri River	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	924 WAIPORI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	1.2	pasture	40.6
sand dune	-	tussock	25.3
cropland	-	lakes	0.9
lowland scrub	11.3	rivers	-
subalpine scrub	-	ice and snow	-
native forest	11.5	urban	-
exotic forest	9.1	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	25.4
undulating (4–7°)	10.5
rolling (8–15°)	16.2
strongly rolling (16–20°)	8.5
moderately steep (21–25°)	35.5
steep (26–35°)	2.8
very steep (>35°)	-
lakes	0.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	58.3	-	-	-	-
wind	3.5	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	37.3				
lakes	0.9				

GENERAL REMARKS

- WNW of Henley (351)
- inflow and outflow controlled by tide and river (351)
- shallow tidal lake, but non-saline (452)
- retention period 76 hours (452)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
449	1965	Mitchell	Sampling report.
450	1967	Mitchell	Primary productivity.
452	1971	Mitchell	Phytoplankton and productivity (1963-66).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE WAIPORI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 8.2 g m^{-3}	t°C n.d.	date n.d.		450
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: At high tide (450).				

TEMPERATURE (°C)			REFS
min 2 (7/65)	(surface) -	(bottom)	452
max 24 (1/65)	(surface) -	(bottom)	452
max difference top to bottom -			
stratification mixed			452
Remarks: 3 year study, 40 readings from 3 sites 7/63 - 1/66 (452).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 1	n n.d.	period n.d.	452
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.5 mg m^{-3}	date April 1965		452
max 6.0 mg m^{-3}	date June 1965		452
mean 4 mg m^{-3}	n 12	date -	452
period of blooms -			
algae -			
Remarks: Sampled monthly for 1 year (452).			

pH READINGS		REFS
min 6.9	date March 1965	452
max 7.6	date November 1965	452
Remarks: One site, 20 readings (452).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	452
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	450, 452
macrophytes	452
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

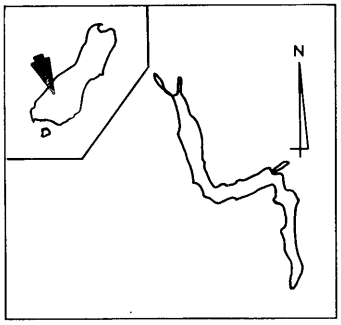
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	452	particulates	-
major ions	452	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	452
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAKATIPU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	310
WATER BOARD	Otago	LONG AXIS (km)	75.2 (N&ENE)
MAP REF (NZMS1)	S132 331743	MEAN DEPTH (m)	210 (339)
MAP REF (260 ser.)	E41 478696	MAX DEPTH (m)	380 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	289.17
MAIN INFLOW	Dart & Rees Rivers	CATCHMENT AREA (km²) (land and lake)	2674
MAIN OUTFLOW	Kawarau River	CATCHMENT No. (MWD)	752746
LEVEL CHANGES	-	DATA BASE CODE (MAF)	761 WAKATIPU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	4.6
sand dune	-	tussock	56.8
cropland	-	lakes	9.7
lowland scrub	4.0	rivers	1.0
subalpine scrub	6.9	ice and snow	2.2
native forest	12.7	urban	-
exotic forest	0.2	other	1.8

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	3.7
undulating (4–7°)	2.8
rolling (8–15°)	1.6
strongly rolling (16–20°)	3.5
moderately steep (21–25°)	10.4
steep (26–35°)	48.8
very steep (>35°)	16.3
lakes	9.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	23.2	17.4	4.3	0.4	0.2
wind	2.6	0.5	-	-	-
scree creep	0.3	13.1	9.9	5.8	2.6
soil slip	0.4	0.2	0.1	-	-
earth slip	-	-	-	-	-
slump	0.6	-	-	-	-
debris avalanche	0.2	0.4	0.1	0.1	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	0.3	0.1	-	-
tunnel gully	-	-	-	-	-
streambank	1.7	0.4	-	-	-
deposition	0.1	-	-	-	-
negligible	5.9				
lakes	9.7				

