WATER & SOIL MISCELLANEOUS PUBLICATION NUMBER 80

Inventory of New Zealand Lakes

PART I: NORTH ISLAND

National Water and Soil Conservation Authority

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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
13.	New Zealand recreational river survey. Pt 1: Introduction. ($5)	1981
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49.	River and estuary mixing workshop; Hamilton. ($8)	1983
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51.	Handbook on estimating dissolved oxygen depletion in polluted rivers. ($8)	1983
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64.	Hydrologists safety handbook. ($8)	1984
65.	Directory of water quality and liquid and waterborne wastes research in New Zealand, 1983. ($6)	1984
66.	Construction and operation of a sea sled for seabed surveying. ($2)	1984
68.	A national inventory of wild and scenic rivers. ($2)	1984
69.	Land treatment of wastes: Proceedings of seminar. Part 1. ($8)	1985
70.	Land treatment of wastes: Proceedings of seminar. Part 2. ($8)	1985
71.	Bibliography of hydrological and sedimentological studies in Manukau and Waitemata Harbours, Auckland. ($3)	1984
72.	The New Zealand Land Resource Inventory rock type classification. Part I: North Island. ($8)	1985
73.	The New Zealand Land Resource Inventory rock type classification. Part II: South Island. ($8)	1985
74.	Land use capability classification of the Southern Hawke's Bay-Wairarapa Region. ($10)	1985
75.	Correlation of North Island regional LUC units from the NZLRI. ($6)	1985
76.	Ocean Outfall Handbook. ($15)	1985
77.	Urban flood hazard.	in press
78.	Research requirements for the design and operation of community irrigation schemes. ($4)	1985
79.	Green Island Borough Urban Land Use Capability Study	in press
80.	Inventory of NZ lakes. Part I North Island. ($12)	1986
81.	Inventory of NZ lakes. Part II South Island. ($12)	1986
82.	Seminar: Biological monitoring in freshwaters. ($12)	1986
83.	Seminar: Biological monitoring in freshwaters. ($12)	1986
84.	Review of water and soil conservation research 1982/83. ($15)	1985
85.	The NZLRI erosion classification. ($10)	1986
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

WATER & SOIL MISCELLANEOUS PUBLICATION No. 80

INVENTORY OF NEW ZEALAND LAKES
PART I NORTH ISLAND

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Inventory of New Zealand Lakes. Part I North Island.

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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.

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Contents

Information Sheets—North 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

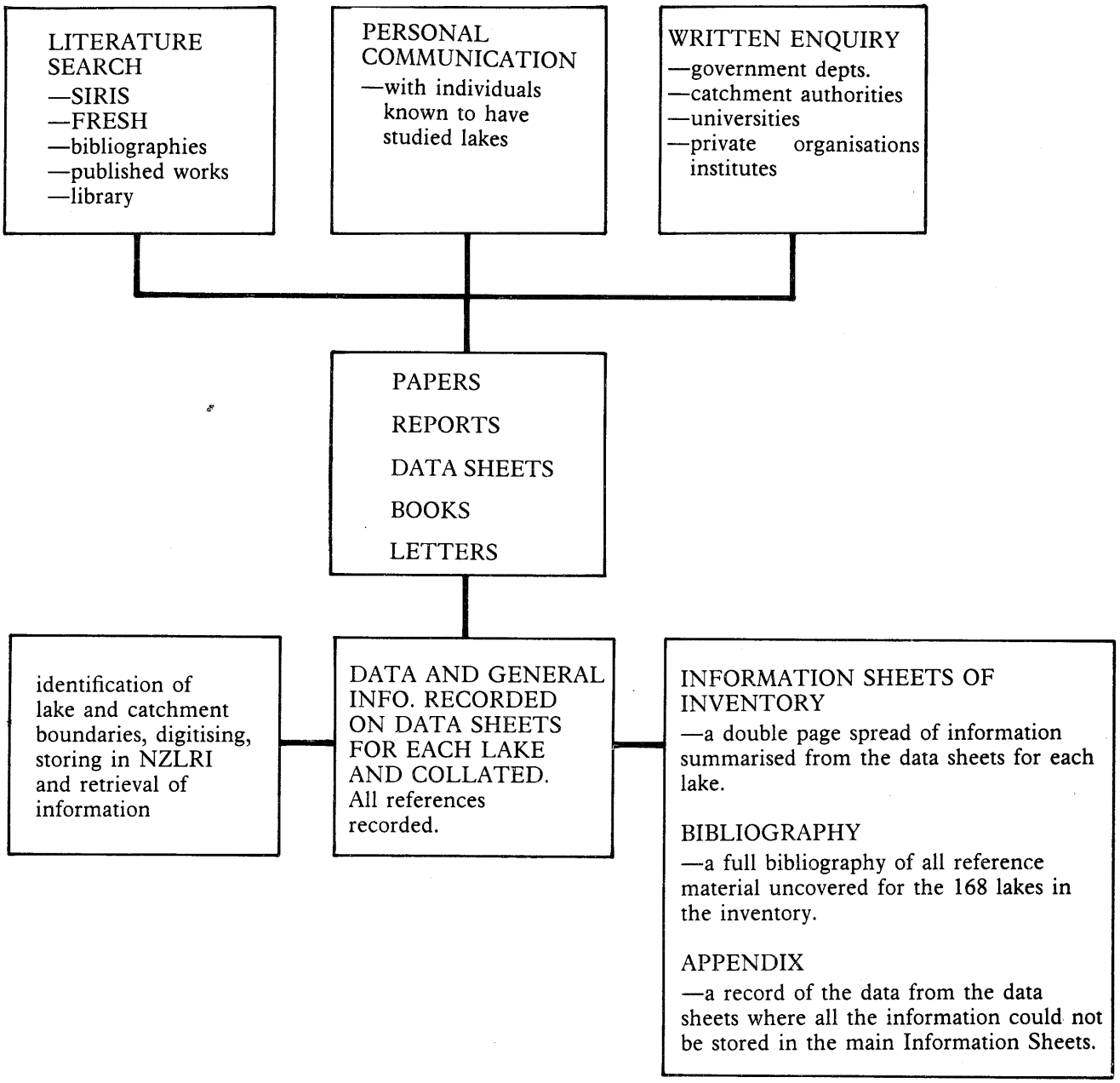


Fig. 1. Procedure followed in the preparation of the Inventory of New Zealand Lakes

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

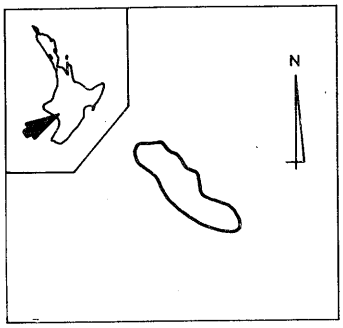
This contains a continuation of reference material where space was insufficient on the main information sheets, and summary of raw data, for certain lakes as indicated by an asterisk on the information sheets. Summaries are given in alphabetical order by lake name.

4.3 Bibliography

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

LAKE ALICE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	102
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.8 (NW)
MAP REF (NZMS1)	N143 842620	MEAN DEPTH (m)	2.1 (RWB)
MAP REF (260 ser.)	S23 086164	MAX DEPTH (m)	3.2 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.16
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	2.84
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	314 ALICE 2

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	100
sand dune	-	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°)	71.1
undulating (4–7°)	-
rolling (8–15°)	18.0
strongly rolling (16–20°)	-
moderately steep (21–25°)	10.9
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	10.9	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	89.1				
lakes	n.d.				

GENERAL REMARKS

- landward side of coastal dunes (351)
- duckshooting, fishing (RWB)
- stock and domestic water supply (RWB)
- input of secondary sewage from hospital (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Dune lake macrophyte distribution (1978).
-	1979	RWB pers comm	Data sheet, water quality (1978).
579	1982	Vant	Determine trophic status with 15 other lakes (1982).

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

LAKE ALICE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 0.6 g m^{-3} t°C n.s. date n.s.	RWB
max 9.0 g m^{-3} t°C n.s. date n.s.	RWB
mean - n - period -	
period of lowest oxygen February	RWB
Remarks: 2 samples only (RWB).	

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 0.37	date n.s.		RWB
max 1:60	date n.s.		RWB
mean 0.78	n 26	period 1978	RWB
period of worst clarity late summer			385
causes phytoplankton			385
Remarks: 0.8 m single reading in 1982 (579).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Extensive algal growth (RWB).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
Phormium	385	*Potamogeton cheesmanii*	385
Remarks: Species dominance varies with season (385).			

TROPHIC STATUS	BASIS	REFS
moderately eutrophic	macrophytes	385
eutrophic	total P, chlorophyll	579
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

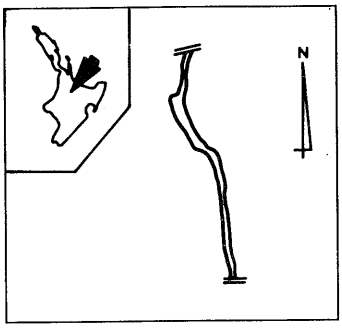
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ARAPUNI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Matamata	ALTITUDE (m a.s.l.)	113
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	6.5 (NNW)
MAP REF (NZMS1)	N75 119066	MEAN DEPTH (m)	53 (289)
MAP REF (260 ser.)	T16 402932	MAX DEPTH (m)	64 (289)
LAKE TYPE	reservoir	LAKE AREA (km²)	4.95
MAIN INFLOW	Waikato River	CATCHMENT AREA (km²) (land and lake)	242.31
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	168 ARAPUNI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	56.3
sand dune	-	tussock	-
cropland	-	lakes	3.5
lowland scrub	7.8	rivers	0.4
subalpine scrub	-	ice and snow	-
native forest	5.5	urban	-
exotic forest	26.5	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	2.2
undulating (4–7°)	5.5
rolling (8–15°)	24.2
strongly rolling (16–20°)	7.4
moderately steep (21–25°)	41.9
steep (26–35°)	12.2
very steep (>35°)	2.6
lakes	3.5

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	23.8	0.3	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	2.9	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	0.5	-	-	-
tunnel gully	-	-	-	-	-
streambank	0.2	-	-	-	-
deposition	-	-	-	-	-
negligible	68.4				
lakes	3.5				

GENERAL REMARKS

- located SSW of Arapuni township (351)
- filled 1929 (289)
- lies between Waipapa and Karapiro in Waikato hydro-lake sequence (403)
- retention time 6-12 days (403)
- geothermal spring water in inflow (403)
- popular for boating and fishing (140)
- good road access (140)
- receives Kinleith pulp and paper mill effluent (560)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
98	1970a	Chapman	History of lake weed infestation.
123	1975a	Coffey	Macrophyte distribution.
126	1976a	Coffey	Land use effects.
140	1976	Davis	Recreational patterns.
221	1972c	Freshwater Section	Biological report.
289	1975	Hill	Brief discussion.
351	1975a	Irwin	Checklist of NZ lakes.
403	1973	Magadza	Comparative limnology.
404	1978	Magadza	Phytoplankton.
517	1972	Robertson-Glasgow	Water plant survey (1972).
560	1979	Strachan	Resource survey, water chemistry, biota (1976-77).
583	1978	Waikato Valley Authority	Management scheme.
604	1968	Wilson & Gibbs	Water plant survey.

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

LAKE ARAPUNI

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 18 (12/76) (surface) - (bottom)	560
max 21 (3/77) (surface) - (bottom)	560
max difference top to bottom -	560
stratification mixed all year	560
Remarks: 2 readings, 1 site.	

SECCHI DISC DEPTH (m)			REFS
min 1.75	date May 1972		517
max -	date -		517
mean -	n -	period -	517
period of worst clarity -			517
causes silt			517
Remarks: 1 reading, 1 site.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Melosira, Asterionella, Cyclotella*			404
Remarks: Phytoplankton growth may be restricted by low light conditions resulting from tannin in pulp mill effluent (560). Chlorophyll readings upstream & below this reservoir (404).			

pH READINGS		REFS
min 7.5	date March 1977	560
max 7.6	date December 1976	560
Remarks: 2 readings, 1 site.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		*Ceratophyllum**	123, 126
		*Egeria**	123, 126
		*Elodea**	123,126
		C. demersus	517
Remarks: *Noted as problem growths; historical changes in species dominance recorded (123). Macrophyte changes discussed, *Ceratophyllum* and *Egeria* distributed at downstream end (560). *C. demersus* given as dominant species (517).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algal assemblage	560
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	126, 403, 560
macrophytes	123, 126, 289, 517, 560
zooplankton	289, 560
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

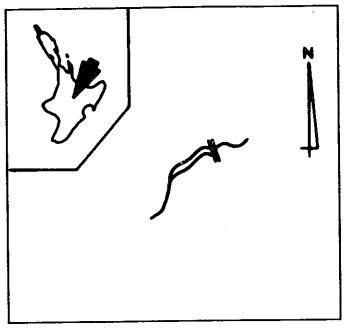
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	560	particulates	-
major ions	560	redox	-
trace elements	560	salinity	560
organic matter	560	alkalinity	-
toxic organics	-	hardness	560
pigments	-	silica	560
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ARATIATIA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo	ALTITUDE (m a.s.l.)	355-366
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	2.2 (WNW)
MAP REF (NZMS1)	N94 599462	MEAN DEPTH (m)	-
MAP REF (260 ser.)	U17 825828	MAX DEPTH (m)	5.0 (403)
LAKE TYPE	reservoir	LAKE AREA (km^2)	0.34
MAIN INFLOW	Waikato River	CATCHMENT AREA (km^2) (land and lake)	131.63
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	355-366 m a.s.l.	DATA BASE CODE (MAF)	206 ARATT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	85.1
sand dune	4.4	tussock	-
cropland	-	lakes	3.1
lowland scrub	2.4	rivers	-
subalpine scrub	-	ice and snow	-
native forest	0.8	urban	-
exotic forest	4.2	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	12.2
undulating (4–7°)	19.7
rolling (8–15°)	10.7
strongly rolling (16–20°)	18.1
moderately steep (21–25°)	27.5
steep (26–35°)	8.7
very steep (>35°)	-
lakes	3.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	39.1	1.9	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	9.3	3.5	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	43.1				
lakes	3.1				

GENERAL REMARKS

- NNE of Taupo (351)
- first reservoir in Waikato hydro-lake sequence (403)
- filled 1964 (403)
- mean discharge 151 m^3sec^{-1} (RWB pers comm)
- retention time 0.1 days (403)
- very clear water (403)
- geothermal discharge in inflow strongly influences lake chemistry (403)
- geothermal waste from Wairakei Power Station (403)
- popular for fishing and boating
- extreme daily fluctuations in level (403-405)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
98	1970a	Chapman	History of lakeweed infestation.
123	1975a	Coffey	Macrophyte distribution.
126	1976a	Coffey	Weed disposal.
129	1977	Coulter	Ecological impact of proposed Geothermal Power Station.
277	1969a	Hill	Limnology and macrophytes.
289	1975	Hill	Brief discussion.
351	1975a	Irwin	Checklist of NZ lakes.
371	1981	Johnstone	Aquatic weed management in hydro lakes (up to 1980).
403*	1973	Magadza	Comparative limnology.
404	1978	Magadza	Phytoplankton (1970-72).
405*	1979	Magadza	Physical and chemical limnology (1970-72).
464	1967a	NZED	Weed survey.
505	1977	Rawlence & Whitton	Chemical composition of macrophytes, water, sediments, plankton (1972).
518*	1972	Robertson-Glasgow	Wildlife report - water plant survey.
560*	1979	Strachan	Resource survey, water chemistry, biota (1976-77).
604	1968	Wilson & Gibbs	Water plant survey.

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

LAKE ARATIATIA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	85.5%	**t °C**	n.s.	**date**	n.s.	405
max	140.4%	**t °C**	n.s.	**date**	n.s.	405
mean	115.5%	**n**	18	**period**	8/70-3/72	405
period of lowest oxygen	-					
Remarks: Dissolved oxygen never seriously depleted due to short retention time (405). 18 readings, 1 site (405).						

TEMPERATURE (°C)				REFS
min	11.8 (9/70)	**(surface)** -	**(bottom)**	405
max	24.7 (2/71)	**(surface)** -	**(bottom)**	405
max difference top to bottom	0°C			403
stratification	mixed			405
Remarks: Bottom temperatures unlikely to differ substantially from surface because of short retention time. Temperature usually 2° higher than L. Taupo because of geothermal inputs, eg, Wairakei (405).				

SECCHI DISC DEPTH (m)						REFS
min	3.0		**date**	n.s.		405
max	9.0		**date**	May 1972		518
mean	6.0	**n**	18	**period**	8/70-3/72	405
period of worst clarity	-					
causes	-					
Remarks: 1 reading only (518).						

CHLOROPHYLL A, PHYTOPLANKTON					REFS
min	1.2 mg m^{-3}	**date**	August 1970		404
max	22.3 mg m^{-3}	**date**	January 1971		404
mean	5.6 mg m^{-3}	**n** 25	**date**	8/70-3/72	404
period of blooms	none reported				
algae	*Melosira, Cyclotella*				404
Remarks: Phytoplankton composition generally indistinguishable from that of L. Taupo (289). *Boeckella-Ceriodaphnia* community (403).					

pH READINGS				REFS
min	6.4	**date**	November 1971	405
max	8.5	**date**	July 1971	405
Remarks: 18 readings, 1 site, water slightly alkaline (405).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		Lagarosiphon	371, 560
		Elodea	371
		Ranunculus	123
Remarks: Macrophyte community different from all other Waikato hydro-lakes (371). *Lagarosiphon major* predicted to remain dominant (123). *L. major* grows to nearly 10 m depth (277). Complex changes in macrophyte species (560).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	not specified	404
oligotrophic	not specified	405
oligotrophic	chemical analysis	560
Remarks: Water properties largely inherited from Lake Taupo.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	289, 404, 505, 560
macrophytes	98, 123, 126, 129, 277, 371, 464, 505, 518, 560
zooplankton	560
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Ecology discussed in ref 129.	

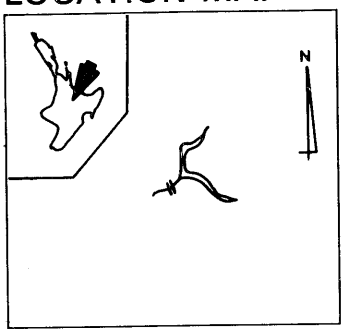
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	405,505,560	**particulates**	-
major ions	505,560	**redox**	-
trace elements	505,560	**salinity**	405,560
organic matter	560	**alkalinity**	405,560
toxic organics	-	**hardness**	405,560
pigments	-	**silica**	560
optical properties	-	**other**	-
Remarks: Effects of geothermal inputs, notably CO_2 and heavy metals (560).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ATIAMURI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo	ALTITUDE (m a.s.l.)	254
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	4.7 (W)
MAP REF (NZMS1)	N85 500740	MEAN DEPTH (m)	-
MAP REF (260 ser.)	U17 742084	MAX DEPTH (m)	28.5 (351)
LAKE TYPE	reservoir	LAKE AREA (km^2)	1.68
MAIN INFLOW	Waikato River	CATCHMENT AREA (km^2) (land and lake)	281.23
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	201 ATIAMURI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.1	pasture	45.7	flat (0–3°)	4.1
sand dune	-	tussock	-	undulating (4–7°)	16.5
cropland	-	lakes	0.8	rolling (8–15°)	17.3
lowland scrub	5.0	rivers	-	strongly rolling (16–20°)	16.1
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	26.0
native forest	13.0	urban	-	steep (26–35°)	14.5
exotic forest	35.5	other	-	very steep (>35°)	4.8
				lakes	0.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	20.8	2.7	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	2.6	-	-	-	-
earth slip	-	-	-	-	-
slump	0.7	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	10.2	1.6	-	-	-
tunnel gully	-	-	-	-	-
streambank	6.1	1.2	-	-	-
deposition	-	-	-	-	-
negligible	53.3				
lakes	0.8				

GENERAL REMARKS

- N of Atiamuri (351)
- filled 1958 (405)
- third reservoir in Waikato hydro-lakes sequence (403)
- mean discharge 162 m^3sec^{-1} (RWB pers comm)
- retention time 0.9 days (403-405)
- lake sheltered from wind (371)
- popular for boating and fishing (403)
- character of river unchanged by passage through lake (560)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
3	1965	Anderson	Diquat spraying.
98	1970a	Chapman	History of lakeweed infestation.
123	1975a	Coffey	Macrophyte distribution in Waikato hydro-lakes.
278	1969b	Hill	Weed survey in Waikato hydro-lakes.
289	1975	Hill	Brief discussion of previous work.
345	1973c	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
361*	1972	Irwin & Heath	Winter temperature structure (1967).
371	1981	Johnstone	Aquatic weed management in hydro lakes (up to 1981).
403*	1973	Magadza	Comparative limnology.
404*	1978	Magadza	Phytoplankton.
405	1979	Magadza	Physical and chemical limnology (1970-72).
406	1980	Magadza	Seasonal primary productivity (1970-72).
462	1965	Munden	Trial weed spraying.
518*	1972	Robertson-Glasgow	Water plant survey.
560*	1979	Strachan	Resources survey, water chemistry, biota (1976, 1977).
604	1968	Wilson & Gibbs	Water plant survey.

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

LAKE ATIAMURI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	7.2 g m^{-3}	t°C	20.8	date January 1971	403
max	11.9 g m^{-3}	t°C	22.4	date February 1971	403
mean	9.5 g m^{-3}	n	23	period 11/70-1/72	403
period of lowest oxygen -					
Remarks:					

TEMPERATURE (°C)					REFS
min	11.0	(surface)	12.3 (8/71)	(bottom)	361, 403
max	22.4 (2/71)	(surface)	20.8 (2/71)	(bottom)	403
max difference top to bottom	1.2 (12/71)				403
stratification	usually complete all year				403, 560
Remarks: Incomplete mixing, Whangapoa Arm water colder than main lake, and input of this water causes vertical temperature variation (361).					

SECCHI DISC DEPTH (m)				REFS
min	0.9	date	October 1970	405
max	5.0	date	May 1972	518
mean	2.46	n 18	period 8/70-3/72	405
period of worst clarity -				
causes -				
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	3.3 mg m^{-3}	date	August 1971	404
max	198 mg m^{-3}	date	January 1971	404
mean	52.9 mg m^{-3}	n 25	date 8/70-3/72	404
period of blooms -				
algae *Melosira, Cyclotella, Asplanchna, Bosmina*				404
Remarks:				

pH READINGS			REFS
min	6.9	date November 1971	405
max	8.5	date July 1971	405
Remarks: 14 readings 11/70-1/72 (405).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		*Ceratophyllum**	123, 560
		*Elodea**	123
		*Potamogeton crispus**	123
		*Egeria**	371
Remarks: *Problem growths, *Egeria* dominant by 1980 (371). Complex series of changes in species (123).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algal assemblage	403-405
eutrophic	algal assemblage	560
Remarks: Eutrophic as a result of nutrients entering L. Ohakuri (403). L. Atiamuri does not change character of river (560).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	289, 404, 406, 560
macrophytes	3, 98, 123, 278, 371, 462, 518, 560, 604
zooplankton	560
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

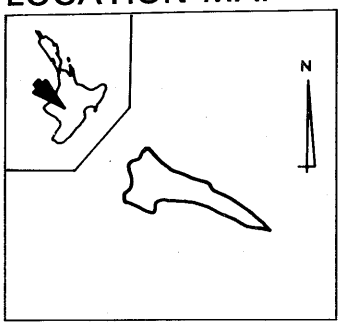
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	405, 560	particulates	-
major ions	560	redox	-
trace elements	560	salinity	405, 560
organic matter	560	alkalinity	405, 560
toxic organics	-	hardness	405, 560
pigments	-	silica	560
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE DUDDING

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	86
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.6 (E)
MAP REF (NZMS1)	N143 793662	MEAN DEPTH (m)	5 (RWB)
MAP REF (260 ser.)	S23 042204	MAX DEPTH (m)	11.9 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.13
MAIN INFLOW	surface inflow present	CATCHMENT AREA (km²) (land and lake)	1.96
MAIN OUTFLOW	surface outflow present	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	309 HOGG

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	95.9	flat (0–3°)	26.6	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	30.1	sheet	2.0	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	36.7	wind	1.0	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	2.0	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	5.1	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	4.1	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	96.9				
						lakes	n.d.				

GENERAL REMARKS

- NW of Lake Alice (351)
- landward side of coastal dunes (351)
- also known as Duddings, Guddops, Hogg (351)
- popular for boating, swimming, fishing (RWB)
- 60+ residents in catchment area, septic tank usage (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385*	1978	Kelly	Macrophytes of dune lakes (1977-78).
- *	1979	RWB pers comm	Water clarity data.
579*	1982	Vant	Trophic status (1982).

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

LAKE DUDDING

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min	0.4 g m^{-3}	t°C n.s.	date n.s.	RWB
max	11.0 g m^{-3}	t°C n.s.	date n.s.	RWB
mean	-	n -	period -	
period of lowest oxygen	low in summer			RWB,579
Remarks: < 1.5 mg l^{-1} in 1982 (579).				

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	1.7	date n.s.	385
max	3.1	date n.s.	385
mean	2.3	n 27 period 1977-78	RWB
period of worst clarity	n.s.		
causes	phytoplankton		
Remarks: 2.2 in 1982 (579).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	-	date -	
max	-	date -	
mean	2.7 mg m^{-3}	n 1 date 3/82	579
period of blooms	-		
algae	-		
Remarks: Sparse algae (RWB).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
Glyceria	385	*Potamogeton ochreatus*	385
Eleocharis	385	*Potamogeton cheesemanii*	385
		Myriophyllum	385
Remarks: Considerable weed growth interferes with boating (RWB). Species dominance varies with season (385).			

TROPHIC STATUS	BASIS	REFS
probably oligotrophic	chlorophyll, total P	579
moderately eutrophic	macrophytes	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAKANOA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 2.1 g m^{-3}	t°C 23	date January 1980		584
max 10.3 g m^{-3}	t°C 19.9	date February 1980		584
mean n.s.	n 20	period 1/80-8/80		584
period of lowest oxygen summer				584
Remarks: 20 readings, 10 visits, 2 sites (584).				

TEMPERATURE (°C)			REFS
min 11.3	(surface) 11.0	(bottom)	584
max 26.5	(surface) 25.0	(bottom)	584
max difference top to bottom 2.5			584
stratification stratified in summer			584
Remarks: 20 readings, 10 visits, 2 sites (584).			

SECCHI DISC DEPTH (m)			REFS
min 0.12	date January 1983		580
max 1.9	date August 1980		584
mean 0.5	n -	period 11/80-3/82	581
period of worst clarity -			
causes algae			584, 581
Remarks: Single readings only (580, 581). 20 readings, 10 visits, 2 sites (584).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 64 mg m^{-3}	n n.s.	date 11/80-3/82	581
period of blooms summer			581
algae *Anacystis, Melosira*			196
Remarks: Blue-green algae scums often present (581).			

pH READINGS		REFS
min 6.9	date March 1980	584
max 8.5	date February 1980	584
Remarks: 20 readings, 10 visits, 2 sites (584).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	584		
Remarks:			

TROPHIC STATUS	BASIS	REFS
eutrophic	phytoplankton	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	584
phytoplankton (algae)	196, 580, 581, 584
macrophytes	144, 584
zooplankton	584
macroinvertebrates	584
fish	-
wildlife	584
Remarks: Multiple use classification applied (584).	

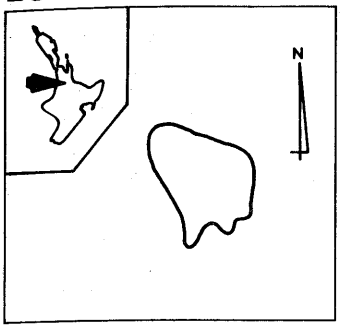
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	581, 584	particulates	580, 584
major ions	-	redox	-
trace elements	-	salinity	584
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	580	silica	-
optical properties	580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HAKANOA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waikato	ALTITUDE (m a.s.l.)	80
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	7.0 (NNW)
MAP REF (NZMS1)	N56 678753	MEAN DEPTH (m)	-
MAP REF (260 ser.)	S14 017031	MAX DEPTH (m)	-
LAKE TYPE	riverine	LAKE AREA (km^2)	0.56
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	4.71
MAIN OUTFLOW	to Waikato River	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	111 HAKANOA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	73.0	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	32.3	-	-	-	-
cropland	-	lakes	9.8	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	11.0	rivers	-	strongly rolling (16–20°)	32.3	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	51.8	soil slip	40.8	-	-	-	-
native forest	5.7	urban	0.4	steep (26–35°)	5.7	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	9.8	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	16.8				
						lakes	9.8				

GENERAL REMARKS

- E of Huntly (351)

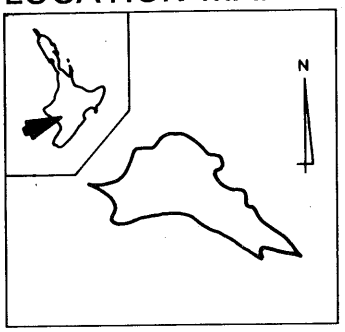
INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
144	1969	Department of Agriculture	Weed control.
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	Green pers comm	Water clarity.
580*	1984	Vant & Davies-Colley	Water clarity (1983).
581	1981	Vant & Pridmore	Nutrients and phytoplankton (1980-1982).
584*	1980	Waikato Valley Authority	Trophic status and water quality (1980).

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

LAKE HEATON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	91-122
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	1.0 (NW)
MAP REF (NZMS1)	N143 803652	MEAN DEPTH (m)	2.0 (RWB)
MAP REF (260 ser.)	S23 051194	MAX DEPTH (m)	4.2 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.20
MAIN INFLOW	surface inflow present	CATCHMENT AREA (km^2) (land and lake)	8.45
MAIN OUTFLOW	surface outflow present	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	310 HEATON

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	100	flat (0–3°)	56.9	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	3.4	sheet	32.8	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	2.8	wind	4.0	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	32.8	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	4.0	soil slip	-	-	-	-	-
native forest	-	urban	-	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	63.2				
						lakes	n.d.				

GENERAL REMARKS

- NW of Lake Alice (351)
- landward side of coastal dunes (351)
- duckshooting (RWB)
- stock and domestic water supply (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136*	1953	Cunningham *et al*	Survey of dune lakes (1949).
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
- *	1979	RWB pers comm	Water quality datasheet (1978).
579*	1982	Vant	Trophic status (1982).

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

LAKE HEATON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 1.8 g m^{-3} t°C n.s. date n.s.	RWB
max 8.8 g m^{-3} t°C n.s. date n.s.	RWB
mean - n - period -	
period of lowest oxygen -	
Remarks: 75% in 1949 (136). Sampling details not given (RWB).	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 20 (1/49) (surface) 18 (1/49) (bottom)	136
max difference top to bottom 2°	136
stratification not stratified	
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min 0.2 date n.s.	385
max 1.25 date 1/49	136
mean 0.5 n 36 period 1978	RWB
period of worst clarity -	
causes -	
Remarks: Twice monthly visits (RWB).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms -	
algae *Volvox*	136
Remarks: Algal abundance noted (385).	

pH READINGS	REFS
min - date -	
max > 8.4 date 1/49	136
Remarks: Single value only (136).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
Azolla	385		
Remarks: Macrophytes sparse, *Azolla rubra* found over large areas of exposed mudflats at the eastern end; *P. crispus* the only submerged rooted plant (385).			

TROPHIC STATUS	BASIS	REFS
"fertile"	algae	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks:	

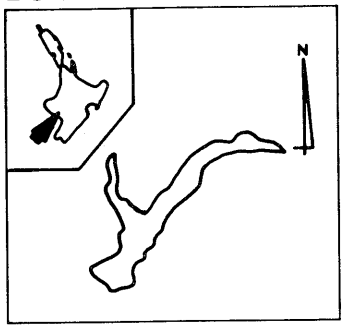
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HERENGAWE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Patea	ALTITUDE (m a.s.l.)	40
WATER BOARD	Taranaki	LONG AXIS (km)	1.2 (ENE)
MAP REF (NZMS1)	N137 195032	MEAN DEPTH (m)	4.8 (136)
MAP REF (260 ser.)	R22 505557	MAX DEPTH (m)	6.5 (136)
LAKE TYPE	dune	LAKE AREA (km²)	0.13
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	5.01
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	281 HERENGW

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	16.4	pasture	83.6
sand dune	-	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°)	35.1
undulating (4–7°)	45.7
rolling (8–15°)	9.2
strongly rolling (16–20°)	-
moderately steep (21–25°)	10.0
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	9.2	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	90.8				
lakes	n.d.				

GENERAL REMARKS

- SSE of Waverley
- lies in basin of consolidated sand

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1949).
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 HERENGAWE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min -	t°C -		date -		-
max 95%	t°C 20		date January 1949		136
mean -	n -		period -		-
period of lowest oxygen -					-
Remarks: Single reading only (136).					

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	-
max 20 (1/49)	(surface) 20 (1/49)	(bottom)	136
max difference top to bottom -			-
stratification mixed			136
Remarks: Single readings (136).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		-
max 1.75	date January 1949		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single reading only (136).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Algal scum apparent (136).			

pH READINGS		REFS
min -	date -	
max 8.0	date January 1949	136
Remarks: Single reading only (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha, sedges	136	*Potamogeton* sp. Characeae	136 136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks: Large numbers of *Hydridella* (136).	

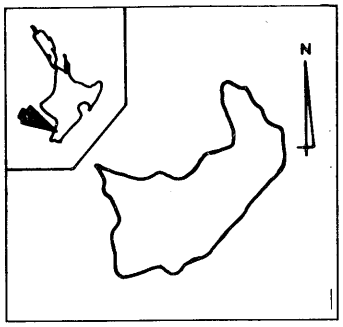
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HOROWHENUA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Horowhenua	ALTITUDE (m a.s.l.)	5.0
WATER BOARD	Manawatu	LONG AXIS (km)	3.3 (NE)
MAP REF (NZMS1)	N152 766039	MEAN DEPTH (m)	1.3 (RWB)
MAP REF (260 ser.)	S24 001635	MAX DEPTH (m)	1.8 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	3.89
MAIN INFLOW	7 surface inflows	CATCHMENT AREA (km^2) (land and lake)	43.61
MAIN OUTFLOW	Hokio Stream	CATCHMENT No. (MWD)	323000
LEVEL CHANGES	fluctuates	DATA BASE CODE (MAF)	340 HOROWHN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	9.6	pasture	61.5
sand dune	-	tussock	-
cropland	6.1	lakes	7.6
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	15.2
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	58.1
undulating (4–7°)	8.0
rolling (8–15°)	-
strongly rolling (16–20°)	7.5
moderately steep (21–25°)	3.6
steep (26–35°)	-
very steep (>35°)	-
lakes	7.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	10.7	3.6	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	0.1	-	-	-	-
deposition	-	-	-	-	-
negligible	62.8				
lakes	7.6				

GENERAL REMARKS

- WNW of Levin, not to be confused with Lake Horowhenua SE of Moutoa (351)
- migrating sand dunes on foreshore (136)
- receives treated sewage effluent from Levin (pop, @ 25,000) (RWB)
- receives peat and cowshed drainage (RWB)
- retention time 53 days (390)
- outlet controlled by a weir (390)
- eel factory processes 100-150 tonnes per annum from local fishery (RWB)
- wildlife refuge, ducks, swans (136)
- mycrosystic health hazard to swimmers has been reported (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
40*	1976	Brougham & Currie	Condition and management.
136*	1953	Cunningham *et al*	Survey of dune lakes (1949).
137*	1980	Currie & Gilliland	Baseline water quality survey (1978).
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-*	1979	RWB pers comm	Water clarity and biological data (1975-77).
390	1978	Lake Horowhenua Technical Committee	Condition and management. Reports on data from Reference 40 (1975-77).
590	1976b	White	Lake report.

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

LAKE HOROWHENUA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min <1 g m^{-3}	t°C n.s.	date March 1976		390
max 13.9 g m^{-3}	t°C 7.6	date July 1976		390
mean n.s.	n 24	period 11/75-11/77		390
period of lowest oxygen summer				390
Remarks: No summer oxygen depletion noted in 1949 (136). 24 readings, 1 site (390).				

TEMPERATURE (°C)			REFS
min 7.6 (7/76)	(surface) 7.5 (9/77)	(bottom)	390
max 22.9 (12/76)	(surface) 22.9 (12/76)	(bottom)	390
max difference top to bottom 1.7°			390
stratification temporary only			390
Remarks: 24 readings, 24 visits, 1 site (390).			

SECCHI DISC DEPTH (m)			REFS
min 0.15	date February 1977		390
max 0.9	date November 1977		390
mean 0.4	n 19	period 11/75-11/77	390
period of worst clarity summer			390
causes mainly algae			390
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		-
max -	date -		-
mean -	n -	date -	-
period of blooms "permanent"			RWB
algae *Anabaena, Anacystis, Melosira, Microcystis*			196
Remarks: Dominant species *Cladophora* (390).			

pH READINGS		REFS
min 7.55	date August 1976	390
max 10.1	date December 1976	390
Remarks: High pH due to algal photosynthesis (390).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha, rushes		*Potamogeton* sp.	136
Remarks: Rafts of decaying *Potamogeton* noted in 1949 (136). Weeds are a problem all summer (196).			

TROPHIC STATUS	BASIS	REFS
very eutrophic	algae	390
eutrophic	algae	196
highly eutrophic	biochemical assay	RWB
Remarks: Nitrogen and phosphorus levels greater than in L.Ellesmere (RWB).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	137
phytoplankton (algae)	196, 390, RWB
macrophytes	136, 390
zooplankton	390
macroinvertebrates	-
fish	390, RWB
wildlife	390, RWB
Remarks:	

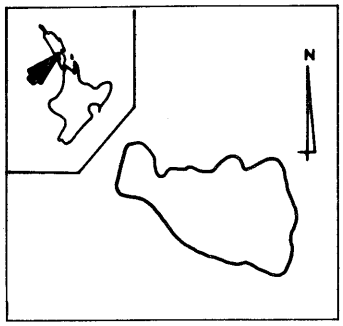
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	40, 136, 137, 390	particulates	137
major ions	40,137,390	redox	40, 390
trace elements	-	salinity	137
organic matter	-	alkalinity	137
toxic organics	-	hardness	137
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE HUMUHUMU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	50
WATER BOARD	Northland	LONG AXIS (km)	1.6 (EW)
MAP REF (NZMS1)	N32 646233	MEAN DEPTH (m)	-
MAP REF (260 ser.)	P09 112411	MAX DEPTH (m)	16.0 (351)
LAKE TYPE	dune	LAKE AREA (km^2)	0.7
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	6.75
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	59 HUMUHUMU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-74)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	13.3	pasture	31.6	flat (0–3°)	13.3	type \ severity	1	2	3	4	5
sand dune	31.9	tussock	-	undulating (4–7°)	-	sheet	31.1	-	-	-	-
cropland	-	lakes	22.8	rolling (8–15°)	53.6	wind	-	0.4	21.2	15.4	8.6
lowland scrub	0.4	rivers	-	strongly rolling (16–20°)	10.2	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	22.8	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	0.4	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	22.8				

GENERAL REMARKS

- N of Kaipara Head (351)
- three bush covered islands (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
363	1978	Irwin & Main	Bathymetric Chart.

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

LAKE HUMUHUMU

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 4.5		date August 1970		347
max 5.0		date August 1970		347
mean 4.75	n 2	period 8/70		347
period of worst clarity -				
causes -				
Remarks: 2 readings, 1 site (347).				

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:	

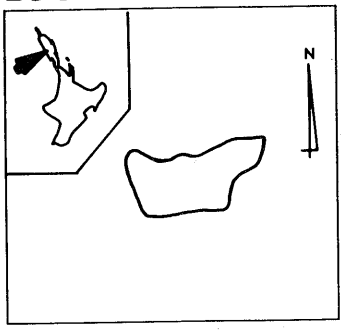
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KAI-IWI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	70
WATER BOARD	Northland	LONG AXIS (km)	0.9 (ENE)
MAP REF (NZMS1)	N22 176850	MEAN DEPTH (m)	-
MAP REF (260 ser.)	007 698986	MAX DEPTH (m)	16 (351)
LAKE TYPE	dune	LAKE AREA (km²)	0.31
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	0.82
MAIN OUTFLOW	Kai-iwi Stream	CATCHMENT No. (MWD)	335000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	43 KAI-IWI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1967)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	48.8
sand dune	-	tussock	-
cropland	-	lakes	n.d.
lowland scrub	51.2	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°)	14.6
strongly rolling (16–20°)	34.1
moderately steep (21–25°)	51.2
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	23.2	51.2	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	14.6	11.0	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible					
lakes					

GENERAL REMARKS

- NE of Kai-iwi Stream mouth on coast (351)
- lies in consolidated sand dunes (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
336	1971a	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
580	1984	Vant & Davies-Colley	Water clarity (1982).

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

LAKE KAI-IWI

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 7.1	date August 1970		347
max 8.0	date December 1982		580
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single visits only (347, 580).			

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.	

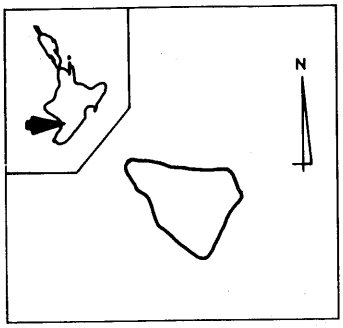
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	580
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	580	silica	-
optical properties	580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KAIKOKOPU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Manawatu	ALTITUDE (m a.s.l.)	0-30
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.6 (NW)
MAP REF (NZMS1)	N148 781326	MEAN DEPTH (m)	0.5 (RWB)
MAP REF (260 ser.)	S24 023897	MAX DEPTH (m)	1.0 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.11
MAIN INFLOW	surface inflow present	CATCHMENT AREA (km²) (land and lake)	21.54
MAIN OUTFLOW	Kaikokopu Stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	artificially controlled to maintain groundwater	DATA BASE CODE (MAF)	330 KAIKOKP

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	96.8
sand dune	0.1	tussock	-
cropland	-	lakes	0.5
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	2.6	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	88.3
undulating (4–7°)	6.7
rolling (8–15°)	3.4
strongly rolling (16–20°)	-
moderately steep (21–25°)	1.0
steep (26–35°)	-
very steep (>35°)	-
lakes	0.5

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	35.4	0.1	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	64.0				
lakes	0.5				

GENERAL REMARKS

- ESE of Himatangi Beach
- duckshooting, boating, eeling (RWB)
- stock and domestic water supply (RWB)
- receives some septic tank and dairy shed effluent via drainage (RWB)
- lake edge ringed with raupo (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1975-79).
579	1982	Vant	Trophic status (1982).

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

LAKE KAIKOKOPU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 6.3 g m^{-3} t°C n.s. date n.s.	RWB
max 19.1 g m^{-3} t°C n.s. date n.s.	RWB
mean - n - period -	
period of lowest oxygen -	
Remarks:	

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 0.5 date n.s.	385
max 0.8 date n.s.	385
mean 1.0 n 90 period 1975-79	RWB
period of worst clarity -	
causes algae	385
Remarks:	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 54.6 mg m^{-3} date -	579
max - date -	
mean - n - date -	
period of blooms -	
algae -	
Remarks: Algal scum extensive (RWB). Single value only (579).	

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
		P. pectinatus	385
Remarks: The only lake in the Rangitikei-Wanganui Region with *Zannichella palustris* (RWB).			

TROPHIC STATUS	BASIS	REFS
fairly eutrophic	macrophytes	385
eutrophic	chlorophyll, total P	579
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	385
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

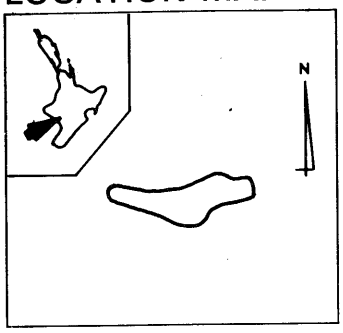
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KAITOKE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wanganui	ALTITUDE (m a.s.l.)	22
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	1.1 (E)
MAP REF (NZMS1)	N138 600828	MEAN DEPTH (m)	1.2 (RWB)
MAP REF (260 ser.)	R22 870360	MAX DEPTH (m)	2.1 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.26
MAIN INFLOW	surface inflow present	CATCHMENT AREA (km^2) (land and lake)	29.41
MAIN OUTFLOW	Kaitoke Stream	CATCHMENT No. (MWD)	332000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	295 KAITOKE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	99.1
sand dune	-	tussock	-
cropland	-	lakes	0.9
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	31.0
undulating (4–7°)	16.5
rolling (8–15°)	7.2
strongly rolling (16–20°)	14.6
moderately steep (21–25°)	29.7
steep (26–35°)	0.3
very steep (>35°)	-
lakes	0.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	44.3	-	-	-	-
wind	-	0.1	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	54.6				
lakes	0.9				

GENERAL REMARKS

- SSE of Durie Hill (351)
- septic tanks for 250 residents (RWB)
- wildlife refuge (RWB)
- used for stock watering (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1978-79).
579	1982	Vant	Trophic status (1982).

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

LAKE KAITOKE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 4.1 g m^{-3} t°C n.s. date 1978-79	RWB
max 10.0 g m^{-3} t°C n.s. date 1978-79	RWB
mean - n - period -	
period of lowest oxygen -	
Remarks: Sampling strategy not specified (RWB).	

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 0.17	date n.s.		385
max 0.40	date n.s.		385
mean 0.3	n 54	period 1978-79	RWB
period of worst clarity -			
causes algae, mud			385,RWB
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min 158 mg m^{-3}	date n.s.	579
max -	date -	
mean -	n - date -	
period of blooms extensive in late summer		RWB
algae -		
Remarks: Single value only (579). Simultaneous red and green algae blooms (385). Algae abundant (RWB).		

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
Phormium	385	*P. pectinatus*	385
Scirpus	385	*Myriophyllum aquaticum**	385
Eleocharis	385		
Remarks: *Unique to Lake Kaitoke in Rangitikei-Wanganui Region (385). Weed growth problematic; continuous cover over most of the lake (385).			

TROPHIC STATUS	BASIS	REFS
eutrophic	total P, chlorophyll	579
eutrophic	macrophytes	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	385
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

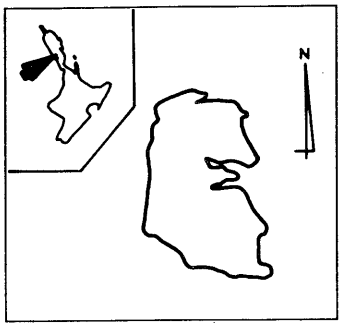
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KANONO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	30.61
WATER BOARD	Northland	LONG AXIS (km)	1.5 (NW)
MAP REF (NZMS1)	N33 669187	MEAN DEPTH (m)	7.9 (136)
MAP REF (260 ser.)	P09 132368	MAX DEPTH (m)	15.5 (136)
LAKE TYPE	dune	LAKE AREA (km²)	0.84
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	4.46
MAIN OUTFLOW	one gauged stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	65 KANONO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-75)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	22.2	flat (0–3°)	28.7	type \ severity	1	2	3	4	5
sand dune	30.9	tussock	-	undulating (4–7°)	-	sheet	22.2	-	-	-	-
cropland	-	lakes	18.2	rolling (8–15°)	53.1	wind	-	-	28.7	-	30.9
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	-	-	-	-	-
native forest	28.7	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	18.2	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	18.2				

GENERAL REMARKS

- WSW of Poutu township (351)
- receives strong spring inflow from a former swamp area now buried by drifting sand (136)
- sand overwhelming parts of marginal vegetation (136)
- vigorous shore erosion in some parts (136)
- popular for fishing and boating

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
83*	1980	Cassie & Freeman	Phytoplankton (1976, 1977).
136*	1953	Cunningham *et al*	Survey of dune lakes (1950).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	RWB pers comm	Resource survey (same data as ref 83).

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

LAKE KANONO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 8.2 g m^{-3}	t °C 19.0	date December 1976		83
max 11.6 g m^{-3}	t °C 11.5	date September 1977		83
mean approx 100%	n 4	period 7/76-9/77		83
period of lowest oxygen -				
Remarks: 4 visits only; oxygen not greatly depleted on any occasion (83).				

TEMPERATURE (°C)				REFS
min 11.5 (9/77)	(surface) 11.5 (9/77)	(bottom)		83
max 21.8 (2/50)	(surface) 21.5 (2/50)	(bottom)		136
max difference top to bottom 2.3°C				83
stratification mixed				83
Remarks: May become weakly stratified for brief periods in summer (83).				

SECCHI DISC DEPTH (m)			REFS
min 4.6	date February 1950		136
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single visit on windy day (136).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Cyclotella, Rhizosotenia, Melosira*			83
Remarks: Algae cont. *Synedra, Fragillaria* (83).			

pH READINGS		REFS
min 6.6	date February 1950	136
max 8.85	date December 1976	83
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Cladium	136	*Potamogeton*	136
Typha	136	Characeae	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Oligotrophic, approach-		
ing mesotrophic	phytoplankton	83
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	83
phytoplankton (algae)	83, 136
macrophytes	136
zooplankton	136
macroinvertebrates	-
fish	136
wildlife	-
Remarks:	

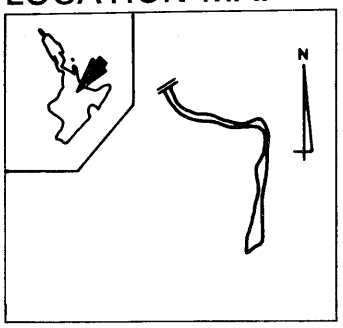
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	83, 136	particulates	-
major ions	136	redox	-
trace elements	-	salinity	83
organic matter	-	alkalinity	136
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KARAPIRO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Matamata	ALTITUDE (m a.s.l.)	55
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	11 (NW)
MAP REF (NZMS1)	N66 044292	MEAN DEPTH (m)	-
MAP REF (260 ser.)	T14 340601	MAX DEPTH (m)	30.5 (351)
LAKE TYPE	reservoir	LAKE AREA (km^2)	5.37
MAIN INFLOW	Waikato River	CATCHMENT AREA (km^2) (land and lake)	817.19
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	135 KARAPIRO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	57.8
sand dune	0.2	tussock	-
cropland	-	lakes	0.8
lowland scrub	2.3	rivers	0.2
subalpine scrub	-	ice and snow	-
native forest	5.1	urban	0.7
exotic forest	32.2	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	6.7
undulating (4–7°)	13.2
rolling (8–15°)	27.5
strongly rolling (16–20°)	22.6
moderately steep (21–25°)	21.4
steep (26–35°)	4.3
very steep (>35°)	2.7
lakes	0.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	8.6	0.3	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	7.2	0.1	-	-	-
earth slip	0.6	0.1	-	-	-
slump	-	-	-	-	-
debris avalanche	0.3	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	0.6	-	-	-	-
gully	0.7	0.2	-	-	-
tunnel gully	-	-	-	-	-
streambank	1.1	-	-	-	-
deposition	-	-	-	-	-
negligible	78.4				
lakes	0.8				

GENERAL REMARKS

- last reservoir in Waikato hydro-lake sequence (403)
- filled 1947 (403)
- mean discharge 229 m^3 sec^{-1} (RWB pers comm)
- retention time 2-8 days (403)
- little change in water quality from L. Waipapa upstream (560)
- geothermal springs near the inflow (RWB pers comm)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
98	1970a	Chapman	History of lake weed infestation.
123	1975a	Coffey	Macrophyte distribution.
289	1975	Hill	Brief discussion based on earlier plant study.
351	1975a	Irwin	Checklist of NZ lakes.
403*	1973	Magadza	Comparative limnology.
404	1978	Magadza	Phytoplankton (1970-72).
405*	1979	Magadza	Physical and chemical limnology (1970-72).
406	1980	Magadza	Seasonal primary productivity.
465	1967b	NZED	Weed survey map.
518	1972	Robertson-Glasgow	Water plant survey.
560*	1979	Strachan	Resource survey, water chemistry and biota (1976-77).
580*	1984	Vant & Davies-Colley	Water clarity (1983).
581	1981	Vant & Pridmore	Nutrients and phytoplankton (1980-1982).
604	1968	Wilson & Gibbs	Water plant survey.

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

LAKE KARAPIRO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 0.4 g m^{-3}	**t °C** 21.4	**date** January 1971		405
max 13.4 g m^{-3}	**t °C** 12.5	**date** October 1970		405
mean 89.6%	**n** 22	**period** 8/70-3/72		405
period of lowest oxygen summer				405
Remarks: Bottom waters seriously depleted on occasions. Single site, 18 readings (405).				

TEMPERATURE (°C)	REFS
min 6.5 (n.s.) **(surface)** 12.5 (n.s.) **(bottom)**	405
max 24.2 (n.s.) **(surface)** 21.4 (n.s.) **(bottom)**	405
max difference top to bottom 13.7	405
stratification irregular	405
Remarks: Normally mixed but occasionally stratifies sufficiently to cause deoxygenation of bottom waters (405). No marked stratification (581).	

SECCHI DISC DEPTH (m)			REFS
min 1.2	**date** September 1971		405
max 4.0	**date** August 1971		405
mean 2	**n** 18	**period** 8/70-3/72	405
period of worst clarity -			-
causes Kinleith effluent and algae			405,560,581
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 11.8 mg m^{-3}	**date** August 1971		404
max 227.6 mg m^{-3}	**date** March 1972		404
mean 102 mg m^{-3}	**n** 25	**date** 8/70-3/72	404
period of blooms -			
algae *Melosira* spp. *Aterionella* sp.			404
Remarks:			

pH READINGS		REFS
min 6.8	**date** n.s.	405
max 8.2	**date** n.s.	405
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		*Egeria**	560
		*Ceratophyllum**	560
Remarks: Macrophytes changes discussed (560). Complex series of changes noted (123). *Problem growths.			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	560
extremely eutrophic	phytoplankton and primary productivity	403,405
trophic status discussed	nutrients & water clarity	581
Remarks: Probably nitrogen limited, at least in late summer (581). Little change in water quality from upstream lake (560).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	289,403,404,406,560,581
macrophytes	98,123,289,403,406,465,518,560,581,604
zooplankton	560
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

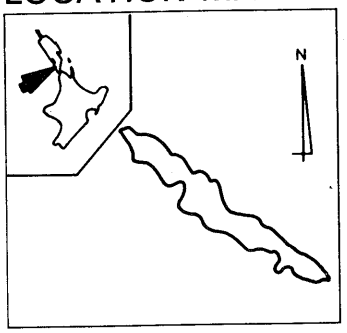
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	403,405,560,581	**particulates**	580
major ions	560	**redox**	-
trace elements	560	**salinity**	403,405,560
organic matter	560	**alkalinity**	403,405
toxic organics	-	**hardness**	403,405,560
pigments	580	**silica**	560
optical properties	580	**other**	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KARETA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rodney	ALTITUDE (m a.s.l.)	0.3
WATER BOARD	Auckland	LONG AXIS (km)	2.6 (NNW)
MAP REF (NZMS1)	N37 805915	MEAN DEPTH (m)	3.3 (136)
MAP REF (260 ser.)	Q10 249116	MAX DEPTH (m)	5.0 (136)
LAKE TYPE	dune	LAKE AREA (km²)	0.61
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	6.85
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	70 KARETA

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

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	-
sand dune	100.00	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°)	26.7
strongly rolling (16–20°)	-
moderately steep (21–25°)	73.3
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	-	100.0	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- SSW of Waioneke (351)
- small areas of marginal peat (136)
- raupo stands are being replaced by *Zizania latifolia* (136)
- dunes advancing (136)
- extensive beds of *Hydrilla* (136)
- no fish apparent (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	RWB pers comm	Resource survey.

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

LAKE KARETA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 7.0 g m^{-3}	t°C 23	date February 1950		136
max 10.3 g m^{-3}	t°C 25	date February 1973		RWB
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Three readings only between both studies.				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 26 (n.s.)	(surface) 25 (n.s.)	(bottom)	RWB
max difference top to bottom 1°			RWB
stratification mixed			136,RWB
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min 1.5	date February 1973		RWB
max 3.0	date February 1950		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Two readings only between both studies.			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Sparse phytoplankton (136).			

pH READINGS		REFS
min 6.4	date February 1950	136
max 9.6	date February 1973	RWB
Remarks: Two readings only between both studies.		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Zizanid *Eleocharis*	136 136	*Potamogeton* sp.	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	-
macroinvertebrates	136
fish	-
wildlife	136
Remarks:	

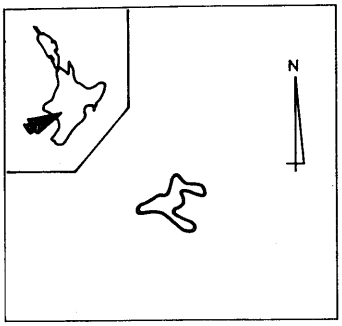
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,RWB	particulates	-
major ions	136,RWB	redox	-
trace elements	RWB	salinity	RWB
organic matter	-	alkalinity	136,RWB
toxic organics	-	hardness	RWB
pigments	-	silica	136,RWB
optical properties	RWB	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KOHATA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wanganui	ALTITUDE (m a.s.l.)	35
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.5
MAP REF (NZMS1)	N138 605820	MEAN DEPTH (m)	6.0 (RWB)
MAP REF (260 ser.)	n.d.	MAX DEPTH (m)	14.8 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.15
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	0.93
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	298 KOHATA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	100
sand dune	-	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°)	68.8
undulating (4–7°)	3.2
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	28.0
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	5.4	-	-	-	-
wind	-	22.6	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	72.0				
lakes	n.d.				

GENERAL REMARKS

- S of Durie Hill (351)
- shooting, fishing (RWB)
- stock, domestic supply (RWB)
- septic tank, spray irrigation, dairy effluent (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1978-79).
579	1982	Vant	Trophic status (1982).

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

LAKE KOHATA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 0 g m^{-3}	t°C n.s.	date n.s.		RWB
max 10.4 g m^{-3}	t°C n.s.	date n.s.		RWB
mean -	n -	period -		
period of lowest oxygen summer				RWB,579
Remarks:				

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 1.65	date n.s.		579
max -	date -		
mean 1.5	n 10	period 1975-78	RWB
period of worst clarity -			
causes -			
Remarks: Single value only (579).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 20 mg m^{-3}	date n.s.		579
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Single value only (579). Algae extensive in late summer, filamentous green algae dominates macrophytes in summer (RWB).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
Eleocharis	385	*Myriophyllum propinquum*	385
Scirpus	385	Characeae	385
Phormium	385		
Remarks: More species than nearby lakes, *Ricciocarpus natans* unique in region (385).			

TROPHIC STATUS	BASIS	REFS
eutrophic/oligotrophic	chlorophyll, total P	579
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	385
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

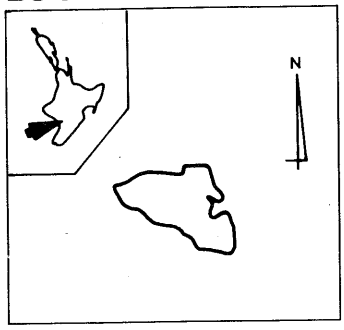
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KOITIATA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	20
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	1.0 (WNW)
MAP REF (NZMS1)	N143 716639	MEAN DEPTH (m)	1.6 (RWB)
MAP REF (260 ser.)	S23 971185	MAX DEPTH (m)	2.2 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.21
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	2.20
MAIN OUTFLOW	Kotiata Stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	312 KOTIATA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	70.0
sand dune	-	tussock	-
cropland	-	lakes	9.1
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	20.9	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	70.0
undulating (4–7°)	20.5
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	0.5
steep (26–35°)	-
very steep (>35°)	-
lakes	9.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	41.4	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	49.5				
lakes	9.1				

GENERAL REMARKS

- WNW of Lake Alice
- shooting (RWB)
- stock, domestic and firefighting supply (RWB)
- septic tanks for 50 residents (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Water quality data (1978, 1979).
579	1982	Vant	Trophic status (1982).

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

LAKE KOITIATA

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.s.		579
max -	date -		
mean 0.87	n 6	period 1978-79	RWB
period of worst clarity occasionally muddy			RWB
causes -			
Remarks: Single value only (579).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 83 mg m^{-3}	date n.s.		579
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Single value only (579). Some algae (RWB).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Very extensive submerged weed (RWB).			

TROPHIC STATUS	BASIS	REFS
mesotrophic	total P	579
eutrophic	chlorophyll	579
Remarks:		

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

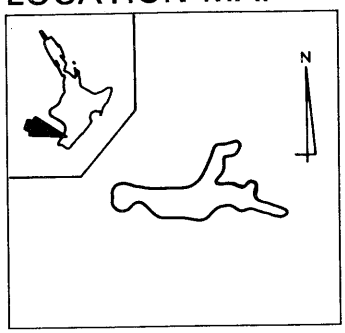
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KOPUREHEREHERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Horowhenua	ALTITUDE (m a.s.l.)	30
WATER BOARD	Manawatu	LONG AXIS (km)	0.6 (WNW)
MAP REF (NZMS1)	N152 699009	MEAN DEPTH (m)	0.6 (RWB)
MAP REF (260 ser.)	R25 939609	MAX DEPTH (m)	11.5 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.11
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	1.24
MAIN OUTFLOW	intermittent stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	344 KOPRHRHR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	78.2
sand dune	21.8	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°)	19.4
rolling (8–15°)	-
strongly rolling (16–20°)	80.6
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	21.8	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	78.2				
lakes	n.d.				

GENERAL REMARKS

- WSW of Manakau (351)
- irregularly shaped (351)
- water supply for stock, irrigation (RWB pers comm)
- surrounded by raupo (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136*	1953	Cunningham *et al*	Survey of dune lakes (1950, 1952).
137*	1980	Currie & Gilliland	Baseline water quality survey - data sheet only (1978).
351	1975a	Irwin	Checklist of NZ lakes.
- *	1979	RWB pers comm	Oxygen and clarity data (1976, 1977, 1979).

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

LAKE KOPUREHEREHERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0.3 g m^{-3}	t°C n.s.	date 12/76, 3/79			RWB
max 9.9 g m^{-3}	t°C n.s.	date 5/77			RWB
mean -	n -	period -			-
period of lowest oxygen summer					RWB
Remarks: Oxygen at 10 metres depth down to 13% (136).					

TEMPERATURE (°C)			REFS
min 9.5 (n.s.)	(surface) -	(bottom)	136,137
max 12.5 (n.s.)	(surface) -	(bottom)	137
max difference top to bottom -			
stratification stratified			136
Remarks: Only three temperature readings total, all taken in winter.			

SECCHI DISC DEPTH (m)			REFS
min 0.75	date June 1949		136
max 2.5	date June 1978		137
mean 1.2	n 2	period January 1949	136
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Cyclotella, Dinobryon*			136
Remarks: No scum 1976-1979 (RWB).			

pH READINGS		REFS
min 5.9	date January 1950	136
max 7.05	date May 1978	137
Remarks: Single visit, 2 readings (136). Five visits, five readings, single site (137).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	136		
Remarks: Very sparse submerged vegetation (136). Some weed developed in littoral region (RWB).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	137
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks: Fauna reported as sparse - reference includes a graph of organism density vs depth (136). Ref 137 data sheet only.	