GENERAL REMARKS

- SW of Queenstown (351)
- 3 main sections to lake, 3 islands in N section (351)
- popular tourist lake
- used for boating, swimming, fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
26	1981	Borlase	Water quality baseline survey.
27	1955	Bottomley	Pulsations of lake.
28	1956a	Bottomley	Free oscillation of lake.
29	1956b	Bottomley	Seiches.
38	1971	Brodie & Irwin	Morphology and sedimentation.
92	1975	Chapman *et al*	Zooplankton.
121	1974a	Coffey	Submerged weed control.
131	1965	Cox	Oscillations of lake.
196	1975	Flint	Phytoplankton.
237	1925	Glock	General description.
282	1970a	Hill	Current status (1970).
309	1872	Hutton	Lake formation.
339	1972a	Irwin	Bathymetric chart.
347*	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
362*	1970	Irwin & Jolly	Seasonal temperature (1952-54, 1968-69).
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology (up to 1967).
382	1975	Jolly & Irwin	Thermal conditions.
424*	1979	McBride	Water quality survey (up to 1979).
484	1977a	Paerl	Ultraplankton and production (1975, 1976).
520	1876	Russel	Early description.
561	1881	Stuart	Lake origin.

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw *data pertaining to this lake.

LAKE WAKATIPU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	94%	t°C	8.75	date	February 53	378
max	-	t°C	-	date	-	
mean	-	n	-	period	-	
period of lowest oxygen	-					
Remarks:						

TEMPERATURE (°C)				REFS
min	8.75 (8/54)	(surface) 8.75 (8/54)	(bottom)	378
max	16.75 (2/54)	(surface) 8.75 (2/54)	(bottom)	378
max difference top to bottom	7.25°C			378
stratification	stratified			378
Remarks: Based on 6 visits, 6 readings (378).				

SECCHI DISC DEPTH (m)					REFS
min	7.7	date	1952-71		424
max	18.0	date	1952-71		424
mean	12.6	n 6	period	12/68-5/69	347
period of worst clarity	-				
causes	-				
Remarks:					

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date	-
period of blooms	-			
algae	*Gomphosphaeria, Botryococcus, Oocytis Staurastrum*			196
Remarks:				

pH READINGS				REFS
min	6.3	date	n.s.	26
max	7.6	date	1974-76	424
Remarks: 3 sites, 6 samples (26).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	121
		Isoetes alpinus	121
		Characeae	121
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	26,484
phytoplankton (algae)	196,282,484
macrophytes	121,282
zooplankton	92
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

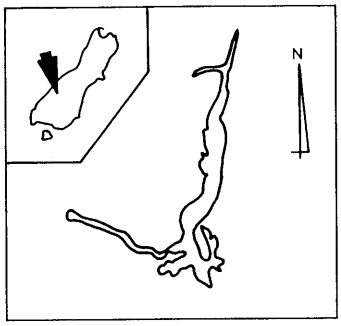
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	26,282,378, 424	particulates	26,424
major ions	378,424	redox	26,424
trace elements	424	salinity	26,424
organic matter	378,424	alkalinity	-
toxic organics	-	hardness	424
pigments	-	silica	282,378
optical properties		other ATP	484
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WANAKA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lake	ALTITUDE (m a.s.l.)	277
WATER BOARD	Otago	LONG AXIS (km)	45.5 (NNE)
MAP REF (NZMS1)	S115 899200	MEAN DEPTH (m)	-
MAP REF (260 ser.)	F40 990123	MAX DEPTH (m)	311 (351)
LAKE TYPE	glacial	LAKE AREA (km²)	180.1
MAIN INFLOW	Makaroa River and Matukituki River	CATCHMENT AREA (km²) (land and lake)	2590.01
MAIN OUTFLOW	Clutha River	CATCHMENT No. (MWD)	752990
LEVEL CHANGES	276-279 m a.s.l.	DATA BASE CODE (MAF)	678 WANAKA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	0.2	pasture	4.6
sand dune	-	tussock	55.7
cropland	-	lakes	7.6
lowland scrub	7.8	rivers	1.3
subalpine scrub	5.5	ice and snow	3.0
native forest	14.3	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	2.6
undulating (4–7°)	3.7
rolling (8–15°)	1.6
strongly rolling (16–20°)	2.7
moderately steep (21–25°)	8.3
steep (26–35°)	53.5
very steep (>35°)	15.7
lakes	7.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	19.5	20.3	1.4	-	-
wind	3.1	0.3	-	-	-
scree creep	10.1	11.4	3.3	0.1	0.1
soil slip	8.3	2.9	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	0.6	2.3	0.2	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	0.1	-	-	-
streambank	2.0	-	-	-	-
deposition	0.3	0.1	-	-	-
negligible	1.6				
lakes	7.6				

GENERAL REMARKS

- N of Wanaka township (351)
- 6 islands in main body lake, 1 island in Stevenson's Arm (351)
- used for tourism, swimming, boating, fishing
- example of a piedmont lake (378)
- generally pristine and unpolluted (424)
- septic tank seepage from Wanaka township (424)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
26	1981	Borlase	Water quality baseline survey.
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
113	1976	Chemistry Division	Water chemistry.
121	1974a	Coffey	Submerged weed control.
196	1975	Flint	Phytoplankton.
225	1974	Freshwater Section	*Lagarosiphon* control.
235	1974	Glasby & Edgerley	Geochemistry of lake waters (1971).
282	1970a	Hill	Current status (1970).
300	1974c	Hughes	Weed control.
301	1975a	Hughes	Weed infestation.
303	1976a	Hughes	Aquatic weed.
305	1977	Hughes	Weed control.
306*	1980	Hughes & McColl	Aquatic weed control (1975-78).
308	1977	Hughes & Meeklah	Control of *Lagarosiphon*.
347*	1974a	Irwin	Water clarity (1971).
351	1975a	Irwin	Checklist of NZ lakes.
365	1976	Irwin & Ridgeway	Bathymetric chart.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology (up to 1967).
420	1973	Mason	*Lagarosiphon*.
424*	1979	McBride	Historical water quality data (up to 1979).
447	1974	Milo	Aesthetics.
516	1980	Robertson & Blair	Resources of lake.
558*	1980	Stout	Water quality of lake and inflows (1975-76).

Refer to Introduction for explanation of box contents. Check appendix for further refs and/or raw data pertaining to this lake.

LAKE WANAKA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN			REFS
min	t °C	date	
max	t °C	date	
mean	n	period	
period of lowest oxygen			
Remarks: No data found.			

TEMPERATURE (°C)	REFS
min 8.5 (8/53) (surface) 8.75 (8/53) (bottom)	378
max 16.9 (n.s.) (surface) 9.0 (n.s.) (bottom)	378
max difference top to bottom 7.9	378
stratification doubtful, stratified in summer	378,306
Remarks: 2 visits only (378).	

SECCHI DISC DEPTH (m)			REFS
min 9.5	date May 1953		378
max 19.0	date July, August 1971		347
mean 17.0	n 9	period 1971	347
period of worst clarity May			378
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Botryococcus, Asterionella, Dinobryon*			196
Remarks:			

pH READINGS		REFS
min 6.5	date 1976-79	424
max 8.0	date n.s.	558
Remarks: 5 readings 9/75-8/76 (558).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	121
		Myriophyllum	121
		Potamogeton	121
		Characeae	121
		Lagarosiphon major	121
Remarks: Hydrosere diagrams (306). Extensive beds of *Lagarosiphon* in Roy's Bay (121).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	nutrient	558
oligotrophic	algae	196,306
oligotrophic	n.d.	235
oligotrophic	physico-chemical	121
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	26,558
phytoplankton (algae)	196,282,306
macrophytes	121,225,282,300,301,303,305,306, 308,420,516
zooplankton	92,282
macroinvertebrates	306
fish	516
wildlife	516
Remarks:	

OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	26,282,306, 378,424,558	particulates	26,424
major ions	235,306,378, 424,558	redox	26,424
trace elements	235,306,424	salinity	26,306
organic matter	-	alkalinity	306
toxic organics	-	hardness	306,424, 558
pigments	-	silica	282,378, 558
optical properties	424	other	-
Remarks: At depths of 0, 50, 100, 150, 200, 260 m. No trends noted (235).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