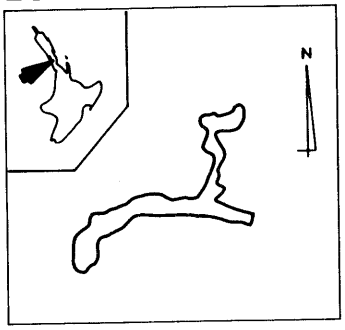
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,137	particulates	137
major ions	136,137	redox	-
trace elements	-	salinity	137
organic matter	-	alkalinity	136,137
toxic organics	-	hardness	137
pigments	-	silica	136
optical properties	-	other	
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE KUWAKATAI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rodney	ALTITUDE (m a.s.l.)	30-61 m
WATER BOARD	Auckland	LONG AXIS (km)	2.1 (NE)
MAP REF (NZMS1)	N37 760987	MEAN DEPTH (m)	5.2 (136)
MAP REF (260 ser.)	010 210183	MAX DEPTH (m)	6.2 (136)
LAKE TYPE	dune	LAKE AREA (km^2)	0.51
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	4.34
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	68 KUWAKT

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

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	35.9
sand dune	52.4	tussock	-
cropland	-	lakes	11.7
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	1.6
rolling (8–15°)	44.1
strongly rolling (16–20°)	-
moderately steep (21–25°)	42.5
steep (26–35°)	-
very steep (>35°)	-
lakes	11.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	1.6	50.8	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	35.9	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	11.7				

GENERAL REMARKS

- NW of Waioneke settlement (351)
- steep shores (136)
- dunes advancing over lake margin (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
154	1973	Donovan	Physico-chemical features (1973).
351	1975a	Irwin	Checklist of NZ lakes.
-*	-	RWB pers comm	Same data as ref 154.

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

LAKE KUWAKATAI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 97%	t °C 22	date February 1950		136
max 106%	t °C 22	date February 1973		154
mean -	n -	period -		
period of lowest oxygen -				
Remarks: One visit, 2 readings, one site (154). One visit, one reading (136). Minimum value 9.0 g m^{-3} (RWB).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 25°	(surface) 11°	(bottom)	136,154
max difference top to bottom 3°			154
stratification probably mixed			136,154
Remarks: February temperatures only. One arm of the lake is stagnant and producing gas (136).			

SECCHI DISC DEPTH (m)			REFS
min 2.0	date February 1973		154
max 6.6	date February 1950		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single readings (136,154).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Peridinium, Botryococcus, Cosmarium*			136
Remarks: Also *Mougetia* (136). High plankton density (136).			

pH READINGS		REFS
min 6.6	date February 1950	136
max 7.6	date February 1973	154
Remarks: Single readings (136,154).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis	136	Characeae	136
Remarks: Only small patches of emergent plants (136).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	136
Remarks:	

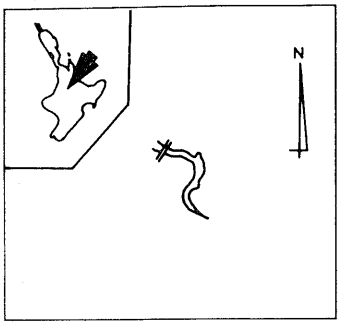
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,154	particulates	-
major ions	136,154	redox	-
trace elements	154	salinity	-
organic matter	-	alkalinity	136
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	154	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MARAETAI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo/Matamata border	ALTITUDE (m a.s.l.)	183
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	7.2 (WNW+NNE)
MAP REF (NZMS1)	N84 272770	MEAN DEPTH (m)	-
MAP REF (260 ser.)	T16 534118	MAX DEPTH (m)	61 (289)
LAKE TYPE	reservoir	LAKE AREA (km^2)	4.21
MAIN INFLOW	Waikato River	CATCHMENT AREA (km^2) (land and lake)	599.96
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	183-213	DATA BASE CODE (MAF)	196 MARAETAI

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

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	35.4
sand dune	-	tussock	-
cropland	0.2	lakes	n.d.
lowland scrub	3.9	rivers	0.8
subalpine scrub	1.2	ice and snow	-
native forest	20.6	urban	0.5
exotic forest	37.4	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	1.0
undulating (4–7°)	7.9
rolling (8–15°)	13.8
strongly rolling (16–20°)	14.8
moderately steep (21–25°)	42.9
steep (26–35°)	14.0
very steep (>35°)	4.4
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	20.0	2.8	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	0.5	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	1.5	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	73.9				
lakes	n.d.				

GENERAL REMARKS

- NE of Mangakino (351)
- filled 1952 (403)
- mean discharge 197 m^3sec^{-1} (RWB pers comm)
- retention time 4.3 days (403)
- Kopakorahi Arm receives black effluent from Kinleith pulp and paper mill, but has few nutrients compared with main lake (289)
- geothermal input (76)
- only reservoir to draw bottom water through the penstocks (560).

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
76	1974c	Cassie	Algal Flora.
98	1970a	Chapman	History of lake weed infestation.
123	1975a	Coffey	Macrophyte distribution.
175*	1971b	Fish	Jellyfish (1970).
289	1975	Hill	Brief discussion of previous work.
351	1975a	Irwin	Checklist of NZ lakes.
403	1973	Magadza	Comparative limnology.
508	1966	Reid	Eutrophication.
518	1972	Robertson-Glasgow	Water plant survey (1972).
560*	1979	Strachan	Resource survey, water chemistry, biota (1976, 1977).
604	1968	Wilson & Gibbs	Water plant survey.

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

LAKE MARAETAI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	0.7 g m^{-3}	t°C	20.5	date January 1970	175
max	-	t°C	-	date -	
mean	-	n	-	period -	
period of lowest oxygen	autumn and summer				175,560
Remarks:					

TEMPERATURE (°C)				REFS
min	17 (12/76)	(surface) -	(bottom)	560
max	25.5 (1/70)	(surface) 21 (1/70)	(bottom)	175
max difference top to bottom	4.5°C			175
stratification	sometimes stratified in summer			175,289,560
Remarks:	Stratification variable from year to year, single visits (175).			

SECCHI DISC DEPTH (m)				REFS
min	2.0	date	May 1972	518
max	3.9	date	n.d.	403
mean	-	n -	period -	
period of worst clarity	-			
causes	silt			518
Remarks:	Single value only (518).			

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date -	
period of blooms	February 1969			76
algae	*Melosira, Anabaena, Dinobryon*			76,289,508
Remarks:	*Dinobryon sertularia* blooms recorded (76).			

pH READINGS				REFS
min	7.3	date	March 1977	560
max	8.0	date	December 1976	560
Remarks:	4 readings, 2 visits, 2 sites (560).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		*Egeria**	123,560
		*Ceratophyllum**	123,560
Remarks:	*Problem growths. Macrophyte changes discussed (560).		

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	76,560
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	76,289,508,560
macrophytes	76,123,560
zooplankton	560
macroinvertebrates	175
fish	-
wildlife	-
Remarks:	Very high input of coliform bacteria from Kinleith effluent (560). Jellyfish infestation discussed (175).

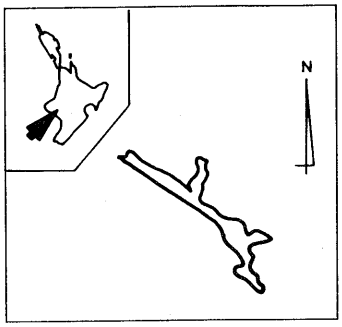
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	560	particulates	-
major ions	560	redox	-
trace elements	560	salinity	560
organic matter	560	alkalinity	560
toxic organics	-	hardness	560
pigments	560	silica	560
optical properties	560	other	-
Remarks:	Concern expressed over methylation and increased solubility of As, Hg during stratification (low dissolved oxygen) (560).		

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE MARAHAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitotara	ALTITUDE (m a.s.l.)	30-61
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.8 (NW)
MAP REF (NZMS1)	N137 361792	MEAN DEPTH (m)	9.8 (RWB)
MAP REF (260 ser.)	R22	MAX DEPTH (m)	15.0 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.05
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	4.22
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	289 MARAHAU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	68.0
sand dune	-	tussock	-
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	32.0

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	22.7
undulating (4–7°)	12.7
rolling (8–15°)	-
strongly rolling (16–20°)	32.0
moderately steep (21–25°)	33.2
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	0.2	-	-	-	-
wind	-	32.9	-	-	32.9
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	34.8				
lakes	n.d.				

GENERAL REMARKS

- SW of Maxwell (351)
- lake is divided into two halves. Northern half is Mac's lake; southern half is Greg's lake and much deeper (RWB)
- stock and domestic water supply (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1975-79).
579	1982	Vant	Trophic status (1982).

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

LAKE MARAHAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min < 1.5 g m^{-3}	t °C n.s.	date 3/82		579
max 10.1 g m^{-3}	t °C n.s.	date n.s.		RWB
mean -	n -	period -		
period of lowest oxygen summer				RWB
Remarks: Values given are for Mac's Lake. Single value only (579). Sampling strategy unspecified (RWB).				

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 0.6	date 3/78		385
max 1.87 (mean)	date n.s.		RWB
mean 0.74	n 30	period 1975-79	RWB
period of worst clarity -			
causes algae and mud			RWB,385
Remarks: Single value only (579). 1.87 mean for Mac's lake; 0.74 mean for Greg's Lake (RWB).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 4.5 mg m^{-3}	date n.s.		579
max 67 mg m^{-3}	date n.s.		579
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Single value only (579). Extensive suspended algae throughout year (RWB).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385
Phormium	385	*P. ochreatus*	385
		P. cheesemanii	385
		Myriophyllum	385
Remarks: Abundant weed in shallows (385).			

TROPHIC STATUS	BASIS	REFS
eutrophic	chlorophyll	579
mesotrophic	total P	579
moderately eutrophic	macrophytes, algae	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	385
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

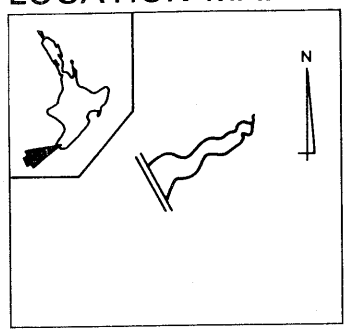
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources

MORTON DAM

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Lower Hutt	ALTITUDE (m a.s.l.)	122-152
WATER BOARD	Wellington	LONG AXIS (km)	0.8 (NE)
MAP REF (NZMS1)	N164 540248	MEAN DEPTH (m)	-
MAP REF (260 ser.)	S121 735083	MAX DEPTH (m)	-
LAKE TYPE	reservoir	LAKE AREA (km^2)	0.05
MAIN INFLOW	surface	CATCHMENT AREA (km^2) (land and lake)	31.88
MAIN OUTFLOW	Wainuiomata River	CATCHMENT No. (MWD)	296000
LEVEL CHANGES	122-152 m a.s.l.	DATA BASE CODE (MAF)	267 MORTONd

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	1.0
sand dune	-	tussock	-
cropland	-	lakes	n.d.
lowland scrub	10.8	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	88.1	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	2.7
undulating (4–7°)	4.0
rolling (8–15°)	-
strongly rolling (16–20°)	0.2
moderately steep (21–25°)	13.5
steep (26–35°)	79.6
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	2.5	15.5	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	2.7	-	-	-	-
deposition	-	-	-	-	-
negligible	79.2				
lakes	n.d.				

GENERAL REMARKS

- E of Wainuiomata (351)
- potable water supply (RWB pers comm)
- in a reserve (RWB pers comm)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ Lakes.
-	-	Irwin NZOI pers comm	Water clarity.
582	1973	Vidal & Maris-McArthur	General limnology (1947-67).

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

MORTON DAM

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 22%	t°C 11°	date March 1967			582
max -	t°C -	date -			
mean n.s.	n n.s.	period 1947-67			582
period of lowest oxygen summer					582
Remarks: Taken from profile graph of dissolved oxygen under bloom conditions.					

TEMPERATURE (°C)				REFS
min 4.5	(surface) 3.5	(bottom)		582
max 23.0	(surface) 22.8	(bottom)		582
max difference top to bottom 6°				582
stratification stratified in summer				582
Remarks: Usually becomes stratified in December, temperatures recorded monthly for 20 year period but dates of maximum and minimum not specified (582).				

SECCHI DISC DEPTH (m)			REFS
min 0.85	date -		Irwin p.c.
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes humic and iron compounds			582
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms occasional			582
algae *Melosira*			582
Remarks: Phytoplankton assemblage varies greatly from year to year - detailed discussion given (582).			

pH READINGS		REFS
min 6.2	date 1947-67	582
max 7.5	date 1947-67	582
Remarks: Monthly measurements for 20 year period (582).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Myriophyllum propinquum	582
Remarks:			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	582
Remarks: More eutrophic some years than others (582).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	582
phytoplankton (algae)	582
macrophytes	582
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks: Iron fixing bacteria a nuisance (582).	

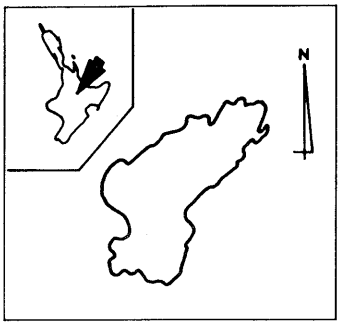
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	582	particulates	582
major ions	582	redox	-
trace elements	582	salinity	582
organic matter	582	alkalinity	582
toxic organics	-	hardness	582
pigments	-	silica	582
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE NGAHEWA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	411
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	0.5 (NE)
MAP REF (NZMS1)	N85 836825	MEAN DEPTH (m)	3.5 (196)
MAP REF (260 ser.)	U16 051153	MAX DEPTH (m)	7.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km^2)	0.11
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	8.25
MAIN OUTFLOW	joins Hakereteke Stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	192 NGAHEWA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	5.8	pasture	84.7	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	5.8	sheet	17.1	70.8	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	0.4	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	5.9	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	81.8	soil slip	-	-	-	-	-
native forest	6.1	urban	-	steep (26–35°)	6.1	earth slip	-	-	-	-	-
exotic forest	3.4	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	-	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	5.8	-	-	-	-
						deposition	-	-	-	-	-
						negligible	6.3				
						lakes	n.d.				

GENERAL REMARKS

- NE of Waiotapu (351)
- small and shallow, recently become eutrophic (428)
- fisheries are poor and the lake only has limited recreational value (428)
- very scenic (428)
- water quality described as "fair" (496)
- potable water supply

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
168	1968	Fish	Trout population (1963-66).
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
206*	1975	Forsyth & McColl	General limnology (1973).
344	1973b	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist.
428*	1975	McColl	Chemical and biological conditions (1973).
496	1923	Phillips & Grigg	Geochemistry and trout conditions (1920).
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 NGAHEWA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 0 g m^{-3}	t°C 17	date 3/73,11/73		206
max 13 g m^{-3}	t°C 5	date 7/73		206
mean n.s.	n 48	period 3/73/11/73		206
period of lowest oxygen late summer				206
Remarks: Taken from 3 profile graphs during 3 visits (206).				

TEMPERATURE (°C)				REFS
min 5 (7/73)	(surface) 5 (7/73)	(bottom)		206
max 19 (3/73)	(surface) 17 (3/73)	(bottom)		206
max difference top to bottom 2°C				206
stratification stratified in late summer				206
Remarks: Cold inflows and surface heating noted (168). 4 sites, 3 visits, 48 readings (206).				

SECCHI DISC DEPTH (m)			REFS
min 1.0	date February 1983		580
max 3.3	date July 1973		206
mean n.s.	n n.s.	period 3/73-11/73	206
period of worst clarity early and late summer			206
causes algae and humic material			206
Remarks: Receives humic water from flax swamp at head (206).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.1 mg m^{-3}	date July 1973		206
max 53.4 mg m^{-3}	date November 1973		206
mean n.s.	n n.s.	date 3/73-11/73	206
period of blooms n.s.			206
algae *Melosira, Trachelomonas, Anabaena*			206,196
Remarks: Also *Kirchneriella* (206). 5 sites, 3 visits, 2 depths (206). Numerous diatoms and Chlorophyceae (496).			

pH READINGS		REFS
min 7.25	date March 1973	206
max 9.21	date March 1973	206
Remarks: 54 readings, 3 visits, various sites and depths (206).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	206	*Potamogeton ochreatus*	206
Eleocharis	206	*Nitella hookeri*	206
Phormium	206		
Remarks: Weed growth problems (206).			

TROPHIC STATUS	BASIS	REFS
dystrophic or polyhumic	humic content	206
eutrophic	algal assemblage	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	206
phytoplankton (algae)	168,196,206,496
macrophytes	206
zooplankton	206
macroinvertebrates	206
fish	168,496
wildlife	-
Remarks:	

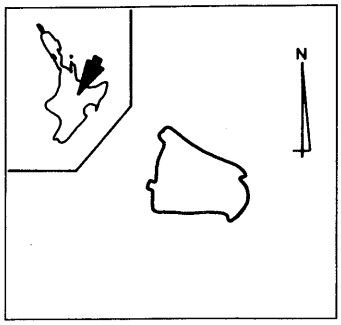
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	206,428,496	particulates	496,580
major ions	206,428,496	redox	496
trace elements	496	salinity	428
organic matter	-	alkalinity	206,428
toxic organics	-	hardness	-
pigments	206,580	silica	206,428, 496
optical properties	580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE NGAPOURI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	477
WATER BOARD	Bay of Plenty	LONG AXIS (km)	0.7 (W)
MAP REF (NZMS1)	N85 797797	MEAN DEPTH (m)	11.8 (197)
MAP REF (260 ser.)	U16 015129	MAX DEPTH (m)	25.0 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	0.26
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	6.14
MAIN OUTFLOW	drains to Waikato River via Waiotapu River	CATCHMENT No. (MWD)	434810
LEVEL CHANGES	-	DATA BASE CODE (MAF)	195 OPOURI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	95.0	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	26.1	sheet	51.3	1.5	-	-	-
cropland	-	lakes	3.9	rolling (8–15°)	13.8	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	2.3	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	31.4	soil slip	-	-	-	-	-
native forest	1.1	urban	-	steep (26–35°)	22.5	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	3.9	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	22.6	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	10.6	-	-	-	-
						deposition	-	-	-	-	-
						negligible	10.1				
						lakes	3.9				

GENERAL REMARKS

- W of Waiotapu (351)
- also known as Lake Opouri (351)
- in a volcanic explosion crater (564)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
162*	1963a	Fish	Limnological conditions.
164	1963c	Fish	Trout water content.
168	1968	Fish	Trout population.
169	1969a	Fish	Oxygen content (up to 1968).
171*	1970a	Fish	Limnological study (1960-66).
197	1977	Flint	Phytoplankton (1970-71).
200	1975	Forsyth	Benthic fauna.
202	1978	Forsyth	Benthic macroinvertebrates (1970-71).
325*	1968	Irwin	Temperature (1965).
349	1974c	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
378*	1968	Jolly	Comparative limnology (1956).
-*	-	Jolly pers comm	Temperature.
425*	1972	McColl	Chemistry and trophic status (1970-71).
428	1975	McColl	Chemical and biological conditions (1970-71).
564	1977	Taylor *et al*	Groundwater influence (1970-73).

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

LAKE NGAPOURI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 0 g m^{-3}	t °C n.s.	date n.s.		171
max 10.7 g m^{-3}	t °C 7.0	date August 1965		171
mean n.s.	n 36	period 1960-1966		171
period of lowest oxygen November-May				171
Remarks: Isopleth diagrams (169,171). Hypolimnion often completely de-oxygenated in summer and autumn. Table in ref 171 shows increasing annual de-oxygenation. 1 site, monthly visits (171).				

TEMPERATURE (°C)	REFS
min 7.0 (8/65) (surface) 7.0 (8/65) (bottom)	171
max 22.9 (n.s.) (surface) 16.8 (n.s.) (bottom)	425
max difference top to bottom 10.6°C	325
stratification summer and autumn	162,164,168, 171,202,325
Remarks: Heat budget determined (171). See also 378, 425 for temperatures. Stratified for 7 months (425). 2 sites, monthly visits, 24 samples (425). Monomictic (378).	

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 3	date 1960-66		171
mean 1.58	n 24	period 4/70-4/71	425
period of worst clarity -			
causes algae			171
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 3 mg m^{-3}	date April 1970		425
max 109 mg m^{-3}	date September 1970		425
mean 7.9 mg m^{-3}	n 12	date 4/70-4/71	425
period of blooms frequent			425
algae *Anabaena, Asterionella, Dinobryon*			171,197
Remarks: Plankton mostly diatoms (171). 12 samples, monthly visits (425). *Melosira* (169).			

pH READINGS		REFS
min 6.9	date April 1959	378
max 7.3 (mean)	date 4/70-4/71	425
Remarks: Rarely above 7 (171).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse in 1963 (162).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algal assemblage	168,169,197
highly eutrophic	algal assemblage	171
eutrophic	physical and chemical	425
Remarks: Probably became eutrophic about 1954 (169).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	162,164,168,169,171,196,197
macrophytes	162
zooplankton	92
macroinvertebrates	202
fish	164,168
wildlife	-
Remarks:	

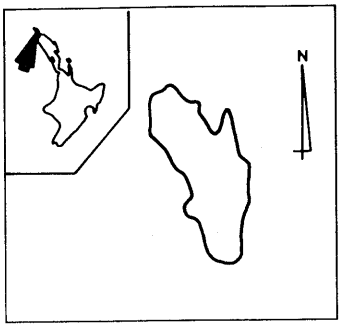
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	168,171,378, 425, 428	particulates	425
major ions	168,171,425 428	redox	171
trace elements	425	salinity	425,428
organic matter	-	alkalinity	378,425, 428
toxic organics	-	hardness	-
pigments	428	silica	378,425, 428
optical properties	-	other	-
Remarks: Complete results lodged with DSIR Library (425).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE NGATU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mangonui	ALTITUDE (m a.s.l.)	36
WATER BOARD	Northland	LONG AXIS (km)	1.41 (N)
MAP REF (NZMS1)	N9 704790	MEAN DEPTH (m)	3.0 (136)
MAP REF (260 ser.)	N04 291858	MAX DEPTH (m)	6.5 (351)
LAKE TYPE	dune	LAKE AREA (km^2)	0.61
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	1.78
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	27 NGATU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	63.5
sand dune	-	tussock	-
cropland	-	lakes	36.5
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	24.2
strongly rolling (16–20°)	39.3
moderately steep (21–25°)	-
steep (26–35°)	-
very steep (>35°)	-
lakes	36.5

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	5.1	-	-	-	-
wind	10.1	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	48.3				
lakes	36.5				

GENERAL REMARKS

- WSW of Waipapakarui (351)
- part of a wildlife reserve

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
358	1982a	Irwin	Bathymetric chart.

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

LAKE NGATU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min -	t°C -	date -			
max 108%	t°C 22.4	date February 1950			136
mean -	n -	period -			
period of lowest oxygen -					
Remarks: Single reading (136).					

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 22.4 (2/50)	(surface) -	(bottom)	136
max difference top to bottom -			
stratification mixed			136
Remarks: Single reading (136).			

SECCHI DISC DEPTH (m)		REFS
min 2.5	date February 1950	136
max 4.0	date July 1970	347
mean -	n - period -	
period of worst clarity -		
causes -		
Remarks: Single readings (136,347).		

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min -	date -	
max -	date -	
mean -	n - date -	
period of blooms -		
algae -		
Remarks: Sparse (136).		

pH READINGS		REFS
min 6.2	date February 1970	136
max -	date -	
Remarks: Single reading (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis	136	Characeae	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks: Zooplankton sparse (136).	

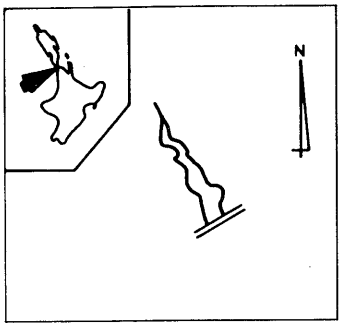
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	136	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	136
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

NIHOTUPU RESERVOIR

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitemata	ALTITUDE (m a.s.l.)	276
WATER BOARD	Auckland	LONG AXIS (km)	1.0 (NW)
MAP REF (NZMS1)	N41 087484	MEAN DEPTH (m)	16.1 (382)
MAP REF (260 ser.)	Q11 496715	MAX DEPTH (m)	33.8 (382)
LAKE TYPE	reservoir	LAKE AREA (km^2)	0.17
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	6.27
MAIN OUTFLOW	Nihotupu Stream	CATCHMENT No. (MWD)	441000
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	84 NIHOTPr

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

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°)	45.5	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	45.5	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	53.0	soil slip	37.5	1.6	-	-	-
native forest	54.5	urban	-	steep (26–35°)	1.6	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	15.5	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	45.5				
						lakes	n.d.				

GENERAL REMARKS

- NNW of Huia settlement (351)
- also known as Nihotapu Reservoir (351)
- potable water supply

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
249	1968a	Green	Limnological study.
250	1968b	Green	Plankton ecology.
268	1967	Haydon	Zooplankton.
351	1975a	Irwin	Checklist of NZ lakes.
382	1975	Jolly & Irwin	Thermal conditions (pre 1971).
-	-	RWB pers comm	Temperature.

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

NIHOTUPU RESERVOIR

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 0.38 g m^{-3}	t °C n.s.	date January 1968		249
max 11.54 g m^{-3}	t °C n.s.	date n.d.		249
mean -	n -	period -		
period of lowest oxygen -				
Remarks:				

TEMPERATURE (°C)				REFS
min 9.5 (n.s.)	(surface) 9.2 (n.s.)	(bottom)		382
max 21.0 (n.s.)	(surface) 11.4 (n.s.)	(bottom)		382
max difference top to bottom 10.6°				382
stratification in summer				382,RWB
Remarks: Dates of data not specified but pre-1971 (382).				

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max -	date -		
mean 1.07	n 8	period 1/68-9/68	249
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms summer			249
algae mostly dinoflagellates			249
Remarks: Phytoplankton abundant (249).			

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)	249, 250
macrophytes	-
zooplankton	92, 268
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

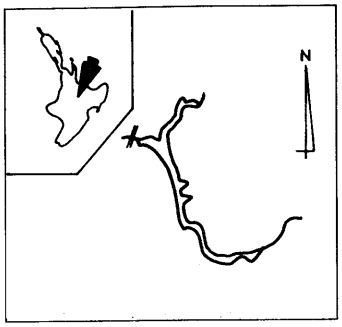
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check 249.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OHAKURI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	274-305
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	7.5 (NW)
MAP REF (NZMS1)	N85 593703	MEAN DEPTH (m)	-
MAP REF (260 ser.)	n.d.	MAX DEPTH (m)	37.5 (351)
LAKE TYPE	reservoir	LAKE AREA (km²)	7.21
MAIN INFLOW	Waikato River	CATCHMENT AREA (km²) (land and lake)	1479.16
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	fluctuates (HEP)	DATA BASE CODE (MAF)	202 OHAKURI 1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.1	pasture	53.2	flat (0–3°)	23.1
sand dune	-	tussock	-	undulating (4–7°)	21.4
cropland	-	lakes	0.7	rolling (8–15°)	12.3
lowland scrub	4.1	rivers	0.3	strongly rolling (16–20°)	9.6
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	20.0
native forest	2.6	urban	-	steep (26–35°)	12.0
exotic forest	39.1	other	-	very steep (>35°)	0.6
				lakes	0.7

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.5	5.1	-	-	-
wind	1.2	-	-	-	-
scree creep	-	-	-	-	-
soil slip	1.1	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	11.7	3.3	0.3	-	-
tunnel gully	-	-	-	-	-
streambank	4.1	0.6	0.1	-	-
deposition	0.5	-	-	-	-
negligible	56.7				
lakes	0.7				

GENERAL REMARKS

- ESE of Ohakuri (351)
- second and largest reservoir in Waikato hydro lake sequence (403)
- Whirinaki Arm receives pastoral drainage and has considerably higher turbidity than the main lake. It is eutrophic and does not mix well with warmer water of the main lake (361, 403, 130)
- geothermal input from Orakei and Koraka (403)
- water is potassium enriched from sewage, volcanic ash (277)
- algal blooms (560)
- exit water green (560)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
94	1966	Chapman	Macrophyte inspection.
98	1970a	Chapman	History of lake weed infestation.
123	1975a	Coffey	Macrophyte distribution.
129	1977	Coulter	Ecology.
130*	1983	Coulter *et al*	Seasonal limnological and production changes (1977-1979).
138	1981	Davenport	Macroinvertebrates and water quality (1980-81).
141	1984	Davis & Simons	Phytoplankton temporal and spatial changes (1980-83).
274	1966a	Hill	Spraying of weed.
275	1966b	Hill	Weed problem.
276	1967	Hill	Investigation of weed problem.
277	1969a	Hill	Limnology and macrophytes.
289	1975	Hill	Brief discussion of weeds.
345	1973c	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
355	1978a	Irwin	Bathymetric chart.
361	1972	Irwin & Heath	Winter temperature structure (1967).
371	1981	Johnstone	Aquatic weed management in hydro lakes (up to 1980).
403	1973	Magadza	Comparative limnology (1970-1972).
404	1978	Magadza	Phytoplankton.
405*	1979	Magadza	Physical and chemical limnology.
406	1980	Magadza	Seasonal primary productivity.
467	1970b	NZED	Weed control by lowering lake level.
472	1965	Nicholls	Aquatic plant survey.
473	1968	Nicholls	Lake weed survey.
518	1972	Robertson-Glasgow	Water plant survey.
560*	1979	Strachan	Resource survey, water chemistry and biota (1976-77).

(REFERENCES CONTINUED IN APPENDIX)

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

LAKE OHAKURI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0%	**t°C** n.s.	**date** Dec-May			130
max 120%	**t°C** n.s.	**date** n.s.			405
mean 49.3%	**n** 18	**period** 8/70-9/72			405
period of lowest oxygen summer, autumn					130,405,560
Remarks: Deoxygenated up to six months annually. Low D.O. may enhance solubility of Hg, As (560).					

TEMPERATURE (°C)				REFS
min 10 (7/78)	**(surface)** 9 (6/78)	**(bottom)**		130
max 24 (3/77)	**(surface)** 14 (4/78)	**(bottom)**		560,130
max difference top to bottom 10.5°C				405
stratification variable				130,405, 361,560
Remarks: Stratified Dec-May (130). Stratified for short periods - maybe polymictic (405). Winter longitudinal profile given (361). Whirinaki Arm often several degrees colder than main lake and is main cause of stratification (361).				

SECCHI DISC DEPTH (m)			REFS
min 1.0	**date** September 1970		405
max 6.0	**date** September 1977		130
mean 2.54	**n** 18	**period** 8/70-9/72	405
period of worst clarity summer			130
causes algae, silt			130
Remarks: Exit water distinctly green (560).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 3.2 mg m^{-3}	**date** August 1971		404
max 207.8 mg m^{-3}	**date** March 1972		404
mean 50.4 mg m^{-3}	**n** 25	**date** 8/70-9/72	404
period of blooms occasional			560
algae *Melosira, Asterionella, Anabaena*			289,404
Remarks: Whirinaki Arm has higher chlorophyll *a*, and turbidity (130). Lake is major breeding ground for phytoplankton (560).			

pH READINGS		REFS
min 6.3	**date** n.s.	405
max 8.6	**date** n.s.	405
Remarks: 18 readings, monthly visits (405).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
Nymphea	371	*Ceratophyllum**	560
		*Elodea**	371,560
		*Egeria**	371
Remarks: *Problem growths; *Nymphea* spreading; distribution of *Elodea* mapped (371). Complex changes (123). Two zones noted associated with oligotrophic and eutrophic parts of lake (277).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algal	130,560
eutrophic	primary productivity	406
eutrophic	physico-chemical	405
eutrophic	water quality	580
Remarks: Oligotrophic in southern region (277).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	129,130,141,289,403,404,560
macrophytes	94,98,123,129,130,274,275,276,289, 371,403,406,467,472,473,518
zooplankton	92,129,560
macroinvertebrates	138
fish	-
wildlife	-
Remarks: Macrophytes continued - 560, 604. Intensive sampling programme for two years - temperature dissolved oxygen and water clarity (130).	