Appendix: Raw Data

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE GRASMERE								
531 Spencer 1978b	surface temp.	single visit (2/76)	2	1	2	17.4°C	–	–
531 Spencer 1978b	pH	single visit (2/76)	2	1	2	–	7.8	7.95
544 Stout 1969a	surface temp.	monthly (5/67–7/68)	1	1	13	–	5.8°C (n s)	19.0°C (n s)
544 Stout 1969a	pH	monthly (5/67–7/68)	1	1	13	–	6.7 (n s)	8.3 (n s)
553 Stout 1975b	surface temp.	previously published work	n s	n s	n s	–	0°C (winter)	21°C (summer)
553 Stout 1975b	Secchi disc	previously published work	n s	n s	n s	8 m	0.42 m (9/70)	–
553 Stout 1975b	pH	previously published work	n s	n s	n s	–	–	8.9 (summer)
573 Timms 1983	Secchi disc	n s (8/78–2/79)	13	n s	n s	2.8 m	1.7 m (n s)	8.2 m (n s)
LAKE HAYES								
26 Borlase 1981	pH	single visit (n s)	1	1	1	8.1	–	–
378 Jolly 1968	dissolved oxygen	4 visits (seasonal)	1	1–2	7	50%	13% (5/56)	112% (11/53)
378 Jolly 1968	surface temp.	4 visits (seasonal)	n s	n s	4	–	5.75°C (n s)	18.35°C (3/54)
378 Jolly 1968	bottom temp.	4 visits (seasonal)	n s	n s	4	–	5.6°C (n s)	8.2°C (3/54)
378 Jolly 1968	Secchi disc	7 visits	n s	n s	7	6 m	4.7 m (12/52)	7.6 m (4/53)
378 Jolly 1968	pH	n s	n s	n s	6	–	7.1 (2, 8/53)	8.0 (2/53)
458 Mitchell & Burns 1979	dissolved oxygen	monthly (12/69–2/72)	1	1	26	–	0 g m^{-3} (Jan–Apr)	10 g m^{-3} (winter)
458 Mitchell & Burns 1979	surface temp.	monthly (12/69–2/72)	1	1	26	–	6°C (winter)	21°C (2/71)
458 Mitchell & Burns 1979	bottom temp.	monthly (12/69–2/72)	1	1	26	–	6°C (July/Aug)	9°C (summer)
458 Mitchell & Burns 1979	Secchi disc	n s	n s	1	n s	1	1.9 m	–
459 Mitchell & Burns 1981	pH	monthly (12/69–2/72)	2 depths	n s	n s	–	6.95 (30 m)	9.4 (0 m)
LAKE MANAPOURI								
282 Hill 1970a	surface temp.	single visit (4/70)	1	1	1	13.5°C	–	–
282 Hill 1970a	Secchi disc	single visit (4/70)	1	1	1	10 m	–	–
338 Irwin 1971c	surface temp.	several visits (1966–68)	8	n s	n s	–	8.0°C (11/68)	16.2°C (1/67)
338 Irwin 1971c	bottom temp.	several visits (1966–68)	8	n s	n s	–	7.9°C (11/68)	8.3°C (1/67)
378 Jolly 1968	dissolved oxygen	1 visit (4/53)	1	1	1	112%	–	–
378 Jolly 1968	surface temp.	3 visits (pre 1967)	1	1	3	–	8.0°C (9/57)	17.75°C (2/53)
378 Jolly 1968	bottom temp.	3 visits (pre 1967)	1	1	3	–	8.0°C (9/57)	9.2°C (2/53)
378 Jolly 1968	Secchi disc	3 visits (pre 1967)	1	1	3	6.5 m	6.0 m (4/53)	7.0 (1/53)
378 Jolly 1968	pH	1 visit (4/53)	1	1	1	6.5	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE ROTORUA (S.I.)								
46 Brown 1979	dissolved oxygen	2 visits (2/71, 2/73)	n s	n s	n s	–	63% (2/73)	–
46 Brown 1979	surface temp.	n s	n s	n s	n s	–	7.0°C (n s)	21.0°C (n s)
46 Brown 1979	bottom temp.	n s	n s	n s	n s	–	7.5°C (n s)	15.5°C (n s)
47 Brown *et al.* 1973	dissolved oxygen	(up to 1973)	n s	n s	n s	–	60% (n s)	–
47 Brown *et al.* 1973	surface temp.	(up to 1973)	n s	n s	22	–	7.0°C (7/72)	20.7°C (summer)
232 Gillespie 1976	surface temp.	3 visits (9/72, 10/72, 3/73)	3	n s	12	–	10°C (9/72)	19.5°C (3/73)
232 Gillespie 1976	pH	3 visits (9/72, 10/72, 3/73)	3	n s	12	–	6.8 (9/72)	7.5 (3/73)
356 Irwin 1978b	surface temp.	weekly (1972–75)	1	n s	n s	–	7.0°C (Aug)	21°C (Jan)
356 Irwin 1978b	bottom temp.	weekly (1972–75)	1	n s	n s	–	7.5°C (Aug)	15.5°C (Mar)
566 Taylor 1971	pH	3 visits (11/70–3/71)	2	5	–	–	6.6 (4/71)	7.1 (12/70)
LAKE WAKATIPU								
347 Irwin 1974a	Secchi disc	2 visits (12/68, 5/69)	n s	n s	6	12.6 m	10 m (n s)	18.0 m (n s)
362 Irwin & Jolly 1970	surface temp.	1952–54, 1968–69	8	1	12	–	8.8°C (8/58)	16.5°C (3/54)
362 Irwin & Jolly 1970	bottom temp.	1952–54, 1968–69	8	1	12	–	8.5°C (12/68)	8.9°C (6/68)
378 Jolly 1968	dissolved oxygen	n s (pre 1967)	n s	n s	n s	–	94%	–
378 Jolly 1968	surface temp.	6 visits	9	1	n s	–	8.75°C (8/54)	16.75°C (n s)
378 Jolly 1968	bottom temp.	6 visits	9	1	n s	–	8.75°C (8/54)	8.75°C (2/54)
378 Jolly 1968	Secchi disc	6 visits	2	n s	n s	9.5 m	7.7 m (11/52)	11.0 m (8/52)
378 Jolly 1968	pH	1 visit (2/53)	n s	n s	n s	7.05	–	–
424 McBride 1979	surface temp.	historical data	–	–	–	–	9°C	16°C
424 McBride 1979	Secchi disc	historical data	–	–	–	–	7.7 m	18.0 m
424 McBride 1979	pH	historical data	–	–	–	–	6.3	7.6
LAKE WANAKA								
306 Hughes & McColl 1980	surface temp.	8 visits (9/75–1/78)	5	1	40	–	9.0°C (6–8/77)	17°C (1/76)
306 Hughes & McColl 1980	pH	8 visits (9/75–1/78)	n s	n s	n s	–	7.3 (n s)	8.0 (n s)
347 Irwin 1974a	Secchi disc	n s (1971)	n s	n s	9	17.0 m	12.0 m (7, 8/71)	19.0 m (7, 8/71)
378 Jolly 1968	surface temp.	2 visits	1	1	2	–	8.5°C (8/53)	16.9°C (n s)
378 Jolly 1968	bottom temp.	2 visits	1	1	2	–	8.75°C (8/53)	9.0°C (n s)
378 Jolly 1968	Secchi disc	4 visits	1	1	4	10.5 m	9.5 m (5/53)	11.5 m (8, 12/52)
378 Jolly 1968	pH	2 visits	1	1	2	–	7.0 8/53)	7.1 (5/53)
424 McBride 1979	Secchi disc	historical data	–	–	–	–	9.5 m	19.0 m
424 McBride 1979	pH	historical data	–	–	–	–	6.5	7.8
558 Stout 1980	pH	n s	5	–	5	–	7.3 (n s)	8.0 (n s)

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