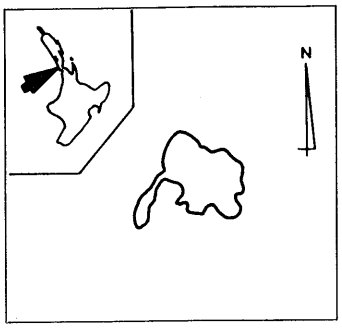
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	130,403, 405,560	**particulates**	580
major ions	403,405, 560	**redox**	-
trace elements	560	**salinity**	403,405, 560
organic matter	560	**alkalinity**	403,405, 560
toxic organics	-	**hardness**	403,405, 560
pigments	580	**silica**	560
optical properties	-	**other**	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OKAIHAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitemata	ALTITUDE (m a.s.l.)	30
WATER BOARD	Auckland	LONG AXIS (km)	-
MAP REF (NZMS1)	N41 966652	MEAN DEPTH (m)	9.5 (136)
MAP REF (260 ser.)	011 390871	MAX DEPTH (m)	4.8 (136)
LAKE TYPE	dune	LAKE AREA (km^2)	0.05
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	2.30
MAIN OUTFLOW	to sea	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	79 OKAIHAU

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	78.7	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	21.3	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	57.4	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	42.6	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	21.3	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	78.7				
						lakes	n.d.				

GENERAL REMARKS

- NNE Muriwai Beach
- very steep sloping sides

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
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 OKAIHAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0	t°C 13	date January 1950			136
max -	t°C -	date -			
mean -	n -	period -			
period of lowest oxygen summer					136
Remarks: Single reading (136).					

TEMPERATURE (°C)				REFS
min -	(surface) -		(bottom)	
max 22.1 (1/50)	(surface) 13 (1/50)		(bottom)	136
max difference top to bottom 9.1				136
stratification stratified				136
Remarks: Two readings only (136).				

SECCHI DISC DEPTH (m)			REFS
min 2.0	date January 1950		136
max -	date -		
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single reading (136).			

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

pH READINGS		REFS
min 6.3	date January 1950	136
max 6.5	date January 1950	136
Remarks: Two readings, one visit (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	136		
Eleocharis	136		
Remarks: *Eleocharis sphacelata* in continuous narrow band around lake, macrophytes quite extensive (136).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	136
Remarks:	

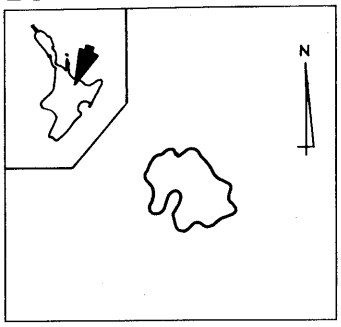
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	136	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OKAREKA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	355
WATER BOARD	Bay of Plenty	LONG AXIS (km)	2.8 (NW)
MAP REF (NZMS1)	N76 819005	MEAN DEPTH (m)	20.0 (325)
MAP REF (260 ser.)	U16 040318	MAX DEPTH (m)	33.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km^2)	3.46
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	17.50
MAIN OUTFLOW	drainage via Waitangi Spring	CATCHMENT No. (MWD)	153131
LEVEL CHANGES	5% of volume (564)	DATA BASE CODE (MAF)	172 OKAREKA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	44.6	flat (0–3°)	9.7	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	11.4	-	-	-	-
cropland	-	lakes	19.8	rolling (8–15°)	6.0	wind	-	-	-	-	-
lowland scrub	7.1	rivers	-	strongly rolling (16–20°)	8.5	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	19.2	soil slip	0.3	10.9	-	-	-
native forest	28.5	urban	-	steep (26–35°)	36.8	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	19.8	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	7.7	14.6	-	-	-
						tunnel gully	2.7	-	-	-	-
						streambank	-	5.5	-	-	-
						deposition	-	-	-	-	-
						negligible	27.1				
						lakes	19.8				

GENERAL REMARKS

- SE Rotorua City (351)
- fills drowned valley (378)
- created less than 13.4 thousand years ago (271)
- rock type is rhyolite; lake dammed by lava flow (271, 564)
- high water quality, exceptionally low levels of ammonium (378)
- scenic, popular for fishing and boating (425)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
4	1970	Anderson	Wildlife report.
11	1971	Baars	Phytoplankton ecology.
12	1971	Barrs-Kloos	Phytoplankton ecology.
35	1976	Bowie & Gillespie	Microbial parameters and trophic status (1973).
92	1975	Chapman *et al*	Zooplankton.
98	1970a	Chapman	History of lakeweed infestation.
196	1975	Flint	Phytoplankton.
197	1977	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
202	1978	Forsyth	Benthic macroinvertebrates.
232*	1976	Gillespie	Heterotrophic potential and trophic status (1973).
271	1975	Healy	Lake origin.
325*	1968	Irwin	Temperature (1966).
349	1974c	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology (up to 1958).
386	1976	Kloos	Phytoplankton and macrophytes.
425*	1972	McColl	Chemistry and trophic status (1970-71).
428*	1975	McColl	Chemical and biological conditions (1970-71).
429	1977	McColl	Sediment chemistry (1972).
496	1923	Phillips and Grigg	Geochemistry and trout conditions (1920).
511	1975	Richmond	Trophic status.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
567	1972	Thomasson	Phytoplankton.
568	1973	Thomasson	Phytoplankton.
569	1974	Thomasson	Phytoplankton.

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

LAKE OKAREKA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0%	t °C n.s.	date May 1971			425
max 100%	t °C n.s.	date August 1970			425
mean 60%	n 14	period 4/70-5/71			425
period of lowest oxygen May					425
Remarks: Anoxic for at least one month per year (425).					

TEMPERATURE (°C)	REFS
min 9.5 (8.72) (surface) 9.4 (n.s.) (bottom)	232,425
max 24.2 (2/73) (surface) 17.5 (2/73) (bottom)	232
max difference top to bottom 13.8°C(12/66)	325
stratification stratified for 7 months	232,325, 378,425
Remarks: 2 visits, 3 depths (232). Monomictic (378).	

SECCHI DISC DEPTH (m)			REFS
min 6.0	date January 1971		425
max 9.5	date April 1970		425
mean 7.7	n 14	period 4/70-5/71	425
period of worst clarity January			425
causes silt			425
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1 mg l^{-1}	date February 1971		425
max 8.5 mg l^{-1}	date October 1970		425
mean 3.5 mg l^{-1}	n 14	date 4/70-5/71	425
period of blooms -			
algae *Synura, Cyclotella, Melosira*			196
Remarks: Monthly samples (425).			

pH READINGS		REFS
min 6.85	date February 1973	232
max 8.4	date February 1973	232
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: See refs 4, 98, 386.			

TROPHIC STATUS	BASIS	REFS
mesotrophic	SDH, ATP	35
mesotrophic	physico-chemical	425
mesotrophic	heterotrophic potential	232
oligotrophic	phytoplankton	196
Remarks: Mean ATP concentration in oligotrophic range (35). Sediment chemistry not closely related to trophic state (429).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232
phytoplankton (algae)	11,12,196,197,386,496,567,568,569
macrophytes	4,98,386
zooplankton	92
macroinvertebrates	200,202,496
fish	496
wildlife	-
Remarks:	

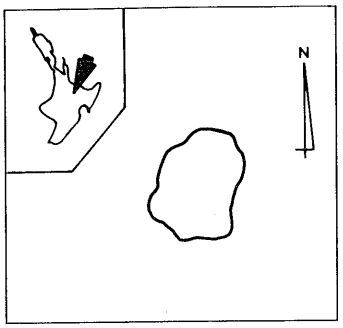
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	378,425, 428,496	particulates	425,496
major ions	425,428, 496,564	redox	496
trace elements	425,496	salinity	425,428
organic matter	-	alkalinity	378,425, 428
toxic organics	-	hardness	-
pigments	425,428	silica	378,425, 428,496
optical properties	-	other	-
Remarks: Detailed data held in DSIR Library (425).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OKARO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	423
WATER BOARD	Bay of Plenty	LONG AXIS (km)	0.7 (W)
MAP REF (NZMS1)	N85 855845	MEAN DEPTH (m)	12.1 (325)
MAP REF (260 ser.)	V16 069171	MAX DEPTH (m)	18.0 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	0.28
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	1.83
MAIN OUTFLOW	Haumi Stream to L. Rotomahana	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	190 OKARO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	83.1
sand dune	-	tussock	-
cropland	-	lakes	16.9
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	23.0
undulating (4–7°)	7.1
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	53.0
steep (26–35°)	-
very steep (>35°)	-
lakes	16.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	12.6	38.3	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	23.0	-	-	-	-
deposition	-	-	-	-	-
negligible	9.3				
lakes	16.9				

GENERAL REMARKS

- NE Waiotapu (351)
- phreatic explosion crater (564)
- catchment developed about 12 years ago and water quality directly affected by agricultural runoff (169)
- popular for water skiing, angling (162)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbial parameters and tropic status.
92	1975	Chapman *et al*	Zoolplankton.
162*	1963a	Fish	Limnological conditions (1962).
168*	1968	Fish	Trout population (1963-64).
169*	1969a	Fish	Oxygen content (up to 1968).
171*	1970a	Fish	Limnological study (1960-66).
178	1975a	Fish	Trophic status and nutrients for comparison with L. Rotorua (1969-70).
196	1975	Flint	Phytoplankton.
197	1977	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
202	1978	Forsyth	Benthic macroinvertebrates.
232*	1976	Gillespie	Heterotrophic potential and trophic status (1973).
325*	1968	Irwin	Temperature (1965).
350	1974d	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology (up to 1958).
425*	1972	McColl	Chemistry and trophic status (1970-71).
428*	1975	McColl	Chemical and biological conditions (1970-71).
429	1977	McColl	Sediment chemistry (1972).
511	1975	Richmond	Trophic status.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
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 OKARO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0%	t°C n.s.	date 1/71-5/71			425
max 100%	t°C n.s.	date 7/70-8/70			425
mean 20%	n 14	period 4/70-5/71			425
period of lowest oxygen summer					162,168,169, 171,178,232
Remarks: Low oxygen in summer cont. 425, 428. Anoxic period varies from year to year; table showing declining dissolved oxygen in summer (169) becomes anoxic rapidly in early summer (429).					

TEMPERATURE (°C)					REFS
min 7.05 (n.s.)	(surface) 8.5 (8/72)	(bottom)			171,232
max 24.2 (2/73)	(surface) 12.4 (n.s.)	(bottom)			232,425
max difference top to bottom 13.9					232
stratification stratified in summer					162,168,169 178,232,325
Remarks: Stratification refs continued (378, 425). Stratified for 7 months (425). Heat budget calculated (169). Monomictic (378).					

SECCHI DISC DEPTH (m)			REFS
min 0.8	date February 1983		580
max 4.0	date March 1971		425
mean 2.0	n 14	period 4/70-5/71	425
period of worst clarity April-August			425
causes algae			162,171, 378,425
Remarks: Single visit, single site (580).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1 mg m^{-3}	date January 1971		425
max 137 mg m^{-3}	date November 1970		425
mean 30 mg m^{-3}	n 14	date 4/70-5/71	425
period of blooms mainly summer*			
algae *Melosira, Oocystis, Gomphosphaeria*			196,197
Remarks: Algae cont. *Closterium, Staurastrum, Ceratium, Anabaena* (178). Seasonal variation (196). *Check phytoplankton refs listed below for bloom species.			

pH READINGS		REFS
min 6.9	date n.s.	425
max 9.75	date February 1973	232
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		*Elodea**	169
Remarks: *Problem growth, but little left by 1963, greatest oxygen demand now from algae (169).			

TROPHIC STATUS	BASIS	REFS
highly eutrophic	algae	168,171, 178,428
eutrophic	SHD, ATP	35
eutrophic	falling summer DO	169
eutrophic	physico-chemical	425
Remarks: Eutrophic - heterotrophic potential (232). Strong H_2S smell in summer bottom water (171). Sediment chemistry not closely related to trophic state (429).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232
phytoplankton (algae)	168,169,171,178,196,197,425,511
macrophytes	171
zooplankton	92
macroinvertebrates	200,202
fish	162,168
wildlife	-
Remarks:	

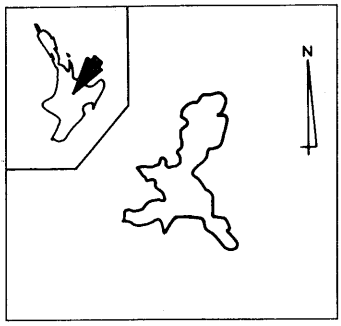
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	171,178,378, 425,428	particulates	425,580
major ions	171,425,428	redox	171
trace elements	425	salinity	425,428
organic matter	-	alkalinity	425,428
toxic organics	-	hardness	-
pigments	425,580	silica	168,171,378 425,428
optical properties	580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OKATAINA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	311
WATER BOARD	Bay of Plenty	LONG AXIS (km)	6.2 (NNE)
MAP REF (NZMS1)	N76 881072	MEAN DEPTH (m)	39.4 (322)
MAP REF (260 ser.)	U16 099378	MAX DEPTH (m)	78.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	10.8
MAIN INFLOW	-	CATCHMENT AREA (km²) (land and lake)	63.58
MAIN OUTFLOW	no known drainage	CATCHMENT No. (MWD)	-
LEVEL CHANGES	307-313 (natural)	DATA BASE CODE (MAF)	166 OKATAINA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	8.9	flat (0–3°)	3.2
sand dune	-	tussock	-	undulating (4–7°)	-
cropland	-	lakes	16.8	rolling (8–15°)	1.7
lowland scrub	5.3	rivers	-	strongly rolling (16–20°)	23.1
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	30.7
native forest	66.1	urban	-	steep (26–35°)	11.5
exotic forest	3.0	other	-	very steep (>35°)	13.0
				lakes	16.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	9.5	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	4.6	10.4	4.4	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	1.9	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	3.3	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	48.9				
lakes	16.8				

GENERAL REMARKS

- ENE of Rotorua City (351)
- drowned valley (378)
- originated less than 2,000 years ago (271)
- surrounded by lava flow barriers (564)
- high water quality, small geothermal spring on shore (271)
- volume varies up to 7% (564)
- scenic, popular for fishing and boating (425)
- three submerged historic Maori sites (271)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
7	1972	Atkinson	Ecology and rising lake level.
35	1976	Bowie & Gillespie	Microbial parameters and trophic status (1973).
42	1970	Brown	Submerged vegetation.
43	1975	Brown	Ecology of macrophytes.
92	1975	Chapman *et al*	Zooplankton.
98	1970a	Chapman	History of lake weed infestation.
118	1970	Coffey	*Lagarosiphon* study.
161	1972	Ewing	Wildlife report.
162*	1963a	Fish	Linological conditions and trout growth (1962).
168	1968	Fish	Trout population (1963-64).
169*	1969a	Fish	Oxygen content (up to 1968).
171*	1970a	Fish	Limnological study (1960-66).
196	1975	Flint	Phytoplankton.
197	1977	Flint	Phytoplankton.
202	1978	Forsyth	Benthic macroinvertebrates.
232*	1976	Gillespie	Heterotrophic potential and trophic status comparison (1972, 1973).
253*	1975b	Green	Light penetration (1955-56).
271	1975	Healy	Lake origin.
322	1967a	Irwin	Bathymetric chart.
325*	1968	Irwin	Temperature (1965, 1967).
351	1975a	Irwin	Checklist of NZ lakes.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology (up to 1958).
425*	1972	McColl	Chemistry and trophic status (1970-71).
428*	1975	McColl	Chemical and biological conditions.
429	1977	McColl	Sediment chemistry and trophic status
496	1923	Phillips & Grigg	Geochemistry and trout conditions.

(REFERENCES CONTINUED IN APPENDIX)

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

LAKE OKATAINA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 6.34 g m^{-3}	t°C n.s.	date March 1963		171
max 10.3 g m^{-3}	t°C 10.8	date September 65		171
mean n.s.	n 50	period 1960-66		171
period of lowest oxygen summer				171
Remarks: Oxygen rarely or never depleted in hypolimnion (425).				

TEMPERATURE (°C)				REFS
min 10 (8/65)	(surface) 9.4 (7/65)	(bottom)		171
max 22 (2/64)	(surface) 12.3 (6/66)	(bottom)		171,378,425
max difference top to bottom 11.3°C				425
stratification stratified up to 8 months				162,171,168, 232,378,425
Remarks: Heat budget calculated (196).				

SECCHI DISC DEPTH (m)			REFS
min 6.0	date August 1955		378
max 14.2	date December 1955		378
mean 9.5	n 12	period 1955-56	378
period of worst clarity August			425
causes mud, after autumn overturn			425
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0 mg m^{-3}	date October 1970		425
max 4.0 mg m^{-3}	date July 1970		425
mean 2 mg m^{-3}	n 12	date 4/70-5/71	425
period of blooms -			-
algae *Dinobryon, Melosira, Cosmocladium*			196,425
Remarks: Monthly readings graphed for 1 year (425). Phytoplankton sparse (196). Numerous diatoms, a few Cyanophyceae (496).			

pH READINGS		REFS
min 6.8	date 3/58, 6/58	378
max 8.3	date n.s.	171
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Lagarosiphon	118
Remarks: Moderate occurrence with native communities present in most areas (118).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	ATP, SDH	35
oligotrophic	"many reasons"	171
oligo-mesotrophic	biochemical assay and algae	425
oligotrophic	algae	168,511
Remarks: Oligotrophic - heterotrophic potential (232). Sediment chemistry not closely related to trophic status (425).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232
phytoplankton (algae)	168,196,197,425,496,567,569
macrophytes	42,43,98,118,171,536,537
zooplankton	92
macroinvertebrates	202,496
fish	496
wildlife	161
Remarks: Ecological effects of rising lake level (7).	

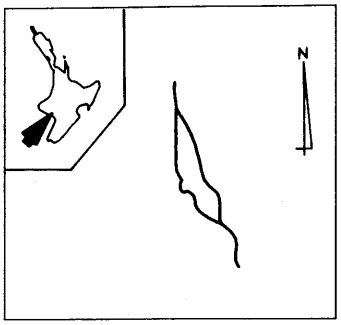
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	168,171,378, 425,428,496	particulates	496
major ions	425,428,496	redox	169,171, 496
trace elements	425,496	salinity	425,428
organic matter	-	alkalinity	378,425, 428
toxic organics	-	hardness	-
pigments	425,428	silica	168,171,378 425,428,496
optical properties	-	other	-
Remarks: Detailed data held in DSIR library (425).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OKOIA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Patea/ Waitotara boundary	ALTITUDE (m a.s.l.)	37
WATER BOARD	Taranaki	LONG AXIS (km)	1.0 (NNW)
MAP REF (NZMS1)	N137 235004	MEAN DEPTH (m)	-
MAP REF (260 ser.)	R22 541531	MAX DEPTH (m)	50 (136)
LAKE TYPE	dune	LAKE AREA (km^2)	0.17
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	2.25
MAIN OUTFLOW	Waiau Stream	CATCHMENT No. (MWD)	339010
LEVEL CHANGES	-	DATA BASE CODE (MAF)	284 OKOIA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	100.00	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	1.8	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	98.2	wind	82.7	10.7	-	-	-
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	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	6.7				
						lakes	n.d.				

GENERAL REMARKS

- WSW Waitotara (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1949).
357	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 OKOIA

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 2.0	date January 1949		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single reading (136).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Sparse plankton community (136).			

pH READINGS		REFS
min -	date -	
max 8.0	date January 1949	136
Remarks: Single reading (136).		

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)	136
macrophytes	-
zooplankton	136
macroinvertebrates	-
fish	136
wildlife	-
Remarks:	

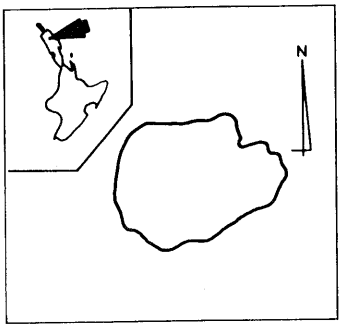
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OMAPERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Bay of Islands	ALTITUDE (m a.s.l.)	238
WATER BOARD	Northland	LONG AXIS (km)	4.6 (EW)
MAP REF (NZMS1)	N15 299414	MEAN DEPTH (m)	-
MAP REF (260 ser.)	P05 825499	MAX DEPTH (m)	1.9 (360)
LAKE TYPE	volcanic	LAKE AREA (km^2)	11.62
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	32.71
MAIN OUTFLOW	Omapere Stream	CATCHMENT No. (MWD)	477050
LEVEL CHANGES	-	DATA BASE CODE (MAF)	31 OMAPERE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1967-74)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	1.9	pasture	60.3
sand dune	-	tussock	-
cropland	-	lakes	37.6
lowland scrub	0.1	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	22.0
undulating (4–7°)	14.4
rolling (8–15°)	20.0
strongly rolling (16–20°)	2.5
moderately steep (21–25°)	3.5
steep (26–35°)	-
very steep (>35°)	-
lakes	37.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	0.4	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	5.0	-	-	-	-
earth slip	0.6	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	1.0	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	55.3				
lakes	37.6				

GENERAL REMARKS

- S of Okaihu township (351)
- dammed by quaternary basalt lava flow (271)
- large soda spring (271)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
271	1975	Healy	Lake origin.
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
360	1982c	Irwin	Bathymetric chart.
436	1965	McDowall	New fish species (*Retropinna*).

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

LAKE OMAPERE

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 0.5		date 7/70, 8/70		347
max 1.3		date 7/70,8/70		347
mean 0.7	n 8		period 7/70-8/70	347
period of worst clarity -				
causes -				
Remarks: Single site.				

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	436
wildlife	-
Remarks:	

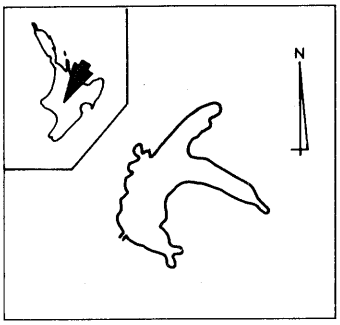
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OTOMANGAKAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo	ALTITUDE (m a.s.l.)	665
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	-
MAP REF (NZMS1)	N112 117990	MEAN DEPTH (m)	-
MAP REF (260 ser.)	T19 373409	MAX DEPTH (m)	9 (Cudby p.c.)
LAKE TYPE	reservoir	LAKE AREA (km^2)	1.8
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	45.92
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	236 OTAMNGK

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	4.7	pasture	7.2	flat (0–3°)	15.2
sand dune	-	tussock	23.8	undulating (4–7°)	22.7
cropland	2.5	lakes	4.0	rolling (8–15°)	15.4
lowland scrub	31.6	rivers	-	strongly rolling (16–20°)	26.3
subalpine scrub	18.4	ice and snow	-	moderately steep (21–25°)	10.3
native forest	7.7	urban	-	steep (26–35°)	4.9
exotic forest	-	other	-	very steep (>35°)	1.2
				lakes	4.0

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	8.7	4.1	-	-	-
wind	-	-	-	-	-
scree creep	-	1.2	-	-	-
soil slip	1.0	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	0.3	0.4	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	4.1	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	7.2	-	-	-	-
deposition	-	-	-	-	-
negligible	69.1				
lakes	4.0				

GENERAL REMARKS

- created as part of Tongariro hydro-electric power scheme
- not listed in Irwin 1975a

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
-	-	Cudby MAF pers comm	Water chemistry data (1975-1977).

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

LAKE OTOMANGAKAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 8.8 g m^{-3}	t°C 7.0	date April 1977		Cudby p.c.
max 12.8 g m^{-3}	t°C 6.8	date June 1977		Cudby p.c.
mean 10 g m^{-3}	n 24	period 7/75-7/77		Cudby p.c.
period of lowest oxygen -				
Remarks: Monthly sampling, single site.				

TEMPERATURE (°C)	REFS
min 5.5 (7/76) (surface) 5.2 (8/76) (bottom)	Cudby p.c.
max 15.5 (2/77) (surface) 16.4 (3/76) (bottom)	Cudby p.c.
max difference top to bottom 3°C	Cudby p.c.
stratification brief periods only	Cudby p.c.
Remarks:	

SECCHI DISC DEPTH (m)			REFS
min 0.75	date July 1975		Cudby p.c.
max 7.5	date September 1976		Cudby p.c.
mean 4.0	n 16	period 7/75-7/77	Cudby p.c.
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae -			
Remarks: Sparse plankton (Cudby p.c.).			

pH READINGS		REFS
min 6.8	date July 1975	Cudby p.c.
max 7.5	date October 1975	Cudby p.c.
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea	Cudby p.c.
Remarks: Few macrophytes, but *Elodea* increasing (Cudby pers comm).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

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

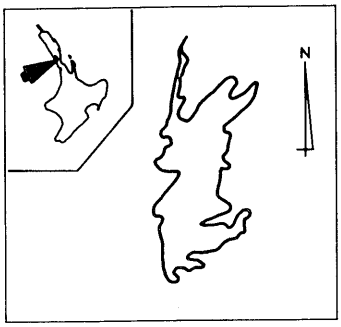
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OTOTOA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rodney	ALTITUDE (m a.s.l.)	64
WATER BOARD	Auckland	LONG AXIS (km)	2.5 (N)
MAP REF (NZMS1)	N33 761006	MEAN DEPTH (m)	10.0 (153)
MAP REF (260 ser.)	Q09 211200	MAX DEPTH (m)	27.5 (351)
LAKE TYPE	dune	LAKE AREA (km^2)	1.39
MAIN INFLOW	fed by seepage and seasonal rivulets	CATCHMENT AREA (km^2) (land and lake)	5.61
MAIN OUTFLOW	no outlet stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	67 OTOTOA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-75)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	53.1
sand dune	15.3	tussock	-
cropland	-	lakes	17.3
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	14.3	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	15.3
rolling (8–15°)	67.4
strongly rolling (16–20°)	-
moderately steep (21–25°)	-
steep (26–35°)	-
very steep (>35°)	-
lakes	17.3

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	14.3	15.3	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	53.1	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	17.3				

GENERAL REMARKS

- S of South Head Light (351)
- also known as Lake Rototoa (351)
- sand dunes encroaching western shore (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
136*	1953	Cunningham *et al*	Survey of dune lakes (1950).
153	1970	Donovan	Bionomics of *Bosmina*.
196	1975	Flint	Phytoplankton.
251	1973	Green	Ecological study of a copepod species.
252*	1975a	Green	Physico-chemical features compared with overseas examples (1969-70).
254	1976	Green	Plankton.
347*	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
364	1981	Irwin & Main	Bathymetric chart.
382*	1975	Jolly & Irwin	Thermal conditions.
509*	1976	Reid	Baseline water quality survey (1976).
577	1968	University of Waikato	Water analyses.

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

LAKE OTOTOA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 24%	t°C 17.0	date March 1970			252
max 105%	t°C 15.3	date November 1969			252
mean n.s.	n 50	period 3/69-3/70			252
period of lowest oxygen autumn					252
Remarks: Taken from profile graphs (252). 3 sites, weekly visits (252).					

TEMPERATURE (°C)					REFS
min 10.2 (8/69)	(surface) 9.7 (8/69)	(bottom)			252
max 25.2 (1/69)	(surface) 20 (2/50)	(bottom)			252,136
max difference top to bottom 8.6°					252
stratification stratified in summer					252,347
Remarks:					

SECCHI DISC DEPTH (m)				REFS
min 5.0	date June 1969			252
max 9.2	date December 1969			252
mean 7	n 50	period 3/69-3/70		252
period of worst clarity -				
causes phytoplankton				252
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min 0.04 mg m^{-3}	date October 1969			254
max 4.61 mg m^{-3}	date August 1969			254
mean 1.5 mg m^{-3}	n 50	date 3/69-3/70		254
period of blooms -				
algae *Cyclotella, Dinobyron, Coelastrum*				136,254
Remarks: Algae cont. *Sphaerocystis.*				

pH READINGS		REFS
min 6.0	date February 1970	252
max 8.5	date May 1969	252
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis	136,254	*Chara australis*	136,251
Typha	136		
Cladium	136		
Remarks: Bands of weed around shore (254).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	phytoplankton	196,254
oligotrophic	physico-chemical	252
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	509
phytoplankton (algae)	136,196,251,254
macrophytes	136,251,254
zooplankton	92,153,252,254
macroinvertebrates	254
fish	136,254
wildlife	-
Remarks:	

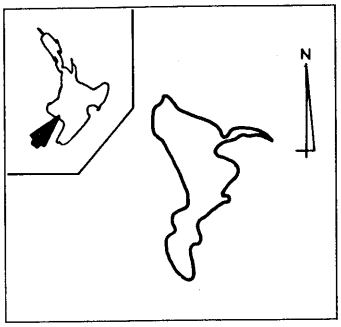
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,252	particulates	509
major ions	136,252,509	redox	509
trace elements	-	salinity	-
organic matter	-	alkalinity	136,252
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	509	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OTURI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Patea	ALTITUDE (m a.s.l.)	55
WATER BOARD	Taranaki	LONG AXIS (km)	0.8 (N)
MAP REF (NZMS1)	N137 175048	MEAN DEPTH (m)	3.4 (136)
MAP REF (260 ser.)	R22 487572	MAX DEPTH (m)	6.5 (136)
LAKE TYPE	dune	LAKE AREA (km^2)	0.13
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	2.12
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	279 OTURI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	19.3	pasture	80.7	flat (0–3°)	36.8	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	42.9	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	4.7	20.3	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	20.3	soil slip	-	-	-	-	-
native forest	-	urban	-	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	75.0				
						lakes	n.d.				

GENERAL REMARKS

- SSW of Waverley township (351)
- in a basin of consolidated sand (136)
- scattered raupo stands (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1949).
294	1964	Hodge	*Tenagomysis chiltoni* - zooplankton.
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 OTURI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min -	t°C -	date -		
max 97%	t°C 18	date January 1949		136
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single measurement (136).				

TEMPERATURE (°C)				REFS
min -	(surface) -		(bottom)	
max 18° (1/49)	(surface) 18° (1/49)		(bottom)	136
max difference top to bottom 0				136
stratification mixed				136
Remarks: 2 measurements, single visit.				

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 1.75	date January 1949		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single measurement (136).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Peridinium, Staurastrum*			136
Remarks:			

pH READINGS		REFS
min -	date -	
max 8.0	date January 1949	136
Remarks: Single measurement (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	136	*Potamogeton*	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136,294
macroinvertebrates	136
fish	136
wildlife	-
Remarks:	

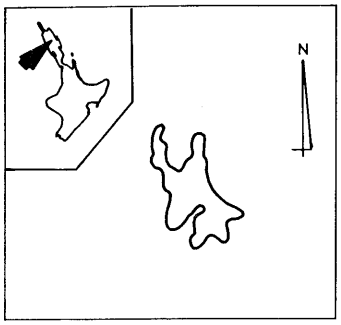
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE OWHAREITI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Bay of Islands	ALTITUDE (m a.s.l.)	98
WATER BOARD	Northland	LONG AXIS (km)	1.8 (NNW)
MAP REF (NZMS1)	N15 452369	MEAN DEPTH (m)	-
MAP REF (260 ser.)	P05 964454	MAX DEPTH (m)	16.0 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	0.76
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	6.80
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	037016
LEVEL CHANGES	-	DATA BASE CODE (MAF)	33 OWHART

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1967-74)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	87.8	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	23.4	-	-	-	-
cropland	-	lakes	12.2	rolling (8–15°)	66.2	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	15.4	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	6.2	soil slip	6.2	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	12.2	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	15.4	-	-	-	-
						tunnel gully	27.4	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	15.4				
						lakes	12.2				

GENERAL REMARKS

- W of Moerewa township (351)
- created by lava flow barrier (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
346	1973d	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity (1970).
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 OWHAREITI

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 1.7		date August 1970		347
max 1.9		date August 1970		347
mean 1.8	n 3	period 8/70		347
period of worst clarity -				
causes -				
Remarks: Single site (347).				

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.	

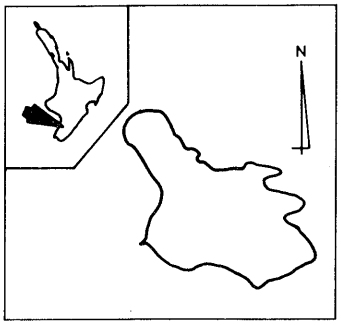
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PAPAITONGA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Horowhenua	ALTITUDE (m a.s.l.)	0-30
WATER BOARD	Manawatu	LONG AXIS (km)	1.2 (NW)
MAP REF (NZMS1)	N152 745000	MEAN DEPTH (m)	1.0 (RWB)
MAP REF (260 ser.)	S25 981600	MAX DEPTH (m)	1.0 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.55
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	4.08
MAIN OUTFLOW	Waiwiri Stream	CATCHMENT No. (MWD)	322000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	342 PAPAITNG

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	70.8	flat (0–3°)	26.5
sand dune	-	tussock	-	undulating (4–7°)	58.1
cropland	16.9	lakes	12.3	rolling (8–15°)	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	3.2
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-
native forest	-	urban	-	steep (26–35°)	-
exotic forest	-	other	-	very steep (>35°)	-
				lakes	12.3

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	3.2	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	9.6	-	-	-	-
deposition	-	-	-	-	-
negligible	75.0				
lakes	12.3				

GENERAL REMARKS

- SW of Levin (351)
- scattered raupo and sedge stands (136)
- two small islands (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953*	Cunningham *et al*	Survey of dune lakes (1949).
137	1980*	Currie & Gilliland	Baseline water quality survey (1978).
351	1975a	Irwin	Checklist of NZ lakes.
-	1979*	RWB pers comm	Water clarity data (1976-78).

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

LAKE PAPAITONGA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 63%	t°C 21	date January 1949		136
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single measurement (136). Oxygen not depleted 1976-78 (RWB).				

TEMPERATURE (°C)			REFS
min 8.5 (6/78)	(surface) -	(bottom)	137
max 21 (1/49)	(surface) 21 (1/49)	(bottom)	136
max difference top to bottom 0			136
stratification mixed			136
Remarks: 2 readings, single visit (136).			

SECCHI DISC DEPTH (m)			REFS
min 0.35	date May 1977		RWB
max 0.9	date October 1978		RWB
mean 0.5	n 5	period 5/78-6/78	137
period of worst clarity -			
causes -			
Remarks: 5 visits, 1 site (137).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms algal blooms not observed			RWB
algae -			
Remarks:			

pH READINGS		REFS
min 7.7	date June 1978	137
max 9.0	date June 1978	137
Remarks: 5 visits, 1 site (137).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	136,RWB		
Remarks: Extensive low density beds of *Typha*, sparse beds of submergent weeds confined to shallows (RWB).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	137
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks:	

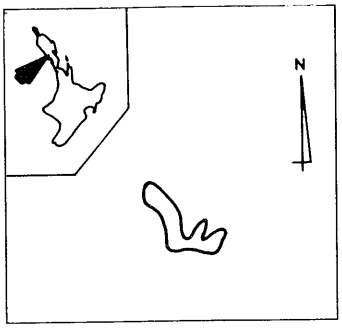
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,137	particulates	137
major ions	137	redox	-
trace elements	-	salinity	137
organic matter	-	alkalinity	137
toxic organics	-	hardness	137
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PARAWANUI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	30.61
WATER BOARD	Northland	LONG AXIS (km)	0.7 (NW)
MAP REF (NZMS1)	N27 376552	MEAN DEPTH (m)	3.0 (RWB)
MAP REF (260 ser.)	P08 873709	MAX DEPTH (m)	5.0 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.13
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	2.99
MAIN OUTFLOW	no surface outlet	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	50 PARAWN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-74)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	99.7
sand dune	0.3	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°)	99.7
strongly rolling (16–20°)	0.3
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	-	-	26.4	0.3	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	73.2	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- SW of Te Kopuru township (351).
- in coastal sand dunes (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
83	1980	Cassie & Freeman	Chemical parameters and phytoplankton (1976-77).
351	1975a	Irwin	Checklist of NZ lakes.
-	-	RWB pers comm	

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

LAKE PARAWANUI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 6.0 g m^{-3}	t°C 18.5	date December 1976		83
max 11.2 g m^{-3}	t°C 12.5	date September 77		83
mean n.s.	n 3	period 12/76-9/77		83
period of lowest oxygen summer				83
Remarks: 3 visits, 4 depths in deepest part of lake (83).				

TEMPERATURE (°C)		REFS
min 12.7 (9/77) (surface)	12.5 (9/77) (bottom)	83
max 23.5 (12/76) (surface)	18.5 (12/76) (bottom)	83
max difference top to bottom 5°C		83
stratification brief period in summer		83
Remarks: 3 visits, 4 depths (83).		

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, Cocconeis, Gonatozygon*			83
Remarks:			

pH READINGS		REFS
min 6.9	date May 1977	83
max 7.1	date September 1977	83
Remarks: 3 visits, 4 depths, 1 site (83).		

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

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	83
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	83
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	83	particulates	-
major ions	-	redox	-
trace elements	-	salinity	83
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PAURI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min	0 g m^{-3}	t °C n.s.	date 1978-1979	RWB
max	12.2 g m^{-3}	t °C n.s.	date 1978-1979	RWB
mean	-	n -	period -	
period of lowest oxygen	-			
Remarks: Periods of low oxygen occur (RWB).				

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	1.4	date February 1978	385
max	1.6	date March 1982	579
mean	-	n - period -	
period of worst clarity	-		
causes	algae		385
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min	-	date -	
max	-	date -	
mean	5.5 mg m^{-3}	n 1 date 3/82	579
period of blooms	late summer		RWB
algae	*Anabeana, Volvox, Peridinium*		136
Remarks: Abundant algae (385).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Polamogeton crispus*	385
Ludwigia	385	*P. ochreatus*	385
Phormium	385	*P. cheesemanii*	385
		Ranunculus fluitans	385
Remarks: No vegetation below 4 m (385).			

TROPHIC STATUS	BASIS	REFS
oligotrophic?	Total P, Chlorophyll	579
moderately eutrophic	algae, macrophytes	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136,385
macrophytes	136,385
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	136
Remarks: Minimal data (136).	

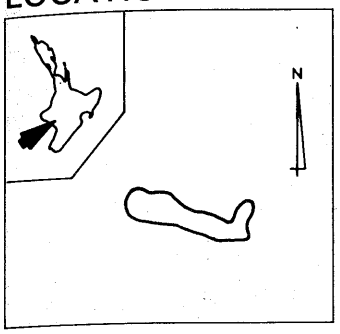
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PAURI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wanganui	ALTITUDE (m a.s.l.)	46
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	1.1 (WNW)
MAP REF (NZMS1)	N138 627809	MEAN DEPTH (m)	6.3 (RWB)
MAP REF (260 ser.)	R23 894342	MAX DEPTH (m)	14.9 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.23
MAIN INFLOW	surface stream from Lake Rotoka	CATCHMENT AREA (km^2) (land and lake)	3.60
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	301 PAURI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	100	flat (0–3°)	37.2	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	12.5	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	24.7	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	25.6	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	24.7	soil slip	-	-	-	-	-
native forest	-	urban	-	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	75.3				
						lakes	n.d.				

GENERAL REMARKS

- SE of Durie Hill (351)
- coastal lake (351)
- used for fishing, boating, eeling (RWB)
- stock and domestic water supply (RWB)

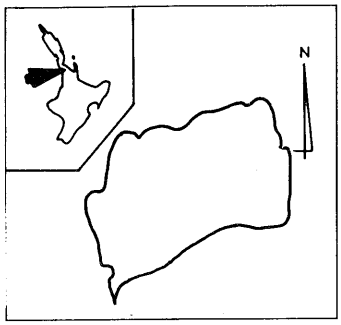
INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1949).
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1978-79).
579	1982	Vant	Trophic status (1982).

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

LAKE POKORUA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Franklin	ALTITUDE (m a.s.l.)	0-30
WATER BOARD	Auckland	LONG AXIS (km)	0.7 (EW)
MAP REF (NZMS1)	N47 157188	MEAN DEPTH (m)	2.6 (136)
MAP REF (260 ser.)	Q12 552442	MAX DEPTH (m)	4.5 (136)
LAKE TYPE	dune	LAKE AREA (km^2)	0.26
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	5.02
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	91 POKORUA

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	99.4	flat (0–3°)	37.6	type \ severity	1	2	3	4	5
sand dune	0.6	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	0.6	wind	-	-	-	0.6	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	61.8	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	-	soil slip	60.2	-	-	-	-
native forest	-	urban	-	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	39.2				
						lakes	n.d.				

GENERAL REMARKS

- W of Kohekohe township (351)
- adjacent to coastal sand dunes (136)
- sheltered shoreline (136)
- peaty margin (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
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 POKORUA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 95%	t°C 19	date January 1950		136
max -	t°C -	date -		-
mean -	n -	period -		-
period of lowest oxygen -				
Remarks: Single reading (136).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 19 (1/50)	(surface) 19 (1/50)	(bottom)	136
max difference top to bottom 0°C			136
stratification mixed			136
Remarks: Two readings only (136).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 1.0	date January 1950		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single reading, windy day (136).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Peridinium, Staurastrum, Pediastrum*			136
Remarks:			

pH READINGS		REFS
min 6.4	date January 1950	136
max 6.6	date January 1970	136
Remarks: Two readings (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis	136	*Potamogeton ochreatus*	136
		Chara australis	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	136
Remarks:	

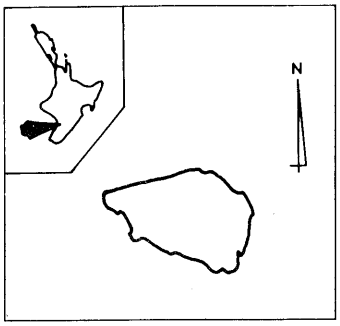
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	136	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	136
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

PUKEPUKE LAGOON

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Manawatu	ALTITUDE (m a.s.l.)	0-10
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.7 (NW)
MAP REF (NZMS1)	N148 782368	MEAN DEPTH (m)	0.58 (RWB)
MAP REF (260 ser.)	S24 025935	MAX DEPTH (m)	1.2 (385)
LAKE TYPE	dune	LAKE AREA (km²)	0.17
MAIN INFLOW	surface inflow present	CATCHMENT AREA (km²) (land and lake)	26.23
MAIN OUTFLOW	surface outflow present	CATCHMENT No. (MWD)	-
LEVEL CHANGES	4.3 - 4.7 m	DATA BASE CODE (MAF)	327 PUKEPUKE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	94.0
sand dune	5.1	tussock	-
cropland	-	lakes	0.8
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	0.1	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	84.4
undulating (4–7°)	1.3
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	13.5
steep (26–35°)	-
very steep (>35°)	-
lakes	0.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	27.4	9.5	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	62.3				
lakes	0.8				

GENERAL REMARKS

- NNE of Himatangi Beach, adjacent to sandhills 3 km from coast (351)
- hard, slightly saline water (329)
- severe drought in summer 1969-70 (329)
- very shallow, surrounded by raupo (136)
- rafts of decaying weed (136)
- stock and domestic water supply (RWB)
- wildlife reserve (RWB)
- this lake is an Internal Affairs research area (see 499)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
65	1973	Caithness	Review of research on lake.
136	1953	Cunningham *et al*	Survey of dune lakes (1949).
196	1975	Flint	Phytoplankton.
229	1973	Gibbs	Drought induced macrophyte and plankton changes (1970-73).
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
499	1976	Potts	Review of limnology.
-	1979	RWB pers comm	Water quality data (1979).
579	1982	Vant	Trophic status (1982).

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

PUKEPUKE LAGOON

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min 4.2	t°C n.s.	date 1977-78	RWB
max -	t°C -	date -	
mean -	n -	period -	
period of lowest oxygen -			
Remarks: 108% at surface (136).			

TEMPERATURE (°C)			REFS
min 6 (6/72)	(surface) -	(bottom)	229
max 30 (2/73)	(surface) -	(bottom)	229
max difference top to bottom n.a. too shallow			229
stratification mixed			136,229
Remarks: 4 sites, sampled monthly 2/70 - 2/73 (229).			

SECCHI DISC DEPTH (m)			REFS
min 0.12	date n.s.		RWB
max 1.2	date n.s.		RWB
mean 0.58	n 32	period 1977-78	RWB
period of worst clarity autumn			229
causes algae			229
Remarks: Average = 0.85 m for samples taken 2/70-2/73 (229). Single value = 0.8 m (579).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min @ 2 mg m^{-3}	date pre 4/71		229
max @ 490 mg m^{-3}	date 2/73		229
mean -	n 20	date 2/70-2/73	229
period of blooms blue green blooms recorded			229
algae *Merismopedia, Actinostrum, Chlamydomonas*			196
Remarks: Algae cont.- *Oocystis, Cyclotella* (196). Macrophytes throughout lake covered in brown fungal and algae growth (385).			

pH READINGS		REFS
min 7.5	date n.s.	229
max 9.4	date n.s.	229
Remarks: From 16 samples, 2/70 - 2/73 (229). Single visit, pH = 8.4, 1/49 (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	*Potamogeton crispus*	385,RWB
		P. pectinatus	385,RWB
		P. cheesemanii	385
		Myriophyllum elatinoides	385
		Ranunculus fluitans	RWB
Remarks: *Veronica anagallis - aquatica* locally dominant at east end (385).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae, water quality	229
eutrophic	Total P, Chlorophyll	579
eutrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	196, 229
macrophytes	136,229,385
zooplankton	65
macroinvertebrates	-
fish	136
wildlife	136
Remarks: Blooms of *Daphnia carinata* (zooplankton), e.g., June, November 1970; February 1972 (65).	

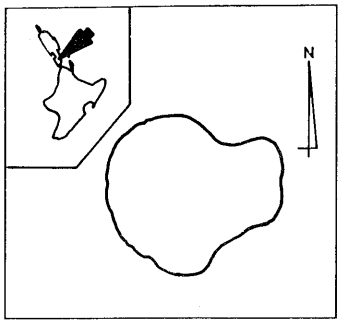
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,229,579	particulates	229
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	229
toxic organics	-	hardness	229
pigments	-	silica	136,229
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE PUPUKE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitemata	ALTITUDE (m a.s.l.)	0.3
WATER BOARD	Auckland	LONG AXIS (km)	1.3 (NE)
MAP REF (NZMS1)	N42 284690	MEAN DEPTH (m)	34.0
MAP REF (260 ser.)	R11 678898	MAX DEPTH (m)	55
LAKE TYPE	volcanic	LAKE AREA (km^2)	1.63
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	2.79
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	025000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	77 PUPUKE

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	-	flat (0–3°)	66.3	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	33.7	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	66.3	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	33.7	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	66.3				
						lakes	33.7				

GENERAL REMARKS

- N of Auckland (351)
- urban catchment
- formerly named Lake Takapuna (107)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
9*	1979	Auckland Regional Water Board	Preliminary appraisal (1976-79).
14	1966	Barker	Physico-chemical factors.
15	1967	Barker	Limnology.
16*	1970	Barker	Physico-chemical features (1966-67).
43	1975	Brown	Ecology of macrophytes.
65	1973	Caithness	Research of Pupuke.
78	1976a	Cassie	Phytoplankton.
79	1976b	Cassie	Phytoplankton.
80	1977	Cassie	Phytoplankton.
92	1975	Chapman *et al*	Zooplankton.
107	1896	Cheeseman	Establishment of *Vallisneria*.
247	1966	Green	Zooplankton.
248	1967	Green	Zooplankton.
271	1975	Healy	Lake origin.
351	1975a	Irwin	Checklist.
498	1900	Pond	Chlorine content.
509*	1976	Reid	Baseline water quality survey (1975-76).
554*	1975c	Stout	Brief discussion of water chemistry and plankton.
580*	1984	Vant & Davies-Colley	Water clarity (1982).
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 PUPUKE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 0.1% g m^{-3} t°C n.s. date n.s.	9
max 11.4 g m^{-3} t°C n.s. date November 1967	16
mean 6 g m^{-3} n 150 period 11/66-11/67	16
period of lowest oxygen late summer	9,16
Remarks: Profile graphs, single site (16).	

TEMPERATURE (°C)	REFS
min 12 (8/76) (surface) 11.3 (8/76) (bottom)	16
max 24.2 (1-4/67) (surface) 14.5 (1/67) (bottom)	16
max difference top to bottom 11.2	16
stratification stratified in summer	9,16,554
Remarks: Strongly stratified January to late April (16).	

SECCHI DISC DEPTH (m)	REFS
min 1.0 date December 1966	16
max 5.5 date n.s.	16
mean n.s. n 23 period 11/66-11/67	16
period of worst clarity summer	16
causes phytoplankton	16,580
Remarks: Single site, frequent visits (16).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min 0 mg m^{-3} date August 1967	16
max 145 mg m^{-3} date January 1967	16
mean 40 mg m^{-3} n 23 date 11/66-11/67	16
period of blooms bluegreen blooms	9,554
algae *Closterium, Staurastrum*	554
Remarks: Abundant phytoplankton (16).	

pH READINGS	REFS
min 6.9 date n.s.	9
max 9.5 date December 1965	16
Remarks: 138 readings, 1 site, taken frequently at 6 depths (16).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Vallisneria gigantea	9,107
Remarks: Unusual weed species (9).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	9
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	9,509
phytoplankton (algae)	9,78,79,80,554,580
macrophytes	9,43,107
zooplankton	92,247,248,554
macroinvertebrates	609
fish	9,16
wildlife	9
Remarks:	

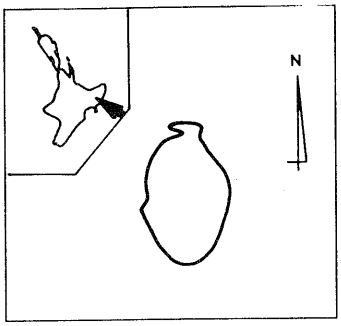
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	9,16,554	particulates	9,580
major ions	9,16,509, 554	redox	9
trace elements	9	salinity	9,554
organic matter	-	alkalinity	16,554
toxic organics	-	hardness	-
pigments	9,580	silica	554
optical properties	9,509,580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE REPONGAERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Cook	ALTITUDE (m a.s.l.)	0.30
WATER BOARD	Poverty Bay	LONG AXIS (km)	1.1 (N)
MAP REF (NZMS1)	N98 262458	MEAN DEPTH (m)	1.0 (RWB)
MAP REF (260 ser.)	Y18 345781	MAX DEPTH (m)	1.0 (RWB)
LAKE TYPE	-	LAKE AREA (km^2)	0.54
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	3.48
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	197051
LEVEL CHANGES	-	DATA BASE CODE (MAF)	209 REPONGR

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	100	flat (0–3°)	29.6	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	1.4	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	69.0	soil slip	70.4	-	-	-	-
native forest	-	urban	-	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	29.6				
						lakes	n.d.				

GENERAL REMARKS

- NW of Gisborne, W of Waipoa River (351).
- stockwatering, duckshooting (RWB pers comm).

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Trophic status, but no parameters measured.

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

LAKE REPONGAERE

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 -				
Remarks: Abundant phytoplankton (RWB).				

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	algae	RWB
Remarks: Advanced state of natural eutrophication (RWB).		

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

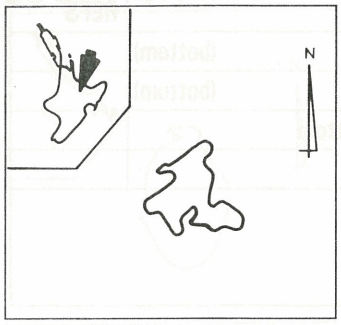
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE REREWHAKAAITU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	438
WATER BOARD	Bay of Plenty	LONG AXIS (km)	3.8 (N)
MAP REF (NZMS1)	N86 951841	MEAN DEPTH (m)	7.0
MAP REF (260 ser.)	V16 157165	MAX DEPTH (m)	15.8 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	7.47
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	40.56
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	274000
LEVEL CHANGES	425-437 m a.s.l.	DATA BASE CODE (MAF)	189 REREWKT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	82.1
sand dune	-	tussock	-
cropland	-	lakes	17.9
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	17.2
undulating (4–7°)	12.6
rolling (8–15°)	23.5
strongly rolling (16–20°)	15.4
moderately steep (21–25°)	13.1
steep (26–35°)	0.3
very steep (>35°)	-
lakes	17.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	16.9	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	1.1	-	-	-	-
deposition	-	-	-	-	-
negligible	64.1				
lakes	17.9				

GENERAL REMARKS

- N of Rerewhakaaitu township (351)
- originated 11,000 years ago (271)
- subjected to further volcanic explosions, lahars 930 years ago (564)
- main lake shallow and exposed, connected to a deeper more sheltered crater lake named Awaatu (381)
- water in main lake affected by agricultural runoff (428)
- main outlet periodically clogs with weed and silt (564)
- three islands (351)
- popular for fishing and boating (428)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
93*	1981	Chapman *et al*	General limnology (1971-74).
169	1969a	Fish	Oxygen content (up to 1968).
180*	1978	Fish	Discussion of phosphate content (1972-74).
271	1975	Healy	Lake origin.
331	1970a	Irwin	Bathymetric chart.
351	1975	Irwin	Checklist of NZ lakes.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology (up to 1958).
381*	1975	Jolly and Flint	Limnological variations within lake.
428*	1975	McColl	Chemical and biological conditions (1970-71).
-*	1974	MAF pers comm	Water quality data (1972-73).
511	1975	Richmond	Trophic status.
538	1973	Stephens	Land use survey.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
597	1980	White & Payne	Phosphorus dynamics.

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

LAKE REREWHAKAAITU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 0 g m^{-3}	**t °C** n.s.	**date** pre 1968		93,169
max 7 g m^{-3}	**t °C** 16	**date** October 1973		93
mean n.s.	**n** 100	**period** 1971-7/74		93
period of lowest oxygen summer, autumn				93,169
Remarks: Profile graph (93). 1 site, numerous visits (93). No deoxygenation recorded (428).				

TEMPERATURE (°C)			REFS
min 6.9 (7/55)	**(surface)** 6.5 (n.s.)	**(bottom)**	378,381
max 24 (n.s.)	**(surface)** 20 (n.s.)	**(bottom)**	93,180, 378,381
max difference top to bottom 16° C			93
stratification stratified summer and autumn			169
Remarks: Not stratified (378); temporary stratification only (93, 381); often stratified (180). Heat budget calculated (93, 180). Stratified in summer (428).			

SECCHI DISC DEPTH (m)			REFS
min 1.2	**date** November 1974		180
max 3	**date** April 1973		93
mean 2.0	**n** 100	**period** 10/72-11/74	180
period of worst clarity n.s.			
causes silt, wind and unstable bottom			93,381
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 12.7 mg m^{-3}	**date** January 1973		180
max 31.9 mg m^{-3}	**date** September 1974		180
mean 13.1 mg m^{-3}	**n** 100	**date** 10/72-11/74	180
period of blooms -			
algae *Cyclotella, Synedra, Cosmarium*			93
Remarks: Algae cont. - *Cosmocladium, Staurastrum* (93). Heavy growth of phytoplankton (169).			

pH READINGS		REFS
min 7.4	**date** 8/73-9/74	180
max 8.8	**date** 8/73-9/74	180
Remarks: Part of fisheries survey run at same time (180).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
Remarks: No introduced macrophytes (428).			

TROPHIC STATUS	BASIS	REFS
not higher than mesotrophic	physico-chemical	MAF
oligotrophic	algae (crater lake)	93
eutrophic	algae (?)	169
mesotrophic	algae (main lake)	93
Remarks: Not eutrophic (180); probably became eutrophic in 1954 (169). A difficult lake to classify (MAF). Agricultural enrichment (428).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	93,169,180,381
macrophytes	428
zooplankton	92,93,180,381
macroinvertebrates	180
fish	-
wildlife	-
Remarks:	

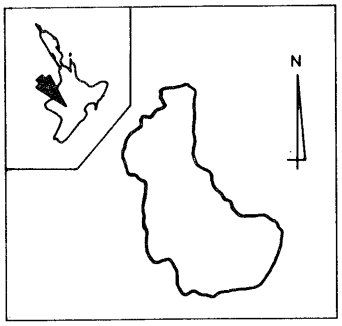
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	93,169,180, 378	**particulates**	-
major ions	93,169	**redox**	93
trace elements	93	**salinity**	169
organic matter	-	**alkalinity**	169,378
toxic organics	-	**hardness**	-
pigments	-	**silica**	169,378
optical properties	-	**other** Dmax	MAF
Remarks: No reactive phosphate found at any time in main lake (180).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOAIRA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo	ALTITUDE (m a.s.l.)	564
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	6.3 (WNW)
MAP REF (NZMS1)	N112 199928	MEAN DEPTH (m)	8.9 (343)
MAP REF (260 ser.)	T19 446350	MAX DEPTH (m)	14.6 (351)
LAKE TYPE	volcanic, reservoir	LAKE AREA (km^2)	15.32
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	130.81
MAIN OUTFLOW	to Lake Taupo	CATCHMENT No. (MWD)	434682
LEVEL CHANGES	-	DATA BASE CODE (MAF)	241 rAIRA

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	5.4	pasture	2.4	flat (0–3°)	10.9	type \ severity	1	2	3	4	5
sand dune	-	tussock	11.3	undulating (4–7°)	7.4	sheet	-	1.3	-	-	-
cropland	-	lakes	11.6	rolling (8–15°)	15.1	wind	-	-	0.6	-	0.2
lowland scrub	34.7	rivers	-	strongly rolling (16–20°)	15.4	scree creep	-	2.3	-	2.1	-
subalpine scrub	6.6	ice and snow	0.2	moderately steep (21–25°)	11.6	soil slip	-	-	-	-	-
native forest	15.0	urban	-	steep (26–35°)	23.6	earth slip	-	-	-	-	-
exotic forest	12.8	other	-	very steep (>35°)	4.3	slump	-	-	-	-	-
				lakes	11.6	debris avalanche	2.3	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	8.3	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	1.3	-	-	-	-
						deposition	-	-	-	-	-
						negligible	69.8				
						lakes	11.6				

GENERAL REMARKS

- SW of Mt Pihanga (351)
- created 120,000 years ago (271)
- water chemistry is strongly influenced by the geology (496)
- used for hydro-electric power
- lake also used for angling, boating, and wildlife refuge (560)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Define relation between productivity and trout environment (1970).
52	1975	Burnet & Wallace	Trophic status and trout environment.
92	1975	Chapman *et al*	Zooplankton.
116	1978	Clayton	Macrophytes.
-	1979	Cudby & Fish MAF pers comm	Description of predevelopment state of lake (1968-72).
185	1973	Fisheries Division	Trout fishery.
200	1975	Forsyth	Benthic fauna.
226	1975	Freshwater Section	Power scheme impact.
271	1975	Healy	Origin of lake.
310	1970	Interdepartmental Committee	Watershed protection.
320	1972b	Internal Affairs	Lake valuation.
343	1973a	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	McColl MWD pers comm	pH, water quality.
496	1923	Phillips & Grigg	Geochemistry and trout conditions (1920).
505	1977	Rawlence & Whitton	Chemical composition of macrophytes, plankton, water, sediments (1972).
560	1979	Strachan	Resource survey, macrophytes.
592	1977b	White	Power scheme effects.

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

LAKE ROTOAIRA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 2.7 g m^{-3}	t°C n.s.	date 1/72		Cudby & Fish p.c.
max 12.3 g m^{-3}	t°C n.s.	date 7/69		Cudby & Fish p.c.
mean n.s.	n 80	period 1968-72		Cudby & Fish p.c.
period of lowest oxygen brief				Cudby & Fish p.c.
Remarks: Single site (Cudby & Fish p.c.). Stratification during calm periods can lead to severe oxygen depletion (McColl p.c.).				

TEMPERATURE (°C)				REFS
min 5.4 (7/69)	(surface) 5.3 (n.s.)	(bottom)		Cudby & Fish p.c.
max 22.3 (n.s.)	(surface) 19.5 (n.s.)	(bottom)		Cudby & Fish p.c.
max difference top to bottom 2.8°C				Cudby & Fish p.c.
stratification weakly stratified only				Cudby & Fish p.c.
Remarks: Single site sampled each fortnight for 3½ years (MAF). During calm periods stratification can be marked (MWD).				

SECCHI DISC DEPTH (m)			REFS
min 1.5	date 2/69		Cudby & Fish p.c.
max 7.9	date 12/69		Cudby & Fish p.c.
mean 4.0	n 80	period 1968-72	Cudby & Fish p.c.
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min n.s.	date n.s.		MAF
max 13 mg m^{-3}	date 3/70		Cudby & Fish p.c.
mean n.s.	n 63	date 1968-72	Cudby & Fish p.c.
period of blooms n.s.			Cudby & Fish p.c.
algae *Nostoc, Anabaena, Microcytis, Staurastrum, Melosira*			Cudby & Fish p.c.
Remarks: Numerous Chlorophyceae, some diatoms (496). Phytoplankton recorded prior to hydro-development (Cudby & Fish p.c.).			

pH READINGS		REFS
min -	date -	
max 7.9	date 4/65	McColl p.c.
Remarks: Single reading (McColl p.c.).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea	116,560
		Ranunculus	116,560
Remarks:			

TROPHIC STATUS	BASIS	REFS
mesotrophic	general limnology	Cudby & Fish p.c.
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	Cudby & Fish p.c.,53 ,496,505
macrophytes	116,505,560
zooplankton	92
macroinvertebrates	200,496
fish	185,496
wildlife	-
Remarks:	

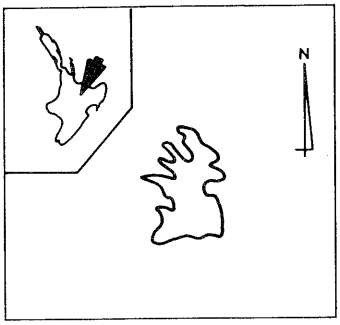
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	53,496,505	particulates	496
major ions	496,505	redox	McColl p.c., 53
trace elements	505	salinity	McColl p.c.
organic matter	-	alkalinity	-
toxic organics	-	hardness	McColl p.c.
pigments	-	silica	-
optical properties	-	other smell	496
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOEHU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	295
WATER BOARD	Bay of Plenty	LONG AXIS (km)	4.6 (N)
MAP REF (NZMS1)	N77 993175	MEAN DEPTH (m)	8.16 (348)
MAP REF (260 ser.)	V15 204469	MAX DEPTH (m)	13.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	8.11
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	42.25
MAIN OUTFLOW	subsurface drainage	CATCHMENT No. (MWD)	147071
LEVEL CHANGES	see reference 497, 564	DATA BASE CODE (MAF)	141 rEHU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	42.9
sand dune	-	tussock	-
cropland	-	lakes	16.1
lowland scrub	14.3	rivers	-
subalpine scrub	-	ice and snow	-
native forest	18.7	urban	-
exotic forest	8.0	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	3.7
undulating (4–7°)	2.3
rolling (8–15°)	9.0
strongly rolling (16–20°)	9.9
moderately steep (21–25°)	23.5
steep (26–35°)	34.4
very steep (>35°)	1.1
lakes	16.1

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	26.9	9.9	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	14.4	0.5	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	32.1				
lakes	16.1				

GENERAL REMARKS

- NW Kawerau (351)
- in drowned valley (378)
- originated 42,000 years ago (271)
- dammed by lava flow barrier (564)
- hot springs on shore (271)
- tourism, angling, wildlife, scenic values high (428)
- partially affected by farming (428)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
62	1973	Burstall	Effects of diversion to L Rotoiti.
73	1973	Cassie	Phytoplankton.
74	1974a	Cassie	Phytoplankton.
75	1974b	Cassie	Phytoplankton.
81*	1978	Cassie	Phytoplankton seasonal changes in density (1973-74).
92	1975	Chapman *et al*	Zooplankton.
98	1970a	Chapman	History of lakeweed infestation.
158	1973	Eggleston	Diversion scheme.
168	1968	Fish	Trout population (1963-64).
169*	1969a	Fish	Oxygen content (up to 1968).
171*	1970a	Fish	Limnological study and heat budget (1960-66).
186	1973	Fisheries Research Division	Diversion consequences.
196	1975	Flint	Phytoplankton.
271	1975	Healy	Origin of lake.
312	1969	Internal Affairs	Weed survey.
325*	1968	Irwin	Temperature (1966).
348	1974b	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
378*	1968	Jolly	Comparative limnology of some NZ lakes.
427	1974b	McColl	Trophic status.
428*	1975	McColl	Chemical and biological conditions (1970-71).
497	1968	Pittams	Water balance and water level fluctuations (1966-67).
511	1975	Richmond	Water chemistry.
564	1977	Taylor *et al*	Groundwater influences (1970-73).

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

LAKE ROTOEHU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0%	t°C n.d.	date pre 1975			511
max 145%	t°C n.s.	date 1973-74			81
mean -	n -	period -			
period of lowest oxygen none observed					169,171,378
Remarks: Most references indicate that low oxygen does not occur.					

TEMPERATURE (°C)					REFS
min 5 (1973-4)	(surface) 8 (7/65)	(bottom)			81,171
max 22.5 (1/65)	(surface) 21 (3/56)	(bottom)			171,378
max difference top to bottom 3.8°C					81
stratification mixed, rarely stratified					81,168,169, 171,325,378
Remarks: Isotherms irregular (325).					

SECCHI DISC DEPTH (m)			REFS
min 4.0	date 8/55, 2/56		378
max 5.6	date October 1955		378
mean 4.5	n 12	period 1955-56	378
period of worst clarity n.s.			378
causes n.s.			378
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		-
max -	date -		-
mean -	n -	date -	-
period of blooms -			-
algae *Melosira, Aphanizomenon*			81
Remarks: Blooms present (81, 169). Other algal species include *Stephanodiscus, Eudorina, Cryptomonas* (81, 196).			

pH READINGS		REFS
min 7.4	date 6/56	378
max 8.3 (mean)	date 4/70-4/71	428
Remarks: Mean of 4 readings (428).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea	169
Remarks: Extensive growths (169).			

TROPHIC STATUS	BASIS	REFS
mesotrophic	algae, physico-chemical	168
extremely eutrophic	algae	81
eutrophic	physico-chemical	427
eutrophic	algae	196
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	73,74,75,81,171,196
macrophytes	98,171,312
zooplankton	92
macroinvertebrates	168
fish	168
wildlife	-
Remarks:	

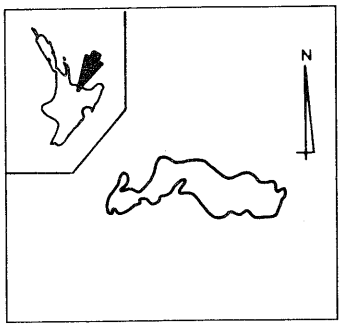
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	378	particulates	-
major ions	81,428	redox	-
trace elements	81,171,428	salinity	81,428
organic matter	-	alkalinity	171,378
toxic organics	-	hardness	-
pigments	-	silica	168,378, 428
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOITI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	279
WATER BOARD	Bay of Plenty	LONG AXIS (km)	15.0 (NNE)
MAP REF (NZMS1)	N76 844168	MEAN DEPTH (m)	31.53 (118)
MAP REF (260 ser.)	V15 104465	MAX DEPTH (m)	93.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	33.48
MAIN INFLOW	from Lake Rotorua	CATCHMENT AREA (km²) (land and lake)	120.56
MAIN OUTFLOW	Kaituna River	CATCHMENT No. (MWD)	146060
LEVEL CHANGES	278-279 m a.s.l.	DATA BASE CODE (MAF)	144 rITI1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	32.2
sand dune	1.2	tussock	0.8
cropland	-	lakes	27.8
lowland scrub	9.9	rivers	-
subalpine scrub	-	ice and snow	-
native forest	23.2	urban	-
exotic forest	5.1	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	3.8
undulating (4–7°)	6.0
rolling (8–15°)	8.9
strongly rolling (16–20°)	16.1
moderately steep (21–25°)	20.6
steep (26–35°)	13.1
very steep (>35°)	3.8
lakes	27.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.9	2.1	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	4.9	1.8	1.9	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	1.9	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	0.9	-	-	-	-
negligible	43.8				
lakes	27.8				

GENERAL REMARKS

- NE Rotorua city (351)
- originated 42,000 years ago (271)
- shallow western basin a distinct limnological entity (182)
- popular for fishing, boating, tourism, highly scenic
- hot springs in bed and on shore (182)
- water quality largely unaffected by limited mixing with Rotorua waters (169)
- increasing number of holiday homes and septic tanks (169)
- partially affected by farming (378)
- annual drainage about 13% of main basin volume (564)
- high albumin nitrogen in water (496)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
42	1970	Brown	Submerged macrophytes.
43	1975	Brown	Ecology of macrophytes.
51	1973	Burnet & Wallace	Primary productivity, nutrients, trout (1969-70).
52	1975	Burnet & Wallace	Eutrophication and trout.
60	1967	Burstall	Weed control.
61	1972	Burstall	Environmental impact.
62	1973	Burstall	Effects of diversion from L Rotoehu.
68	1966	Carr	Phytoplankton and phytonecton.
73	1973	Cassie	Phytoplankton.
74*	1974a	Cassie	Phytoplankton (1966-69).
75	1974b	Cassie	Phytoplankton.
76	1974c	Cassie	Phytoplankton.
77	1975	Cassie	Phytoplankton.
81*	1978	Cassie	Seasonal changes in phytoplankton density (1973-74).
86	1969	Chapman	Zooplankton.
87	1973a	Chapman	Zooplankton.
92	1975	Chapman *et al*	Zooplankton.
95	1967a	Chapman	Preliminary macrophyte survey.
97	1969	Chapman	Macrophyte research.
98	1970a	Chapman	History of lake weed infestation.
103	1971a	Chapman *et al*	Submerged vegetation.
104	1971b	Chapman *et al*	Submerged vegetation.
118	1970	Coffey	*Lagarosiphon* weed study.
119	1971	Coffey	Macrophytes and diquat.
147	1974	Devcich	Crayfish biology.
158	1973	Eggleston	Diversion scheme.
160	1972	Evison & Calhaem	Heat flow.

(REFERENCE LIST CONTINUED IN APPENDIX)

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

LAKE ROTOITI (N.I.)

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0 g m^{-3}	t°C 17.0	date 4/70			178
max 10.5 g m^{-3}	t°C 10.3	date 7/68			178
mean n.s.	n 80	period 1967-70			178
period of lowest oxygen April-May					178
Remarks: Frequent sampling at 4 sites (178). Low or zero oxygen also reported in summer (74,81,166,169,182,378).					

TEMPERATURE (°C)	REFS
min 9.4 (7/69) (surface) 10.0 (7/69) (bottom)	178
max 26 (1/65) (surface) 20.5 (2/64) (bottom)	166
max difference top to bottom 11.7°C	325
stratification stable summer stratification	166,169,178, 182,325
Remarks: Most authors report stratification during summer months. Whole lake stratified, not just part (325).	

SECCHI DISC DEPTH (m)			REFS
min 4.5	date 6/56		378
max 9	date 2/56		378
mean 5	n 200	period 1967-70	178
period of worst clarity winter			178
causes -			
Remarks: Intensive sampling at 4 sites for 3 years (178).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 94 "T%"	date 8/64		166
max 30 "T%"	date 5/64		166
mean -	n -	date -	
period of blooms swarms of diatoms and abundant Chlorophyceae, Protozoa			496
algae *Melosira, Peridinium, Asterionella*			81,178
Remarks: Phytoplankton always low (169).			

pH READINGS		REFS
min 5.9	date n.s.	178
max 9.2	date n.s.	238
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Lagarosiphon major	103
		Elodea canadensis	103
Remarks: Excessive weed growths, Arsenic an ineffective weed control (163). Diquat experiment locally effective (166).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	n.s.	178
more oligotrophic than Rotorua	algae	74
moderately eutrophic	biochemical assay	178
mesotrophic	physico-chemical	428
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	51,52,81,178,496
macrophytes	42,163
zooplankton	496
macroinvertebrates	163,166,496
fish	51,52,163,496
wildlife	-
Remarks:	

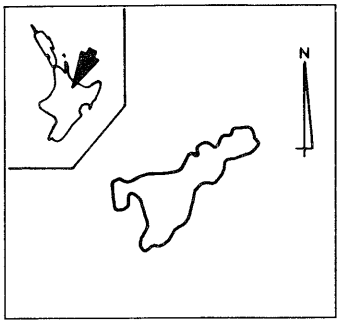
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	81,163,166, 178,182,238	particulates	163,496
major ions	81,163,166, 238,428	redox	-
trace elements	163,428,496	salinity	163
organic matter	-	alkalinity	166,178 182,378
toxic organics	-	hardness	-
pigments	428	silica	163,166,178 378,428
optical properties	-	other Pmax	51
Remarks: Nutrients continued : 378, 428, 496.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOKAKAHI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	394
WATER BOARD	Bay of Plenty	LONG AXIS (km)	4.3 (NE)
MAP REF (NZMS1)	N76 781942	MEAN DEPTH (m)	17.5 (196)
MAP REF (260 ser.)	U16 004262	MAX DEPTH (m)	32.0 (351)
LAKE TYPE	volcanic	LAKE AREA (km^2)	4.48
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	17.45
MAIN OUTFLOW	Wairoa Stream to Lake Tarawera	CATCHMENT No. (MWD)	153132
LEVEL CHANGES	fluctuates 0.3 m (564)	DATA BASE CODE (MAF)	181 rAKAHI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	11.3	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	6.9	-	-	-	-
cropland	-	lakes	25.4	rolling (8–15°)	0.8	wind	-	-	-	-	-
lowland scrub	18.2	rivers	-	strongly rolling (16–20°)	5.5	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	39.7	soil slip	-	-	-	-	-
native forest	3.1	urban	-	steep (26–35°)	28.5	earth slip	-	-	-	-	-
exotic forest	42.1	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	25.4	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	13.8	-	-	-	-
						tunnel gully	3.5	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	50.4				
						lakes	25.4				

GENERAL REMARKS

- SSE of Rotorua City (351)
- also called Green Lake (351)
- 2 islands, Motutawa, Punaruku (351)
- formed by lava barrier (564)
- only Rotorua lake free of *Lagarosiphon major* (42)
- access limited by Maori land ownership (42)
- highly scenic (425)
- limited recreational use (425)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbiology and trophic status (1973).
42	1970	Brown	Submerged vegetation.
43	1975	Brown	Ecology of macrophytes.
92	1975	Chapman *et al*	Zooplankton.
196	1975	Flint	Phytoplankton.
197	1977	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
202	1978	Forsyth	Benthic macroinvertebrates.
232*	1976	Gillespie	Heterotrophic potential and trophic status.
271	1975	Healy	Origin of lake.
325*	1968	Irwin	Temperature (1966, 1967).
332	1970b	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
378*	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
425*	1972	McColl	Chemistry and trophic status (1970-71).
428	1975	McColl	Water chemistry (1970-71).
429	1977	McColl	Relation of sediment chemistry with trophic status.
496	1923	Phillips & Grigg	Geochemistry and trout environment.
511	1975	Richmond	Water chemistry.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
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 ROTOKAKAHI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0%	**t °C**		**date** March-May		425
max 100%	**t °C** n.c.		**date** October 1970		425
mean 40%	**n** 14		**period** 4/70-5/71		425
period of lowest oxygen at least 3 months					425
Remarks: Anoxic in late summer (429). H_2S odor in summer bottom sample (232).					

TEMPERATURE (°C)	REFS
min 9.6 (n.s.) **(surface)** 13.6 (n.s.) **(bottom)**	425
max 22.6 (n.s.) **(surface)** 9.0 (7/55) **(bottom)**	425,378
max difference top to bottom 9°C	425
stratification stratified for 7 months	425
Remarks: Stratified in summer (232).	

SECCHI DISC DEPTH (m)				REFS
min 5.0*		**date** February 1983		580
max 10.5		**date** n.s.		425
mean 7.9	**n** 10	**period** 4/70-5/71		425
period of worst clarity n.s.				425
causes algae				425
Remarks: *Single value only (580).				

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1.0 mg m^{-3}	**date** January 1971		425
max 11.5 mg m^{-3}	**date** July 1970		425
mean 5 mg m^{-3}	**n** 12	**date** 4/70-5/71	425
period of blooms -			
algae *Dinobryon, Synura, Cyclotella, Chlorella*			196,197
Remarks: Algae cont - *Anabaena* (196, 197). A number of diatoms present (496).			

pH READINGS			REFS
min 6.15	**date** February 1973		232
max 7.55	**date** February 1973		232
Remarks: 2 visits, 3 depths, 14 readings (232). Monthly visits, 2 depths pH 6.9-7.8 (425). Mean of 48 readings = 7.4 (428).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
Remarks: Data not checked, see Brown 1975. (ref 43).			

TROPHIC STATUS	BASIS	REFS
mesotrophic	SDH, ATP	35
mesotrophic	chemistry & biology	425,429
mesotrophic?	heterotrophic potential	232
mesotrophic	algae	196,197
Remarks: Sediment chemistry not closely related to trophic status (429).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232
phytoplankton (algae)	196,197
macrophytes	42,43
zooplankton	92
macroinvertebrates	200,202
fish	-
wildlife	-
Remarks:	

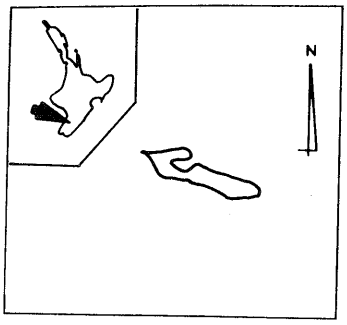
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	378,425,428, 496	**particulates**	496,580
major ions	425,428,496	**redox**	425
trace elements	425	**salinity**	428
organic matter	-	**alkalinity**	378,425
toxic organics	-	**hardness**	-
pigments	425,428,580	**silica**	378,428
optical properties	580	**other** SDH, ATP	35
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOKAUWAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	30-61
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.8 (NW)
MAP REF (NZMS1)	N143 676794	MEAN DEPTH (m)	1.3 (RWB)
MAP REF (260 ser.)	R23 939327	MAX DEPTH (m)	1.9 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.08
MAIN INFLOW	spring fed	CATCHMENT AREA (km²) (land and lake)	1.97
MAIN OUTFLOW	one stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	302 rKAUWAU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	100
sand dune	-	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°)	82.2
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	13.7
moderately steep (21–25°)	4.1
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	4.1	-	-	-	-
wind	13.7	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	82.2				
lakes	n.d.				

GENERAL REMARKS

- NE of Whangaehu, landward side of coastal dunes (351)
- agricultural drainage (RWB)
- tends to be muddy (RWB)
- stock and domestic water supply

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Water clarity data (1978).
579	1982	Vant	Trophic status (1982).

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

LAKE ROTOKAUWAU

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	0.8	date	March 1982	579
mean	0.34	n 6	period n.s.	RWB
period of worst clarity	-			
causes	mud			RWB
Remarks: Single value only (579).				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	22 mg m^{-3}	n 1	date 3/82	579
period of blooms	very extensive algae			RWB
algae	-			
Remarks:				

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

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

TROPHIC STATUS	BASIS	REFS
eutrophic	Chlorophyll, total P	579
Remarks:		

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

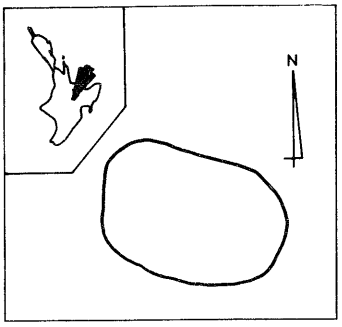
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOKAWA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo	ALTITUDE (m a.s.l.)	341
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	1.3 (EW)
MAP REF (NZMS1)	N94 654443	MEAN DEPTH (m)	2.8 (271)
MAP REF (260 ser.)	U17 788281	MAX DEPTH (m)	27 (271)
LAKE TYPE	volcanic	LAKE AREA (km²)	0.53
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	n.d.
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	210 rKAWA1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED see general remarks)

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

- NE of Taupo (351)
- originated 5,000 years ago, partly by hydrothermal explosion (271)
- also known as Rotokaua and Rotokawau
- Land Resource Catchment data unavailable due to undefined and small catchment area

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
37	1971	Brock & Brock	Microbiology of thermal habitats (1969).
202	1977	Forsyth	Limnology of an acid lake (1975, 1976).
269	1941	Healy	Brief description.
271	1975	Healy	Origin of lake.
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 ROTOKAWA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS.
min 0.2 g m^{-3}	t°C 9.7	date 6/76			202
max n.d.	t°C -	date -			
mean -	n -	period -			
period of lowest oxygen -					
Remarks: 3 visits, 2 sites, 1 sample (202). Low oxygen caused by H_2S bubbles (202).					

TEMPERATURE (°C)				REFS
min 9.2 (6/76)	(surface) 9.7 (6/76)	(bottom)		202
max 41.5 (12/69)	(surface) 16.2 (10/75)	(bottom)		37,202
max difference top to bottom 1.3°C				202
stratification minimal				202
Remarks: 1 reading 12/69 (37). 3 readings at 2 sites, various depths (202).				

SECCHI DISC DEPTH (m)			REFS
min 0.33	date (n.d.)		202
max 1.9	date 10/75		202
mean 0.78	n n.d.	period n.d.	202
period of worst clarity -			
causes algae and silt			202
Remarks: 2 sites, number of readings not specified (202).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.7 mg m^{-3}	date 10/75		202
max 274.1 mg m^{-3}	date 2/76		202
mean -	n -	date -	
period of blooms -			
algae *Euglena, Ulothrix*			202
Remarks:			

pH READINGS		REFS
min 2.1	date 2/76	202
max 2.15	date 10/75	202
Remarks: 3 visits, 2 sites, 15 readings (202).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis	202		
Typha	202		
Remarks:			

TROPHIC STATUS	BASIS	REFS
eutrophic	physico-chemical	202
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	37
phytoplankton (algae)	37,202
macrophytes	202
zooplankton	-
macroinvertebrates	202
fish	-
wildlife	-
Remarks:	

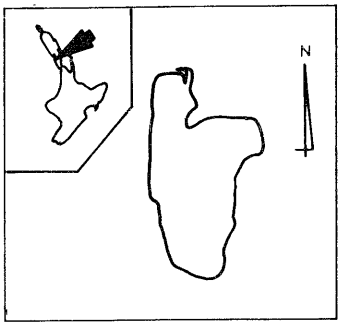
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	202	particulates	202
major ions	202	redox	-
trace elements	-	salinity	202
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	202
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOKAWAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	30-61
WATER BOARD	Northland	LONG AXIS (km)	1.0 (N)
MAP REF (NZMS1)	N33 671209	MEAN DEPTH (m)	4.3 (136)
MAP REF (260 ser.)	P09 134388	MAX DEPTH (m)	12.0 (136)
LAKE TYPE	dune	LAKE AREA (km²)	0.31
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	1.97
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	62 rKAWAU3

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-67)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	100.00	flat (0–3°)	82.2	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	4.1	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	13.7	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	13.7	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	4.1	soil slip	-	-	-	-	-
native forest	-	urban	-	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	82.2				
						lakes	n.d.				

GENERAL REMARKS

- NW of Poutu township (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
347	1974a	Irwin	Water clarity.
351	1975a	Irwin	Checklist of NZ lakes.
-	-	McColl MWD pers comm	Letter from McColl to Fisheries Research Lab Rotorua, 31.5.74.

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

LAKE ROTOKAWAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	n.d.	t°C -	date	-	
max	80%	t°C 22.5	date	2/50	136
mean	-	n -	period	-	
period of lowest oxygen	-				
Remarks: Single visit, single reading (136).					

TEMPERATURE (°C)					REFS
min	-	(surface) -		(bottom)	
max	22.5 (2/50)	(surface)	22.0 (2/50)	(bottom)	136
max difference top to bottom	0.5				136
stratification	mixed				136
Remarks: Single visit only (136).					

SECCHI DISC DEPTH (m)					REFS
min	0.5	date	n.d.		347
max	0.8	date	n.d.		347
mean	0.65	n	n.d.	period n.d.	347
period of worst clarity	-				
causes	-				
Remarks: Sampling strategy not checked.					

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date -	
period of blooms	-			
algae	-			
Remarks: Sparse algae (136).				

pH READINGS				REFS
min	-	date	-	
max	6.4	date	2/50	136
Remarks: Single reading only (136).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis *Cladium*	136 136	*Chara australis*	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	n.d.	McColl p.c.
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks:	

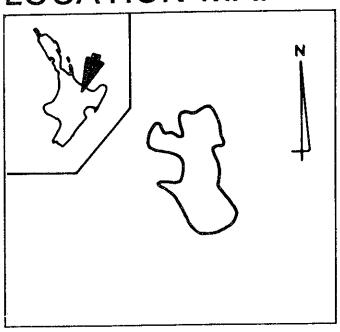
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOMA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	313
WATER BOARD	Bay of Plenty	LONG AXIS (km)	5.2 (N)
MAP REF (NZMS1)	N77 043137	MEAN DEPTH (m)	36.9 (382)
MAP REF (260 ser.)	V15 249433	MAX DEPTH (m)	83.0 (351)
LAKE TYPE	volcanic	LAKE AREA (km^2)	11.16
MAIN INFLOW	Rere Stream & small stream	CATCHMENT AREA (km^2) (land and lake)	33.92
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	147072
LEVEL CHANGES	313-318 m a.s.l.	DATA BASE CODE (MAF)	151 rMA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	37.8	flat (0–3°)	4.7
sand dune	-	tussock	-	undulating (4–7°)	1.2
cropland	-	lakes	32.8	rolling (8–15°)	6.7
lowland scrub	0.1	rivers	-	strongly rolling (16–20°)	0.4
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	23.2
native forest	26.7	urban	1.1	steep (26–35°)	27.8
exotic forest	1.5	other	-	very steep (>35°)	1.9
				lakes	32.8

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	20.4	6.2	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	22.8	1.5	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	15.0				
lakes	34.0				

GENERAL REMARKS

- NW of Kawerau (351)
- lake fills drowned river valley (378)
- water quality partially affected by farming (378)
- lava barrier and explosion crater (564)
- no surface drainage but annual outflow equivalent to 7% of lake volume (564)
- water of fair quality for potable use (496)
- drowned Maori village on submerged island at 10 m depth (271)
- scenic, popular for fishing and boating (425)
- possibly some geothermal input (425)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbiology and trophic status (1973).
74	1974a	Cassie	Phytoplankton.
81	1978	Cassie	Phytoplankton, seasonal change in density (1973-74).
92	1975	Chapman	Zooplankton.
98	1970a	Chapman	History of weed infestation.
116	1978	Clayton	Submerged vegetation.
186	1973	Fisheries Research Division	Report on the consequences of diversion.
196	1975	Flint	Phytoplankton.
197	1977	Flint	Phytoplankton.
202	1978	Forsyth	Benthic macroinvertebrates (1978).
232*	1976	Gillespie	Heterotrophic potential and trophic status (1972, 1973).
271	1975	Healy	Origin of lake.
316	1971b	Internal Affairs	Wildlife Division report on water quality.
323	1967b	Irwin	Bathymetric chart.
325*	1968	Irwin	Temperature (1965, 1967).
351	1975a	Irwin	Checklist of NZ lakes.
378*	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
382	1975	Jolly & Irwin	Thermal conditions.
425*	1972	McColl	Chemistry and trophic status (1970-71).
428	1975	McColl	Chemistry and biological conditions (1970-71).
429	1977	McColl	Sediment chemistry and trophic condition (1972).
496	1923	Phillips & Grigg	Geochemistry and trout conditions (1920).
497	1968	Pittams	Water balance study and level fluctuations (1963-67).
511	1975	Richmond	Water chemistry.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
567	1972	Thomasson	Phytoplankton.

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

LAKE ROTOMA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 50%	t °C n.s.	date autumn		425
max 95%	t °C n.s.	date August 1970		425
mean @ 70%	n 13	period 4/70-5/71		425
period of lowest oxygen rarely or never				425
Remarks: See also ref 511. Always well oxygenated (429).				

TEMPERATURE (°C)	REFS
min 10.1 (8/72) (surface) 10.0 (8/72) (bottom)	232
max 24.0 (n.s.) (surface) 17.6 (2/73) (bottom)	425,232
max difference top to bottom 12.6°C	425
stratification stratified	81,232,325, 378,425
Remarks: General concensus appears to be one of stratification during summer months.	

SECCHI DISC DEPTH (m)			REFS
min 10.0	date January 1956		378
max 11.0	date n.s.		81
mean 11.0	n 13	period 4/70-5/71	425
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 0.5 mg m^{-3}	date August 1970		425
max 4.5 mg m^{-3}	date November 1970		425
mean 3 mg m^{-3}	n 12	date 4/70-5/71	425
period of blooms -			
algae *Dinobryon, Cyclotella, Melosira, Staurastrum, Ceratium*			196,197
Remarks:			

pH READINGS		REFS
min 7.3	date August 1972	232
max 7.7 (mean)	date 4/70-5/71	425
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: See references below.			

TROPHIC STATUS	BASIS	REFS
oligotrophic	SDH, ATP	35
oligotrophic	chemistry and biology	425,429
oligotrophic	heterotrophic potential	232
oligotrophic	algae	81
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35
phytoplankton (algae)	74,81,196,197,567,568,569
macrophytes	98,116
zooplankton	92
macroinvertebrates	202
fish	186,496
wildlife	602
Remarks:	

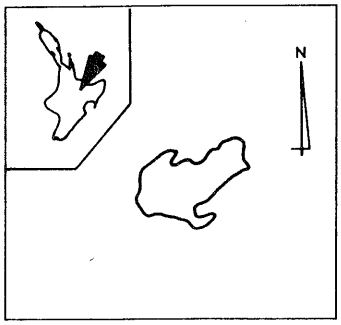
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	378,425,428, 496	particulates	-
major ions	81,425,428, 496	redox	425
trace elements	81,425,496	salinity	428
organic matter	-	alkalinity	428
toxic organics	-	hardness	-
pigments	425,428	silica	-
optical properties	-	other SDH, ATP	35
Remarks: Lake sediment chemistry (429).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOMAHANA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	335
WATER BOARD	Bay of Plenty	LONG AXIS (km)	6.2 (NW)
MAP REF (NZMS1)	N86 907885	MEAN DEPTH (m)	60 (382)
MAP REF (260 ser.)	U16 118206	MAX DEPTH (m)	125 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	7.95
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	88.58
MAIN OUTFLOW	surface outflow man-made	CATCHMENT No. (MWD)	153134
LEVEL CHANGES	333-342 m a.s.l.	DATA BASE CODE (MAF)	183 rMAHANA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	1.9	pasture	41.6	flat (0–3°)	2.5
sand dune	-	tussock	-	undulating (4–7°)	9.4
cropland	-	lakes	9.9	rolling (8–15°)	6.8
lowland scrub	28.7	rivers	-	strongly rolling (16–20°)	30.2
subalpine scrub	3.1	ice and snow	-	moderately steep (21–25°)	21.9
native forest	9.7	urban	-	steep (26–35°)	11.0
exotic forest	3.7	other	1.3	very steep (>35°)	8.3
				lakes	9.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.4	1.8	-	-	-
wind	-	-	3.0	-	-
scree creep	-	1.3	0.1	-	-
soil slip	3.3	1.9	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	10.8	5.6	3.9	-	-
tunnel gully	-	-	-	-	-
streambank	3.9	-	-	-	-
deposition	-	-	-	-	-
negligible	40.0				
lakes	9.9				

GENERAL REMARKS

- NW of Rerewhakaaitu township (351)
- one island, Patiti or Banded Island (351)
- basin of lake created by phreatic explosions mainly during the 1886 eruption of Tarawera (564)
- hot springs in lake bottom at 3 sites west of island (325)
- water unsuitable for potable purposes (496)
- popular for fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
271	1975	Healy	Origin of lake.
314	1970b	Internal Affairs	Wildlife report.
315	1971a	Internal Affairs	Water quality report.
325	1968	Irwin	Temperature (1966).
351	1975a	Irwin	Checklist of NZ lakes.
359	1982b	Irwin	Bathymetric chart.
376	1959	Jolly	Limnological study.
378	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
382	1975	Jolly & Irwin	Thermal conditions.
427	1974b	McColl	Trophic condition.
428	1975	McColl	Chemistry and biological conditions (1970-71).
496	1923	Phillips & Grigg	Geochemistry and trout conditions (1920).
511	1975	Richmond	Water chemistry.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
567	1972	Thomasson	Phytoplankton.
568	1973	Thomasson	Phytoplankton.
569	1974	Thomasson	Phytoplankton.
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 ROTOMAHANA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	68%	t°C	15.7	date April 1957	378
max	83%	t°C	14.1	date July 1957	378
mean	-	n	-	period -	
period of lowest oxygen	-				
Remarks: 1 site, 2 samples (378). Oxygen concentration given as 2.5 g m^{-3} in groundwater (511).					

TEMPERATURE (°C)					REFS
min	14.25 (7/55)	(surface)	14.1 (7/55)	(bottom)	378
max	25 (2/66)	(surface)	37.8 (2/66)	(bottom)	325
max difference top to bottom	5.1°C				378
stratification	stratified, monomictic				325,378
Remarks: Certain parts of lake boiling continuously (496).					

SECCHI DISC DEPTH (m)					REFS
min	1.5	date	December 1955		378
max	6.5	date	July 1957		378
mean	3.5	n	4	period pre 1958	378
period of worst clarity	-				
causes	-				
Remarks: 1 site, 1 visit (378).					

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date -	
period of blooms	abundant algae			427
algae	*Mougeotia, Closterium, Asterionella, Synedra*			378
Remarks: Diatoms, green algae (511).				

pH READINGS				REFS
min	6.9	date	December 1955	378
max	7.5	date	December 1955	378
Remarks: Mean of 4 readings = 7.1 (428).				

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)	567,568,569
macrophytes	-
zooplankton	-
macroinvertebrates	609
fish	496
wildlife	314
Remarks:	

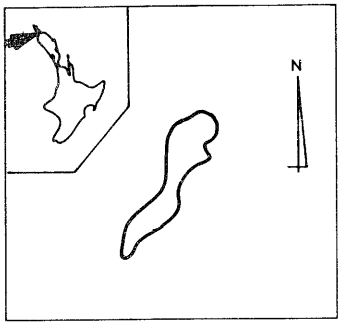
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	378,428,496	particulates	-
major ions	428,496	redox	-
trace elements	-	salinity	428
organic matter	-	alkalinity	378
toxic organics	-	hardness	-
pigments	428	silica	378,428
optical properties	-	other	-
Remarks: Albumin - nitrogen high (496).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOROA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mangonui	ALTITUDE (m a.s.l.)	26 m
WATER BOARD	Northland	LONG AXIS (km)	1.5 (NNE)
MAP REF (NZMS1)	N9 702759	MEAN DEPTH (m)	-
MAP REF (260 ser.)	NO4 288829	MAX DEPTH (m)	8.0 (351)
LAKE TYPE	dune	LAKE AREA (km²)	0.53
MAIN INFLOW	n.d.	CATCHMENT AREA (km²) (land and lake)	2.85
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	153080
LEVEL CHANGES	-	DATA BASE CODE (MAF)	n.d.

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	47.0	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	50.5	rivers	-	strongly rolling (16–20°)	47.0	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	39.6	soil slip	39.6	13.3	-	-	-
native forest	2.5	urban	-	steep (26–35°)	13.3	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	47.0				
						lakes	n.d.				

GENERAL REMARKS

- SW of Waipapakauri township (351)
- landward side of coastal dunes, SW end of lake swampy (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
327	1969b	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
358	1982a	Irwin	Bathymetric chart.

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

LAKE ROTOROA (N.I.)

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 3.0		date 7/70	347
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: 2 readings (347).			

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.	

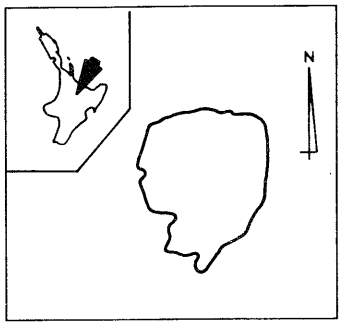
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTORUA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	280
WATER BOARD	Bay of Plenty	LONG AXIS (km)	12.1 (N)
MAP REF (NZMS1)	N76 717121	MEAN DEPTH (m)	11.0 (382)
MAP REF (260 ser.)	U15 950427	MAX DEPTH (m)	44.8 (382)
LAKE TYPE	volcanic	LAKE AREA (km²)	79.78
MAIN INFLOW	many surface streams	CATCHMENT AREA (km²) (land and lake)	482.04
MAIN OUTFLOW	Ohau Channel to Lake Rotoiti	CATCHMENT No. (MWD)	146070
LEVEL CHANGES	-	DATA BASE CODE (MAF)	161 rRUA1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.2	pasture	44.0	flat (0–3°)	4.4
sand dune	-	tussock	-	undulating (4–7°)	11.5
cropland	-	lakes	16.9	rolling (8–15°)	16.8
lowland scrub	4.4	rivers	-	strongly rolling (16–20°)	9.6
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	23.5
native forest	21.0	urban	6.7	steep (26–35°)	9.0
exotic forest	6.9	other	-	very steep (>35°)	1.6
				lakes	16.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	12.9	2.5	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	2.0	0.7	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	6.5	1.9	0.5	-	-
tunnel gully	0.9	-	-	-	-
streambank	2.7	1.3	-	-	-
deposition	0.2	-	-	-	-
negligible	44.3				
lakes	16.9				

GENERAL REMARKS

- lies NE of Rotorua township (351)
- one island, Mokoia (351)
- receives reticulated sewage for Rotorua City and geothermal discharge (169)
- hot springs on shore; directly affected by farming (378)
- lake originated 300,000 years ago (271)
- 9 monitored inflows
- popular tourist attraction, fishing, boating
- relation between water quality and sewage input a highly contentious issue (478)
- 66% of water input from streams (291)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
11	1971	Baars	Phytoplankton ecology.
12	1971	Baars-Kloos	Phytoplankton ecology.
24	1980	Biggs	Eutrophication.
35	1976	Bowie & Gillespie	Microbiology and trophic status (1973).
43	1975	Brown	Ecology of macrophytes.
51	1973	Burnet & Wallace	Primary productivity, nutrients, trout (1969-70).
52	1975	Burnet & Wallace	Eutrophication and trout.
60	1967	Burstall	Weed control.
61	1972	Burstall	Environmental impact report.
71	1967	Cassie	Spraying effects on phytoplankton.
72	1969	Cassie	Phytoplankton seasonal changes in density (1966-67).
76*	1974c	Cassie	Algal flora (1966-69).
77	1975	Cassie	Phytoplankton.
86	1969	Chapman	Zooplankton.
87	1973a	Chapman	Zooplankton.
92	1975	Chapman *et al*	Zooplankton.
94	1966	Chapman	Macrophyte inspection.
98	1970a	Chapman	History of lakeweed infestation.
142	1950	Davis	Lakeweed control.
149	1966	Dick	Lakeweed.
163	1963b	Fish	Weed growth, water chemistry (1961).
169*	1969a	Fish	Oxygen content (1967-68).
170	1969b	Fish	Eutrophication.
174	1971a	Fish	Nutrients and water quality.
176	1972a	Fish	Lake survey.
178*	1975a	Fish	Trophic status (1967-70).
179	1975b	Fish	Nutrient budget.

(REFERENCES CONTINUED IN APPENDIX)

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

LAKE ROTORUA (N.I.)

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 1%	**t°C** 20	**date** March 1970			178
max 130%	**t°C** 12	**date** September 55			378
mean @ 9%	**n** 80	**period** 1967-1970			178
period of lowest oxygen autumn, summer					178,598
Remarks: Periods of low oxygen not always evident. For trends, see ref 521.					

TEMPERATURE (°C)			REFS
min 8.0 (July)	**(surface)** 8.0 (7/69)	**(bottom)**	178
max 24.5 (2/70)	**(surface)** 21.5 (1/70)	**(bottom)**	178
max difference top to bottom 4°C			178
stratification sometimes stratified			521
Remarks: Stratification largely a function of wind disturbance (521).			

SECCHI DISC DEPTH (m)			REFS
min 1.5	**date** February 1970		178
max 4.6	**date** March 1956		378
mean 2.5	**n** 200	**period** 1967-70	178
period of worst clarity spring			378
causes n.s.			
Remarks: 4 sites, intensive sampling (178). Mean of 3.5 m from 12 samples taken monthly (378). Single value of 2.0 m, 2/83 (580).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 2.9 mg m^{-3}	**date** January 1968		178
max 47.0 mg m^{-3}	**date** n.d.		596
mean -	**n** -	**date** -	
period of blooms frequent blooms			178,596, 598
algae *Melosira, Asterionella, Mougeotia, Anabaena, Dinobryon*			77
Remarks: Swarms of diatoms, abundant Chlorophyceae and Protozoa (496).			

pH READINGS		REFS
min 6.1	**date** n.s.	178
max 8.8	**date** n.s.	178
Remarks: Taken from 415 readings 1967-70 (178).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		*Lagarosiphon major**	77,178
		*Elodea canadensis**	77,178
Remarks: *Both species form nuisance growths. Macrophytes declined after 1967, and were no longer a problem by 1970 (178). Diurnal changes in D.O., temp, and alkalinity mainly caused by macrophyte photosynthesis (182).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae and chemistry	178
eutrophic	SDH, ATP	35
eutrophic	algae	596,598, 76,72
eutrophic	heterotrophic potential	232
Remarks: Progressing towards hypereutrophy (178).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232,233,484
phytoplankton (algae)	11,12,51,71,72,76,77,182,386,567, 568,569
macrophytes	43,60,94,98,142,149,163,182,272, 386,395,423,513,532
zooplankton	86,92
macroinvertebrates	163,609
fish	51,52,163,496
wildlife	-
Remarks: Ultraplankton content relatively low (484).	

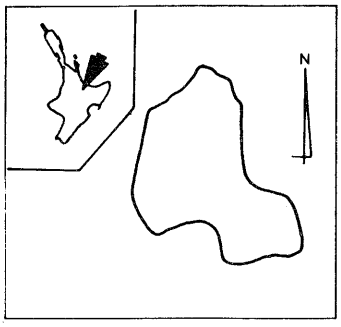
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,163,169, 178,182,378	**particulates**	-
major ions	163,428,496	**redox**	52
trace elements	-	**salinity**	428
organic matter	-	**alkalinity**	178,182, 378
toxic organics	-	**hardness**	163,178,378 428,496
pigments	428	**silica**	163,178,378 428,496
optical properties	-	**other** SDH,ATP	35,484
Remarks: Nutrients cont. 496, 521, 598. Pmax (52). Review of changes in 14 parameters from 1966 to 1983 (521). Water high in organic matter (496).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE ROTOWHERO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	380
WATER BOARD	Bay of Plenty	LONG AXIS (km)	0.25
MAP REF (NZMS1)	N85 835818	MEAN DEPTH (m)	-
MAP REF (260 ser.)	U16 050147	MAX DEPTH (m)	14 (351)
LAKE TYPE	volcanic (thermal)	LAKE AREA (km²)	0.025
MAIN INFLOW	several hot springs	CATCHMENT AREA (km²) (land and lake)	see general remarks box
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	193 rWHERO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

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

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

GENERAL REMARKS

- NNE of Waiotapu (351)
- also named Green Lake (351)
- catchment area small and ill defined. NZ Land Resource Inventory Data indicates areas of native and exotic forests, strongly rolling countryside and slight sheet erosion
- of scientific and scenic interest (428)
- part of lake boiling (431)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbial parameters and trophic status (1973).
37	1971	Block & Block	Microbiological study (1969).
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
205	1974	Forsyth & McColl	Limnology and biology (1970-72).
232	1976	Gillespie	Heterotrophic potential and trophic status (1972, 1973).
351	1975a	Irwin	Checklist of NZ lakes.
428	1975	McColl	Chemical and biological conditions (1970-71).
429	1977	McColl	Sediment chemistry and trophic status.
431*	1973	McColl & Forsyth	Limnology and chemistry (1970-71).
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 ROTOWHERO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 5.2 g m^{-3}	**t°C** 34	**date** November 1970		431
max 5.8 g m^{-3}	**t°C** 33.2	**date** November 1970		431
mean 5.5 g m^{-3}	**n** 24	**period** 11/70-5/71		431
period of lowest oxygen n.s.				431
Remarks: 4 profile graphs, no measurement deeper than 5 m.				

TEMPERATURE (°C)				REFS
min 29.5 (8/70)	**(surface)** 33.2 (11/70)	**(bottom)**		431
max 78 (11/70)	**(surface)** 34 (11/70)	**(bottom)**		431
max difference top to bottom at least 2.8°C				431
stratification mixed				232,429, 431
Remarks: Transects at 4 sites at 0, 1 m and bottom (431).				

SECCHI DISC DEPTH (m)				REFS
min -	**date** -			
max -	**date** -			
mean 0.9	**n** n.s.	**period** 11/70		431
period of worst clarity -				
causes green algae and silica(?)				431
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min 4.4 mg m^{-3}	**date** -			431
max 27.3 mg m^{-3}	**date** -			431
mean 17.1 mg m^{-3}	**n** 25	**date** 11/70-5/71		431
period of blooms permanent green algal bloom, hence name "Green" Lake				431
algae *Chlorella, Stichococcus, Euglena, Hormidium*				205
Remarks:				

pH READINGS			REFS
min 3.07	**date** May 1971		431
max 3.2	**date** February 1973		232
Remarks: 25 readings (431). 2 readings (232).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
Remarks: Macrophytes absent (205).			

TROPHIC STATUS	BASIS	REFS
very highly eutrophic	chemistry and biology	429
highly eutrophic	heterotrophic potential	232
highly eutrophic or polytrophic	algae, nutrients	431
highly eutrophic	algae	205
Remarks: Eutrophic (35).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,37,232,431
phytoplankton (algae)	37,196,205,431
macrophytes	431
zooplankton	-
macroinvertebrates	200,205,431,609
fish	200
wildlife	-
Remarks: Fish absent, macrofauna exclusively insects dominated by *Chironomus zelandicus* (205).	

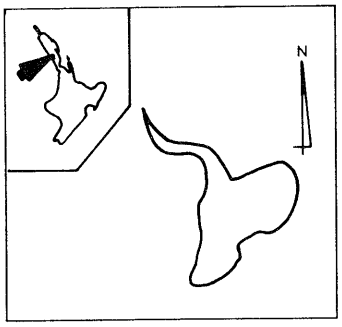
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	428,431	**particulates**	431
major ions	431	**redox**	431
trace elements	431	**salinity**	-
organic matter	-	**alkalinity**	-
toxic organics	-	**hardness**	-
pigments	428,431	**silica**	-
optical properties	-	**other** SDH, ATP	35
Remarks: Lake sediment chemistry (429).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE SWAN

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	3.2
WATER BOARD	Northland	LONG AXIS (km)	0.9 (N)
MAP REF (NZMS1)	N33 665228	MEAN DEPTH (m)	3.2 (136)
MAP REF (260 ser.)	P09 129405	MAX DEPTH (m)	5.5 (136)
LAKE TYPE	dune	LAKE AREA (km²)	0.32
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	0.40
MAIN OUTFLOW	intermittent surface outlet	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	59 SWAN2

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-75)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	85.0
sand dune	15.0	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°)	100
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	85.0	-	-	-	-
wind	-	-	-	-	15.0
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- NW of Poutu township (351)
- in sand dunes and swamp (351)
- sheltered shore, peaty margin (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
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 SWAN

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min -	t°C -	date -		
max 102%	t°C 22.6°	date 2150		136
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single site, single sample (136).				

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 2.0	date 2/50		136
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single reading (136).			

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

pH READINGS		REFS
min 6.2	date 2/50	136
max -	date -	
Remarks: Single reading (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Cladium	136	*Potamogeton ochreatus*	136
Eleocharis	136	*Chara australis*	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	136
zooplankton	-
macroinvertebrates	136
fish	136
wildlife	136
Remarks:	

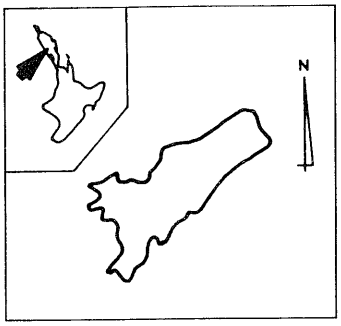
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	136	redox	-
trace elements	136	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TAHAROA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	70
WATER BOARD	Northland	LONG AXIS (km)	2.6 (EW)
MAP REF (NZMS1)	N22 170860	MEAN DEPTH (m)	17 (336)
MAP REF (260 ser.)	007 693996	MAX DEPTH (m)	37 (351)
LAKE TYPE	dune	LAKE AREA (km^2)	2.10
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	4.74
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	415000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	42 TAHAROA 1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1967)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	38.8
sand dune	-	tussock	-
cropland	-	lakes	n.d.
lowland scrub	61.2	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°)	30.6
strongly rolling (16–20°)	8.2
moderately steep (21–25°)	61.2
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	8.2	61.2	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	30.6	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- NNE of Kai-Iwi Stream mouth (351)
- consolidated sand dunes (351)
- two main basins (83)
- popular for swimming, boating, fishing

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
83*	1980	Cassie & Freeman	Phytoplankton.
92	1975	Chapman *et al*	Zooplankton.
336	1971a	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Resource survey - water quality (same data as ref 83).
580	1984	Vant & Davies-Colley	Water clarity (1982).

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

LAKE TAHAROA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 1.4 g m^{-3} t°C 16.5 date 4/76	83
max 10.2 g m^{-3} t°C 12.8 date 9/77	83
mean - n - period -	
period of lowest oxygen autumn	83
Remarks: 4 visits, 4 depths at deepest part of lake (83). Data for Massey Basin (83). Similar range for Hauhatoki Bay (83).	

TEMPERATURE (°C)	REFS
min 13 (9/77) (surface) 12.8 (9/77) (bottom)	RWB
max 20 (12/76) (surface) 17.5 (12/76) (bottom)	RWB
max difference top to bottom 2.5°C	RWB
stratification occasionally stratified	RWB
Remarks: 4 visits, 2 sites (RWB).	

SECCHI DISC DEPTH (m)	REFS
min 8.0 date December 1982	580
max 9.2 date August 1970	347
mean 8.9 n 4 period 1970	347
period of worst clarity -	
causes -	
Remarks: Single visit (347).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean - n - date -	
period of blooms -	
algae *Ceratium, Nephrocytium, Staurastrum Peridinium*	83
Remarks:	

pH READINGS	REFS
min 6.1 date April 1976	RWB
max 6.75 date May 1977	RWB
Remarks: 4 visits, 20 samples total (RWB).	

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

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	RWB
oligotrophic	algae	83
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	RWB
phytoplankton (algae)	83
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

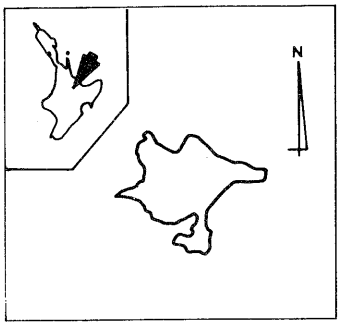
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	RWB,83	particulates	-
major ions	-	redox	83
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	580	silica	-
optical properties	580	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TARAWERA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	299
WATER BOARD	Bay of Plenty	LONG AXIS (km)	11.4 (ENE)
MAP REF (NZMS1)	N76 880959	MEAN DEPTH (m)	50 (382)
MAP REF (260 ser.)	U16 095275	MAX DEPTH (m)	87.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km^2)	41.02
MAIN INFLOW	Wairoa Stream	CATCHMENT AREA (km^2) (land and lake)	150.01
MAIN OUTFLOW	Tarawera River	CATCHMENT No. (MWD)	153130
LEVEL CHANGES	298-299 m a.s.l.	DATA BASE CODE (MAF)	178 TARAWERA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1967)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	12.1	flat (0–3°)	1.5
sand dune	-	tussock	-	undulating (4–7°)	0.7
cropland	-	lakes	27.4	rolling (8–15°)	9.8
lowland scrub	30.6	rivers	-	strongly rolling (16–20°)	18.1
subalpine scrub	3.3	ice and snow	-	moderately steep (21–25°)	24.1
native forest	17.5	urban	-	steep (26–35°)	14.4
exotic forest	8.8	other	-	very steep (>35°)	4.0
				lakes	27.4

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	7.8	-	-	-	-
wind	-	-	1.1	0.4	-
scree creep	-	0.2	0.2	1.9	-
soil slip	1.5	6.8	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	9.1	4.3	-	-	-
tunnel gully	3.8	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	35.6				
lakes	27.4				

GENERAL REMARKS

- 17.5 km from Rotorua City (351)
- annual drainage about 10% volume of lake (564)
- originated 20,000 years ago (271)
- "not yet recovered from the eruption of 1866" (496)
- level higher than before 1886 eruption (271)
- hot springs on shore (378)
- level fluctuates about 0.4 metres (564)
- very popular for fishing and boating (427)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
42	1970	Brown	Submerged vegetation.
43	1975	Brown	Ecology of macrophytes.
98	1970a	Chapman	History of lakeweed infestation.
118	1970	Coffey	*Lagarosiphon* (weed) study.
169*	1969a	Fish	Oxygen content (1968).
-	-	Green pers comm	Water clarity (1972).
260	1970a	Harding	Lakeweed.
271	1975	Healy	Origin of lake.
325	1968	Irwin	Temperature (1966).
328	1969c	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist.
376	1959	Jolly	Limnological study.
378	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
382	1975	Jolly & Irwin	Thermal conditions.
427	1974b	McColl	Trophic condition.
428	1975	McColl	Chemistry and biology (1970-71).
484	1977a	Paerl	Ultraphytoplankton and production (1975-76).
496	1923	Phillips & Grigg	Geochemistry and trout conditions (1920).
511	1975	Richmond	Water chemistry.
536	1974a	Starling *et al*	*Nitella* study.
537	1974b	Starling *et al*	*Nitella* study.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
568	1973	Thomasson	Phytoplankton.
569	1974	Thomasson	Phytoplankton.
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 TARAWERA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 75%	t°C 11.25	date June 1956			378
max 115%	t°C 11.25	date November 1955			378
mean @ 90%	n 9	period n.s.			378
period of lowest oxygen -					
Remarks: Sampled monthly for 1 year (378).					

TEMPERATURE (°C)					REFS
min 11 (8/55)	(surface) 10.6 (8/55)	(bottom)			378
max 22.75 (3/57)	(surface) 11.3 (3/57)	(bottom)			378
max difference top to bottom 11.4°C					378
stratification stratified					378
Remarks: 1 site, sampled monthly for 1 year (378).					

SECCHI DISC DEPTH (m)			REFS
min 5.3	date January 1956		378
max 9.0*	date October 1955		378
mean 7.0	n 12	period pre 1958	378
period of worst clarity -			
causes -			
Remarks: Sampled monthly for 1 year at 1 site (378). *Also reported by Green (p.c.).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae *Mougeotia, Ceratium, Melosira, Dinobryon*			378
Remarks:			

pH READINGS		REFS
min 7.2	date June 1956	378
max 8.0	date January 1956	378
Remarks: Sampled surface and bottom, 4 readings only (378). Mean of 4 samples, 1970-71, = 7.8 (428).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Lagarosiphon major	118
		Elodea canadensis	118
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligo-mesotrophic	physico-chemical	427
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	496
macrophytes	42,43
zooplankton	-
macroinvertebrates	496
fish	496
wildlife	-
Remarks:	

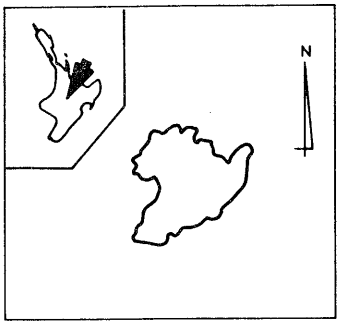
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	169,378,496	particulates	496
major ions	169,496	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	169,378
toxic organics	-	hardness	-
pigments	169	silica	378,496
optical properties	-	other smell	496
Remarks: ATP (484).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TAUPO

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo	ALTITUDE (m a.s.l.)	357
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	40.5 (NE)
MAP REF (NZMS1)	N102 368182	MEAN DEPTH (m)	97 (196)
MAP REF (260 ser.)	T18 607578	MAX DEPTH (m)	162.8 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	622.63
MAIN INFLOW	30 surface rivers	CATCHMENT AREA (km²) (land and lake)	3312.15
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434620
LEVEL CHANGES	periodic for HEP (296)	DATA BASE CODE (MAF)	216 TAUPO

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	1.1	pasture	17.9
sand dune	-	tussock	3.1
cropland	-	lakes	18.6
lowland scrub	16.2	rivers	-
subalpine scrub	6.3	ice and snow	-
native forest	22.3	urban	0.2
exotic forest	14.3	other	0.1

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	6.1
undulating (4–7°)	16.7
rolling (8–15°)	14.5
strongly rolling (16–20°)	10.9
moderately steep (21–25°)	13.2
steep (26–35°)	10.7
very steep (>35°)	9.0
lakes	18.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	10.6	1.5	0.5	-	0.6
wind	1.2	0.4	1.0	0.1	1.0
scree creep	-	0.2	0.2	0.6	0.4
soil slip	2.8	0.9	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	3.3	3.9	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	0.4	-	-	-	-
gully	6.9	3.1	0.2	-	-
tunnel gully	0.1	-	-	-	-
streambank	1.4	0.3	0.1	-	-
deposition	-	-	-	-	-
negligible	39.2				
lakes	18.6				

GENERAL REMARKS

- Taupo township on lake edge (351)
- controlled for hydro-electric power generation (296)
- retention time about 10 years (599)
- composite origin of lake related to volcanic history (271)
- hot springs on shore (378)
- water chemistry strongly influenced by geology (505)
- water satisfactory for potable purposes (496)
- mean monthly discharge 131 m^3 sec^{-1}
- popular for many recreational pursuits

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
5	1935	Armstrong	Biology.
51	1973	Burnet & Wallace	Primary productivity, nutrients, trout (1970).
63	1978	Burstall	Aquatic weeds.
92	1975	Chapman *et al*	Zooplankton
117	1979	Clayton	Water weeds.
-*	-	Cudby MAF pers comm	Dissolved oxygen (1969-72).
141	1984	Davis & Simons	Phytoplankton (1980-83).
145	1965	DSIR Wairaki	Water analyses.
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
203	1983	Forsyth & Howard-Williams	Ecology (up to 1982), good overall account.
204	1980	Forsyth & McCullum	Zooplankton.
226	1975	Freshwater Section	Power scheme impact.
253*	1975b	Green	Water clarity (1955-56).
271	1975	Healy	Origin of lake.
277	1969a	Hill	Brief discussion.
283	1970b	Hill	Algae.
296	1980	Howard-Williams & Davies	Nuisance aquatic weeds (1980).
342	1972d	Irwin	Bathymetric chart.
351	1975a	Irwin	Checklist of NZ lakes.
376	1959	Jolly	Limnological study.
377	1965	Jolly	Zooplankton
378*	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
392	1981	Lam	Phytoplankton.
399	1978	Lister	Sedimentology.

(REFERENCE LIST CONTINUED IN APPENDIX)

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

LAKE TAUPO

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 6.9 g m^{-3}	**t°C** 11.0	**date** April 1971		Cudby p.c.
max 10.0 g m^{-3}	**t°C** 10.4	**date** August 1972		Cudby p.c.
mean -	**n** -	**period** -		
period of lowest oxygen no depletion				599
Remarks: Monthly samples for two years at 1 site (Cudby p.c.). Oxygen values also given in White *et al* (595).				

TEMPERATURE (°C)			REFS
min 10.5 (8/72)	**(surface)** 10.4 (12/70)	**(bottom)**	Cudby p.c.
max 22.7 (1/70)	**(surface)** 11.3 (12/71-4/72)	**(bottom)**	Cudby p.c.
max difference top to bottom 10.25°C			Cudby p.c.
stratification stratified			Cudby p.c. 378,599
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min 11.0	**date** January 1975		Cudby p.c.
max 18.6	**date** November 1970		Cudby p.c.
mean 15.2-17.0	**n** 100	**period** 8/74-3/76	599
period of worst clarity n.s.			599
causes -			
Remarks: Monthly samples for 3 years (Cudby p.c.). Monthly samples at 3 sites for 2 years (599).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 1 mg m^{-3}	**date** most of the year		599
max 3 mg m^{-3}	**date** August		599
mean 1.4 mg m^{-3}	**n** 32	**date** 8/74-3/76	599
period of blooms -			
algae *Melosira, Asterionella, Dinobryon, Epithermia*			392
Remarks: Detailed discussion of phytoplankton given (599). Other algae includes *Staurastrum* (554).			

pH READINGS		REFS
min 7.0	**date** March 1976	378
max 7.6	**date** March 1976	378
Remarks: 4 readings, surface and bottom (378). Mean of 48 samples, 1970-71, = 7.7 (428).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		Lagarosiphon major	296
		Elodea canadensis	296
		Ceratophyllum demersum	296
Remarks: Detailed study of macrophytes and review of previous literature (296).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	196,560,594
oligotrophic	nitrogen levels	595
mesotrophic	phosphorous levels	595
oligotrophic	physico-chemical	405
Remarks: Phosphate limiting January-June, nitrate limiting July-December, trace elements stimulate chlorophyll production (595).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	141,196,283,554,560,595,599
macrophytes	63,117,141,296,560
zooplankton	92,204,296,554,560
macroinvertebrates	200,609
fish	51,496
wildlife	-
Remarks: General biology (5). Overall ecology (203).	

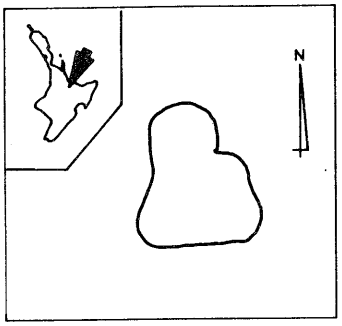
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	51,283,378, 428,496,505	**particulates**	-
major ions	428,496,505, 554,599	**redox**	554
trace elements	505	**salinity**	51,428
organic matter	-	**alkalinity**	378,554, 599
toxic organics	-	**hardness**	-
pigments	-	**silica** 428	283,378, 505,554
optical properties	-	**other** Pmax, ATP	51,484
Remarks: Nutrients continued - 554, 560, 594, 599.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TIKITAPU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rotorua	ALTITUDE (m a.s.l.)	417.8
WATER BOARD	Bay of Plenty	LONG AXIS (km)	1.6 (N)
MAP REF (NZMS1)	N76 796969	MEAN DEPTH (m)	18.0 (382)
MAP REF (260 ser.)	U16 018286	MAX DEPTH (m)	27.5 (351)
LAKE TYPE	volcanic	LAKE AREA (km²)	1.40
MAIN INFLOW	few small streams	CATCHMENT AREA (km²) (land and lake)	5.97
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	153132
LEVEL CHANGES	fluctuates 1.1 m, or 6% of volume (564)	DATA BASE CODE (MAF)	179 TIKITAPU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1977-78)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	5.9
sand dune	-	tussock	-
cropland	-	lakes	23.6
lowland scrub	16.9	rivers	-
subalpine scrub	-	ice and snow	-
native forest	44.9	urban	-
exotic forest	8.7	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	-
strongly rolling (16–20°)	13.2
moderately steep (21–25°)	1.3
steep (26–35°)	61.8
very steep (>35°)	-
lakes	23.6

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	9.5	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	37.2	-	-	-	-
tunnel gully	5.9	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	23.8				
lakes	23.6				

GENERAL REMARKS

- SSE of Rotorua City (351)
- also known as Blue Lake (351)
- originated 13,400 years ago (271)
- resulted from an explosion crater (378)
- dammed by lava barriers (564)
- water satisfactory for potable purposes (496)
- popular for fishing, swimming, boating

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
35	1976	Bowie & Gillespie	Microbiology and trophic status (1973).
42	1970	Brown	Submerged vegetation.
43	1975	Brown	Ecology of macrophytes.
92	1975	Chapman *et al*	Zooplankton.
118	1970	Coffey	*Lagarosiphon* (weed) study.
195	1970	Flint	Algae.
196	1975	Flint	Phytoplankton.
197	1977	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
202	1978	Forsyth	Benthic macroinvertebrates.
232*	1976	Gillespie	Heterotrophic potential and trophic status (1972, 1973).
271	1975	Healy	Lake origin.
324	1967c	Irwin	Bathymetric chart.
325*	1968	Irwin	Temperature (1966, 1967).
351	1975a	Irwin	Checklist of NZ lakes.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).
382	1975	Jolly & Irwin	Thermal conditions.
425*	1972	McColl	Chemistry and trophic status (1970-71).
428	1975	McColl	Chemical and biological conditions (1970-71).
429	1977	McColl	Sediment chemistry and trophic status (1972).
496	1923	Phillips & Grigg	Geochemistry and trout conditions (1920).
511	1975	Richmond	Trophic status.
536	1974a	Starling *et al*	*Nitella* study.
537	1974b	Starling *et al*	*Nitella* study.
564	1977	Taylor *et al*	Groundwater influences (1970-73).
567	1972	Thomasson	Phytoplankton.

(REFERENCES CONTINUED IN APPENDIX)

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

LAKE TIKITAPU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0%	**t °C** n.s.	**date** late summer			425
max 112%	**t °C** 11.5	**date** November 1955			378
mean -	**n** -	**period** -			
period of lowest oxygen autumn					378
Remarks: Monthly samples at 1 site for 1 year (378). Monthly samples at 2 sites for 1 year, low oxygen observed in May 1970 (425). Can approach anoxia in late summer (429).					

TEMPERATURE (°C)				REFS
min 9.5 (8/72)	**(surface)** 9.5 (8/55)	**(bottom)**		232,378
max 23.0 (2/66)	**(surface)** 17.7 (2/73)	**(bottom)**		325,232
max difference top to bottom 12.7°C				325
stratification stratified in summer				232,325, 378,425
Remarks: 2 visits, 1 site (325).				

SECCHI DISC DEPTH (m)				REFS
min 5.0	**date** January 1956			378
max 11.0*	**date** 4/70-5/71			425
mean 7.5	**n** 12	**period** 1955-56		378
period of worst clarity -				
causes -				
Remarks: *Given as mean value from 12 readings (425).				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min 0.2 mg m^{-3}	**date** October 1970			425
max 5.5 mg m^{-3}	**date** December 1970			425
mean n.s.	**n** n.s.	**date** 4/70-5/71		425
period of blooms -				
algae *Chlorella, Chodatella, Cosmocladium*				196
Remarks: "A few protozoa and one or two diatoms" (496).				

pH READINGS				REFS
min 5.8	**date** March 1956			378
max 7.55	**date** February 1973			232
Remarks: Mean of 12 readings for 1 year = 7.0 (425).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
		Characeae	118
Remarks: Native community still dominant (118).			

TROPHIC STATUS	BASIS	REFS
oligotrophic	SDH, ATP	35
oligotrophic	chemical and biological	425
mesotrophic	heterotrophic potential	232
oligotrophic	algae	195,196,197
Remarks: ATP higher than in other oligotrophic lakes (35). Sediment chemistry not closely related to trophic status (429).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	35,232
phytoplankton (algae)	43,195,196,197,536,567,568,569
macrophytes	42,118,536
zooplankton	92
macroinvertebrates	200,202
fish	496
wildlife	-
Remarks:	

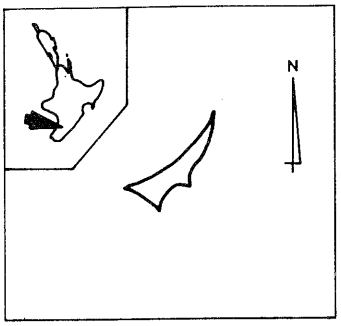
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	378,425, 428,496	**particulates**	496
major ions	425,428, 496	**redox**	425
trace elements	-	**salinity**	425,428
organic matter	-	**alkalinity**	378
toxic organics	-	**hardness**	-
pigments	425,428	**silica**	378,425, 428
optical properties	496	**other** SDH,ATP	35
Remarks: Lake sediment chemistry (429).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TIRITEA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Horowhenua	ALTITUDE (m a.s.l.)	130
WATER BOARD	Manawatu	LONG AXIS (km)	0.9 (NNE)
MAP REF (NZMS1)	N149 163255	MEAN DEPTH (m)	15 (RWB)
MAP REF (260 ser.)	T24 370822	MAX DEPTH (m)	30 (RWB)
LAKE TYPE	reservoir	LAKE AREA (km^2)	0.13
MAIN INFLOW	2 gauged streams	CATCHMENT AREA (km^2) (land and lake)	19.09
MAIN OUTFLOW	Tiritea Stream	CATCHMENT No. (MWD)	325120
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	336 TIRITEA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1976-79)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	17.7
sand dune	-	tussock	-
cropland	-	lakes	n.d.
lowland scrub	50.1	rivers	-
subalpine scrub	-	ice and snow	-
native forest	32.2	urban	-
exotic forest	-	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	4.3
undulating (4–7°)	8.6
rolling (8–15°)	3.7
strongly rolling (16–20°)	11.6
moderately steep (21–25°)	4.1
steep (26–35°)	26.0
very steep (>35°)	41.7
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	25.6	-	-	-	-
wind	-	-	-	-	-
scree creep	25.5	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	49.0				
lakes	n.d.				

GENERAL REMARKS

- SE of Palmerston North (351)
- Palmerston North water supply
- surrounded by plantation in water conservation reserve

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Water chemistry.

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

LAKE TIRITEA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min <1.0 g m^{-3}	t°C n.s.	date n.s.		RWB
max -	t°C -	date -		
mean -	n -	period -		
period of lowest oxygen summer				RWB
Remarks: Sampling programme not given (RWB).				

TEMPERATURE (°C)			REFS
min 7.0	(surface) 6.3	(bottom)	RWB
max 22.0	(surface) 11.2	(bottom)	RWB
max difference top to bottom 10.8°C			RWB
stratification stratified in summer			RWB
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min 3	date n.s.		RWB
max 5	date n.s.		RWB
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms no blooms or scums noted			RWB
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: Slight growth of macrophyte weeds around littoral regions (RWB).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

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

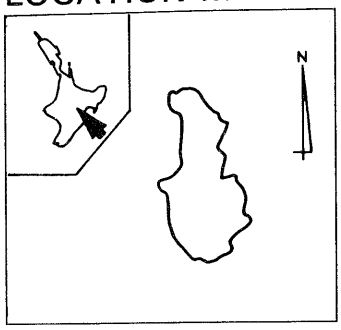
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE TUTIRA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hawke's Bay	ALTITUDE (m a.s.l.)	150
WATER BOARD	Hawke's Bay	LONG AXIS (km)	2.5 (N)
MAP REF (NZMS1)	N114 314714	MEAN DEPTH (m)	21 (576)
MAP REF (260 ser.)	V20 459126	MAX DEPTH (m)	42 (576)
LAKE TYPE	landslip	LAKE AREA (km^2)	1.47
MAIN INFLOW	Papakiri Stream	CATCHMENT AREA (km^2) (land and lake)	29.03
MAIN OUTFLOW	Mahiaruhe Stream	CATCHMENT No. (MWD)	225032
LEVEL CHANGES	-	DATA BASE CODE (MAF)	258 TUTIRA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	3.6	pasture	90.5	flat (0–3°)	3.6
sand dune	-	tussock	-	undulating (4–7°)	13.0
cropland	-	lakes	5.9	rolling (8–15°)	26.3
lowland scrub	-	rivers	-	strongly rolling (16–20°)	10.3
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	30.6
native forest	-	urban	-	steep (26–35°)	10.4
exotic forest	-	other	-	very steep (>35°)	-
				lakes	5.9

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	14.2	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	35.0	10.7	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	34.3				
lakes	5.9				

GENERAL REMARKS

- SSE of Tutira township (351)
- bird sanctuary, one island (351)
- fishing, camping, etc (576)
- wildlife refuge (572)
- nonpower boating (576)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
51	1973	Burnet & Wallace	Primary productivity, nutrients, trout (1970).
52	1975	Burnet & Wallace	Eutrophication and trout.
196	1975	Flint	Phytoplankton.
244	1965	Grant	Long term study.
258	1959	Gunn	Fish stocks.
351	1975a	Irwin	Checklist of NZ lakes.
357	1978c	Irwin	Bathymetric chart.
-	-	Irwin pers comm	Water clarity.
417	1965	Mason	*Hydrilla* study.
430*	1978	McColl	Phosphorus loadings and management.
-	1979	RWB pers comm	Miscellaneous data (1977-79).
572	1974	Tierney	Lake management.
576	1976	Tutira Technical Committee	Lake management (1973-76).

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

LAKE TUTIRA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	0%	t°C	n.s.	date	summer	576
max	80.7%	t°C	n.s.	date	winter	576
mean	-	n	-	period	-	
period of lowest oxygen	summer					576
Remarks: Sampling strategy not given (576).						

TEMPERATURE (°C)				REFS
min	10° (Jul-Oct)	(surface)	10° (Jul-Oct) (bottom)	576
max	24° (summer)	(surface)	10° (all year) (bottom)	576
max difference top to bottom	10°C			576
stratification	stratified in summer			51,576
Remarks:				

SECCHI DISC DEPTH (m)					REFS
min	0.9	date	summer		576
max	5.4	date	winter		Irwin p.c.
mean	2.5	n	n.s.	period 1973-76	576
period of worst clarity	summer				576
causes	algae				576
Remarks:					

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n	- date -	
period of blooms	occasional large algal blooms			572,576
algae	green algae-winter, blue-green-summer			RWB
Remarks: Scums and odour noteable (576). Algae species - *Staurastrum, Closterium, Melosira, Microcystis, Anabaena* (576).				

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	576
		Hydrilla sp.	576
Remarks: Prolific littoral growth (576).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae, limnology	572
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	576
phytoplankton (algae)	51,576
macrophytes	576
zooplankton	576
macroinvertebrates	-
fish	576
wildlife	-
Remarks:	

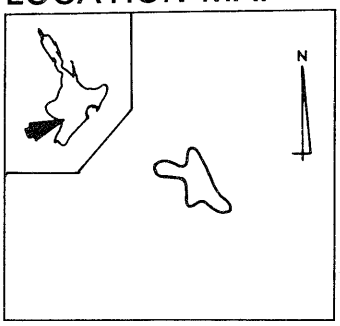
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	576	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Pmax, oxygen deficit (576).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE VIPAN

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	30-61
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.5 (NW)
MAP REF (NZMS1)	N143 772671	MEAN DEPTH (m)	2.5 (RWB)
MAP REF (260 ser.)	S23 023212	MAX DEPTH (m)	6.7 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.05
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	1.11
MAIN OUTFLOW	intermittent surface outflow	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	308 VIPAN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	67.6
sand dune	-	tussock	-
cropland	-	lakes	n.d.
lowland scrub	-	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	32.4	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	67.6
rolling (8–15°)	-
strongly rolling (16–20°)	-
moderately steep (21–25°)	32.4
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	100				
lakes	n.d.				

GENERAL REMARKS

- NW of Lake Alice, landward side of coastal dunes (351)
- moderately popular for duck shooting (RWB)
- septic tanks for 15 residents (RWB)
- stock, domestic and firefighting water supply (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1979).
579	1982	Vant	Trophic status (1982).

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

LAKE VIPAN

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min < 1.5 g m^{-3} t°C n.s. date March 1982	579
max *8.3 g m^{-3} t°C n.s. date 1979	RWB
mean - n - period -	
period of lowest oxygen summer	579
Remarks: *Possibly a surface measurement. Single measurement only (579).	

TEMPERATURE (°C)	REFS
min - (surface) - (bottom)	
max 31 (n.s.) (surface) - (bottom)	385
max difference top to bottom -	
stratification -	
Remarks:	

SECCHI DISC DEPTH (m)	REFS
min 2.3 date March 1982	579
max - date -	
mean 2.67 n 6 period 1979	RWB
period of worst clarity -	
causes algae	385
Remarks: Sampling strategy not specified (385).	

CHLOROPHYLL A, PHYTOPLANKTON	REFS
min - date -	
max - date -	
mean 16 mg m^{-3} n 1 date 3/82	579
period of blooms some scum	385
algae species dominance variable	385
Remarks:	

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha orientalis	385	*Nitella christata*	385
		Chara corallina	385
		Myriophyllum propinquum	385
		Potamogeton crispus	385
		P. cheesemanii	385
Remarks:			

TROPHIC STATUS	BASIS	REFS
mesotrophic?	chlorophyll	579
oligotrophic	total P	579
moderately eutrophic	algae	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	-
macrophytes	385
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

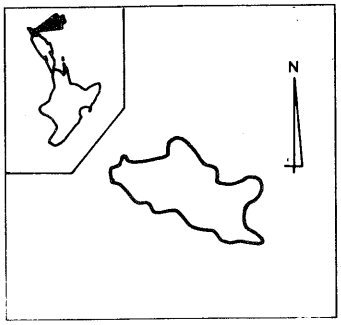
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAHAKARI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mangonui	ALTITUDE (m a.s.l.)	30.6
WATER BOARD	Northland	LONG AXIS (km)	1.6 (WNW)
MAP REF (NZMS1)	N4 415242	MEAN DEPTH (m)	-
MAP REF (260 ser.)	N02 038278	MAX DEPTH (m)	12 (351)
LAKE TYPE	dune	LAKE AREA (km^2)	0.9
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	11.01
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	9 WAHAKARI

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	28.5
sand dune	4.9	tussock	-
cropland	-	lakes	8.2
lowland scrub	34.2	rivers	-
subalpine scrub	-	ice and snow	-
native forest	-	urban	-
exotic forest	-	other	24.2

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	-
undulating (4–7°)	-
rolling (8–15°)	39.1
strongly rolling (16–20°)	44.5
moderately steep (21–25°)	8.3
steep (26–35°)	-
very steep (>35°)	-
lakes	8.2

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	8.1	6.9	-	-	-
wind	4.4	4.9	-	-	24.2
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	43.4				
lakes	8.2				

GENERAL REMARKS

- WMW of Te Kao township (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
353	1976	Irwin	Bathymetric chart.

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

LAKE WAHAKARI

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 6.0		date 7/70		347
max 6.5		date 7/70		347
mean 6.3	n 3	period 7/70		347
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: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIAU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min -	t°C -		date -		
max 103%	t°C 19		date 1/49		136
mean -	n -		period -		
period of lowest oxygen -					
Remarks: Single visit, 1 site, 1 sample (136).					

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 19 (1/49)	(surface) 18.5 (1/49)	(bottom)	136
max difference top to bottom -			
stratification mixed			136
Remarks: Single value only (136).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 72.5	date 1/49		126
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single value only (136).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean -	n -	date -	
period of blooms -			
algae sparse algal growth			136
Remarks:			

pH READINGS			REFS
min -	date -		
max 78.4	date 1/49		136
Remarks: Single value only (136).			

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha *Scirpus*	136 136	*Potamogeton*	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks:	

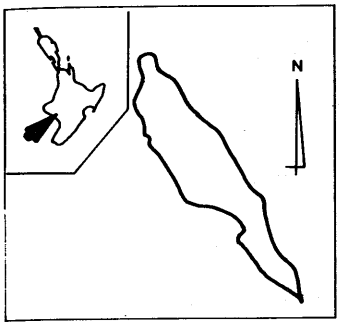
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIAU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitotara	ALTITUDE (m a.s.l.)	n.d.
WATER BOARD	Taranaki	LONG AXIS (km)	1.3 (NNW)
MAP REF (NZMS1)	N137 230032	MEAN DEPTH (m)	1.4 (136)
MAP REF (260 ser.)	R22 537556	MAX DEPTH (m)	3.3 (136)
LAKE TYPE	dune	LAKE AREA (km²)	0.28
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	4.56
MAIN OUTFLOW	Waiau Stream	CATCHMENT No. (MWD)	397000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	292 WAIAU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	20.8	pasture	73.0	flat (0–3°)	59.6	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	24.3	sheet	-	-	-	-	-
cropland	-	lakes	6.1	rolling (8–15°)	9.9	wind	-	2.9	-	-	-
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	6.1	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	91.0				
						lakes	6.1				

GENERAL REMARKS

- SE Waverley (351)
- wildlife reserve
- source of Waiau Stream

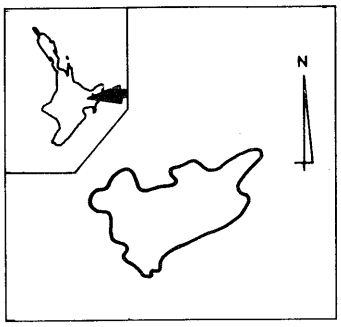
INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lake (1949).
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 WAIKAREITI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wairoa	ALTITUDE (m a.s.l.)	881-914
WATER BOARD	Hawke's Bay	LONG AXIS (km)	3.3 (NE)
MAP REF (NZMS1)	N96 576335	MEAN DEPTH (m)	-
MAP REF (260 ser.)	W18 715686	MAX DEPTH (m)	-
LAKE TYPE	landslip	LAKE AREA (km^2)	3.33
MAIN INFLOW	n.d.	CATCHMENT AREA (km^2) (land and lake)	13.71
MAIN OUTFLOW	n.d.	CATCHMENT No. (MWD)	214042
LEVEL CHANGES	-	DATA BASE CODE (MAF)	211 WAIKRT

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975-78)

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	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	24.2	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	29.8	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	46.0	soil slip	-	-	-	-	-
native forest	75.8	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	24.2	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	75.8				
						lakes	24.2				

GENERAL REMARKS

- upstream from Lake Waikaremoana (351)
- scenic reserve
- six islands (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
92	1975	Chapman *et al*	Zooplankton.
351	1975a	Irwin	Checklist of NZ lakes.
378	1968	Jolly	Comparative limnology of NZ lakes (up to 1958).

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

LAKE WAIKAREITI

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min -	t°C -	date -		
max 6.35 g m^{-3}	t°C n.d.	date 2/57		378
mean -	n -	period -		
period of lowest oxygen -				
Remarks: Single visit, 3 depths sampled at 1 site (378).				

TEMPERATURE (°C)			REFS
min -	(surface) -	(bottom)	
max 19° (2/57)	(surface) -	(bottom)	378
max difference top to bottom -			
stratification -			
Remarks: Single visit, no comment given on thermal stratification (378).			

SECCHI DISC DEPTH (m)			REFS
min -	date -		
max 11.5	date 2/57		378
mean -	n -	period -	
period of worst clarity -			
causes -			
Remarks: Single visit, single site (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	
macroinvertebrates	
fish	
wildlife	
Remarks: No data found.	

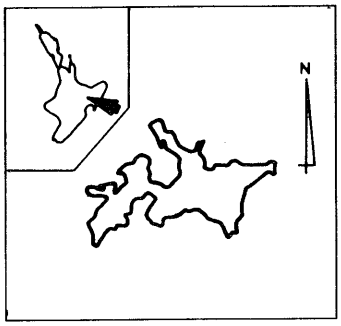
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients		particulates	
major ions		redox	
trace elements		salinity	
organic matter		alkalinity	
toxic organics		hardness	
pigments		silica	
optical properties		other	
Remarks: None found.			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIKAREMOANA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wairoa	ALTITUDE (m a.s.l.)	585
WATER BOARD	Hawke's Bay	LONG AXIS (km)	16.0 (ENE)
MAP REF (NZMS1)	N105 523267	MEAN DEPTH (m)	-
MAP REF (260 ser.)	W18 665626	MAX DEPTH (m)	248 (351)
LAKE TYPE	landslide	LAKE AREA (km²)	55.74
MAIN INFLOW	3 main streams	CATCHMENT AREA (km²) (land and lake)	347.42
MAIN OUTFLOW	Waikare-Taheke River	CATCHMENT No. (MWD)	214042
LEVEL CHANGES	level raised for HEP	DATA BASE CODE (MAF)	215 WAIKAREMN

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1975)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	0.3	pasture	-	flat (0–3°)	0.3	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	4.0	sheet	1.5	1.3	-	-	-
cropland	-	lakes	16.0	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	17.7	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	21.1	soil slip	3.4	-	-	-	-
native forest	83.7	urban	-	steep (26–35°)	33.3	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	7.6	slump	-	-	-	-	-
				lakes	16.0	debris avalanche	24.3	9.1	1.5	2.5	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	40.5				
						lakes	16.0				

GENERAL REMARKS

- NW of Tuai Village (351)
- 2 islands in SW arm (351)
- controlled for hydro-electric power (351)
- originated 2,200 years ago (378)
- deepest lake in the North Island (378)
- 2 main basins in lake (408)
- multiple recreational use
- in Urewera National Park

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
69	1951	Carter	Description.
81*	1978	Cassie	Phytoplankton, seasonal changes in density (1973-74).
92	1975	Chapman *et al*	Zooplankton.
200	1975	Forsyth	Benthic fauna.
236	1977	Glasby & Main	Water chemistry (1972).
281	1969e	Hill	Weed report.
287	1971a	Hill	Analytical data.
347	1974a	Irwin	Water clarity (1972).
351	1975a	Irwin	Checklist of NZ lakes.
354	1977	Irwin	Bathymetric chart.
376	1959	Jolly	Limnological study.
378*	1968	Jolly	Comparative limnology of NZ lakes (1957).
408*	1976	Main	Morphology and benthic fauna (1972).
411	1927	Marshall	Origin of lake.
463	1978	Mylechreest	Benthic fauna and trout ecology.
482	1932	Ongley	Description.
554*	1975c	Stout	Brief discussion.

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

LAKE WAIKAREMOANA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min	55.0%	t°C	n.s.	date	1973-74	81
max	95.0%	t°C	9.2	date	March 1957	378
mean	-	n	-	period	-	
period of lowest oxygen	-					
Remarks: Number of samples not specified (81).						

TEMPERATURE (°C)						REFS
min	9.0 (7/57)	(surface)	8.5 (7/57)	(bottom)		378
max	20 (2/57)	(surface)	8.5 (3/57)	(bottom)		378
max difference top to bottom	8.6°C					378
stratification	stratified much of year					81
Remarks:						

SECCHI DISC DEPTH (m)					REFS
min	7.0	date	July 1957		378
max	15.0	date	September 1972		347
mean	12.2	n	10	period 9/72	347
period of worst clarity	-				
causes	-				
Remarks: Humic material in water (347).					

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n	- date -	
period of blooms	-			
algae	*Staurastrum, Volvox, Ceratium*			554
Remarks:				

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	463
		Potamogeton sp.	463
		Myriophyllum sp.	463
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	not specified	554
oligotrophic	not specified	81
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	81,554
macrophytes	-
zooplankton	554
macroinvertebrates	408
fish	-
wildlife	-
Remarks:	

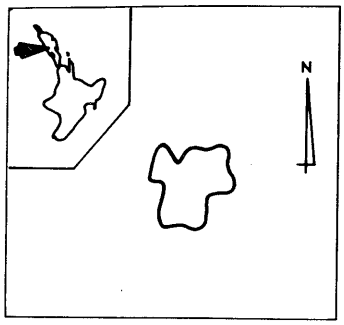
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	81,236	redox	-
trace elements	81,236	salinity	-
organic matter	-	alkalinity	81,236, 378,554
toxic organics	-	hardness	236
pigments	-	silica	236
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIKERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	79
WATER BOARD	Northland	LONG AXIS (km)	0.8 (EW)
MAP REF (NZMS1)	N22 152868	MEAN DEPTH (m)	15 (RWB)
MAP REF (260 ser.)	007 677004	MAX DEPTH (m)	30 (351)
LAKE TYPE	dune	LAKE AREA (km²)	0.35
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km²) (land and lake)	1.64
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	41 WAIKERE

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1967)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	54.3	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	-	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	37.2	wind	-	59.8	-	-	-
lowland scrub	45.7	rivers	-	strongly rolling (16–20°)	17.1	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	45.7	soil slip	-	-	-	-	-
native forest	-	urban	-	steep (26–35°)	-	earth slip	-	-	-	-	-
exotic forest	-	other	-	very steep (>35°)	-	slump	-	-	-	-	-
				lakes	n.d.	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	40.2	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	-				
						lakes	n.d.				

GENERAL REMARKS

- NNW of Kai-iwi Stream mouth (351)
- popular for swimming, boating (RWB)
- adjacent to consolidated sand dunes (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
83	1980	Cassie & Freeman	Phytoplankton and chemistry (1976-77).
336	1971a	Irwin	Bathymetric chart.
347	1974a	Irwin	Water clarity (1970).
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Resource survey data - see Cassie & Freeman 1980.

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

LAKE WAIKERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	9.5 g m^{-3}	t°C	18	date 12/76	83
max	11.2 g m^{-3}	t°C	15	date 5/77	83
mean	-	n	12	period 1976-77	-
period of lowest oxygen	-				
Remarks: 3 visits, 4 depths sampled near deepest part of lake (83).					

TEMPERATURE (°C)				REFS
min	12.8 (9/77)	(surface) 12.8 (9/77)	(bottom)	83
max	21 (12/76)	(surface) 18 (12/76)	(bottom)	83
max difference top to bottom	3°C			83
stratification	not evident			83
Remarks: 3 visits, 4 depths, 1 site (83).				

SECCHI DISC DEPTH (m)				REFS
min	-	date -		
max	9.0	date 8/70		347
mean	-	n -	period -	
period of worst clarity	-			
causes	-			
Remarks: Single value only (347).				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date -	
period of blooms	-			
algae	*Peridinium, Hyalotheca, Staurastrum*			83
Remarks:				

pH READINGS				REFS
min	6.25	date	12/76	83
max	6.9	date	12/76	83
Remarks: 12 readings, 3 visits, 4 depths, 1 site (83).				

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

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	83
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	83
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

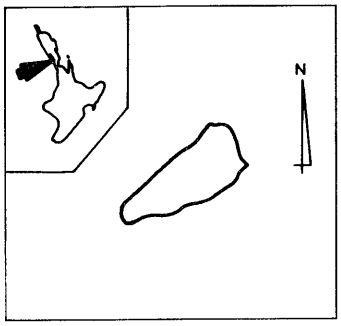
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	83	particulates	-
major ions	-	redox	83
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAINGATA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Hobson	ALTITUDE (m a.s.l.)	30-61
WATER BOARD	Northland	LONG AXIS (km)	0.6 (NE)
MAP REF (NZMS1)	N33 675204	MEAN DEPTH (m)	3 (RWB)
MAP REF (260 ser.)	P09 138383	MAX DEPTH (m)	8 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.12
MAIN INFLOW	surface inflow not apparent	CATCHMENT AREA (km^2) (land and lake)	0.57
MAIN OUTFLOW	surface outflow not apparent	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	63 WAINGATA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1964-75)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	100
sand dune	-	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°)	96.5
strongly rolling (16–20°)	3.5
moderately steep (21–25°)	-
steep (26–35°)	-
very steep (>35°)	-
lakes	-

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	96.5	-	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	3.5	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	-				
lakes	n.d.				

GENERAL REMARKS

- NW of Poutu township (351)
- in sand and swampland (351)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
83	1980	Cassie & Freeman	Phytoplankton and chemistry (1976, 1977).
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
-	-	Freshwater Section	DSIR Taupo, pers comm. Miscellaneous data.
167	1966b	Fish	Trout population (1960-65).
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Resource survey data (1976-77), same as Cassie and Freeman (1980).
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 WAINGATA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN				REFS
min 5.0 g m^{-3}	t°C 20.5	date December 76		83
max 11.9 g m^{-3}	t°C 11.0	date Sept 1977		83
mean n.s.	n -	period -		83
period of lowest oxygen	summer for brief periods			83
Remarks: 4 visits, 4 depths at deepest part of lake (83).				

TEMPERATURE (°C)				REFS
min 11.0 (9/77)	(surface) 11 (9/77)	(bottom)		83
max 23.5 (12/76)	(surface) 20.5 (12/76)	(bottom)		83
max difference top to bottom	3°C (12/76)			83
stratification	slightly stratified in summer			83,167
Remarks: 4 visits, 4 depths (83).				

SECCHI DISC DEPTH (m)			REFS
min 0.2	date n.d.		F.Water Section p.c.
max 3.0	date n.d.		F.Water Section 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 *Staurodesmus, Staurastrum, Peridinium*			83
Remarks:			

pH READINGS		REFS
min 6.5	date December 1976	83
max 7.5	date December 1977	83
Remarks: 4 visits, 4 depths at deepest part of lake (83).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis	136	*Chara gymnopitys*	136,167
Cladium	136	Characeae	136,167
		Potamogeton	136,167
		Elodea canadensis	136,167
Remarks:			

TROPHIC STATUS	BASIS	REFS
oligotrophic	algae	83
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	83,167
macrophytes	136,167
zooplankton	167
macroinvertebrates	136,167
fish	136,167
wildlife	136
Remarks:	

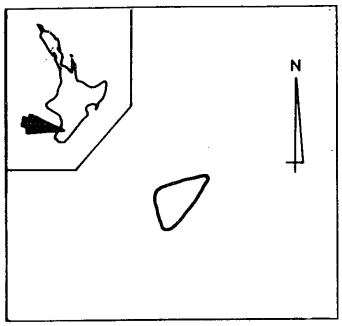
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	83,167	particulates	-
major ions	167	redox	83
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIORONGOMAI

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Horowhenua	ALTITUDE (m a.s.l.)	30
WATER BOARD	Manawatu	LONG AXIS (km)	0.5 (NNE)
MAP REF (NZMS1)	N152 670919	MEAN DEPTH (m)	-
MAP REF (260 ser.)	R25 910528	MAX DEPTH (m)	1.0 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.11
MAIN INFLOW	streams	CATCHMENT AREA (km²) (land and lake)	2.06
MAIN OUTFLOW	Waiorongomai Stream	CATCHMENT No. (MWD)	319000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	343 WAIORNGM

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	71.8
sand dune	28.2	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°)	71.8
rolling (8–15°)	-
strongly rolling (16–20°)	28.2
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	1.5	26.7	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	71.8				
lakes	n.d.				

GENERAL REMARKS

- W of Manakau (351)
- duck shooting (RWB)
- stock watering (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
137	1980	Currie & Gilliland	Baseline water quality survey (1978).
351	1975a	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Water clarity (1976-77).

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

LAKE WAIORONGOMAI

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: Surface oxygen given (137). No depletion observed (RWB).	

TEMPERATURE (°C)	REFS
min 9.5 (6/78) (surface) 12.0 (6/78) (bottom)	137
max - (surface) - (bottom)	
max difference top to bottom -	
stratification -	
Remarks: 5 visits, 1 site (137).	

SECCHI DISC DEPTH (m)	REFS
min 0.15 date 5/77	RWB
max 0.7 date 11/77	RWB
mean 0.34 n 6 period °976-77	RWB
period of worst clarity -	
causes -	
Remarks:	

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

pH READINGS	REFS
min 7.8 date 6/78	137
max 8.7 date 5/78	137
Remarks: 5 visits, single site (137).	

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Moderate growths of submergent species (RWB).			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	137
phytoplankton (algae)	-
macrophytes	-
zooplankton	-
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

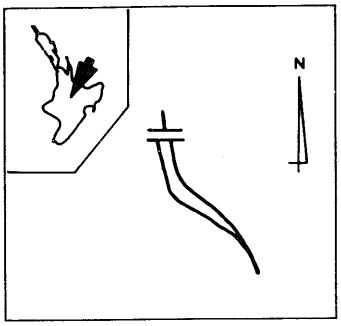
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	137	particulates	137
major ions	137	redox	137
trace elements	137	salinity	-
organic matter	-	alkalinity	137
toxic organics	-	hardness	137
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIPAPA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo/Matamata border	ALTITUDE (m a.s.l.)	129.5
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	1.6 (NNW)
MAP REF (NZMS1)	N84 174850	MEAN DEPTH (m)	-
MAP REF (260 ser.)	T16 447193	MAX DEPTH (m)	16.5 (403)
LAKE TYPE	reservoir	LAKE AREA (km^2)	5.5
MAIN INFLOW	Waikato River	CATCHMENT AREA (km^2) (land and lake)	258.31
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	188 WAIPAPA

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	0.1	pasture	27.6	flat (0–3°)	0.1
sand dune	-	tussock	-	undulating (4–7°)	1.4
cropland	-	lakes	n.d.	rolling (8–15°)	15.5
lowland scrub	17.3	rivers	0.5	strongly rolling (16–20°)	7.6
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	43.5
native forest	35.0	urban	-	steep (26–35°)	28.9
exotic forest	19.6	other	-	very steep (>35°)	2.4
				lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	18.7	0.5	-	-	-
wind	-	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	2.3	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	77.9				
lakes	n.d.				

GENERAL REMARKS

- NNW of Mangakino (351)
- 5th reservoir in Waikato hydro-lake sequence (289)
- filled in 1961 (289)
- little change in water quality and biology of river during passage through lake (560)
- monthly mean discharge 211 m^3 sec^{-1}
- retention period 0.34 days (403)
- geothermal spring discharge in inflow (403)
- effluent from Kinleith pulp and paper mill; sewage from Mangakino (403)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
98	1970a	Chapman	History of lake weed infestation.
123	1975a	Coffey	Macrophyte distribution.
141	1984	Davis & Simons	Phytoplankton (1980-83).
289	1975	Hill	Brief description.
351	1975a	Irwin	Checklist of NZ lakes.
371	1981	Johnstone	Weed management in hydro lakes (up to 1981).
403*	1973	Magadza	Comparative limnology.
404	1978	Magadza	Phytoplankton (1970-72).
405*	1979	Magadza	Physical and chemical limnology (1970-72).
406	1980	Magadza	Seasonal productivity.
466	1970a	NZED	Electricity Division, effects of lowering lake level.
517	1972	Robertson-Glasgow	Water plant survey (1972).
560*	1979	Strachan	Resource survey, water quality, algae, macrophytes (1976-1977).
604	1968	Wilson & Gibbs	Water plant survey.

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

LAKE WAIPAPA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 75.4%	t°C n.s.	date n.s.			405
max 116.1%	t°C n.s.	date n.s.			405
mean 95.0%	n 18	period 8/70-3/72			405
period of lowest oxygen n.s.					405
Remarks: Monthly sampling at 1 site (405).					

TEMPERATURE (°C)			REFS
min 11.1 (7/71) (surface)	-	(bottom)	403
max 20.5 (2/71) (surface)	-	(bottom)	403
max difference top to bottom 2.7°C (2/71)			403
stratification mixed			405
Remarks:			

SECCHI DISC DEPTH (m)			REFS
min 1.5	date 11/70-1/71		405
max 3.5	date 8/71		405
mean 2.3	n 18	period 8/70-3/72	405
period of worst clarity summer			405
causes Kinleith effluent?			405
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 8.5 mg m^{-3}	date August 1971		404
max 257.3 mg m^{-3}	date March 1972		404
mean 69.1 mg m^{-3}	n 18	date 8/70-3/72	404
period of blooms -			
algae *Bosmina, Asplanchna, Calamoecia*			403
Remarks: Algae continued : *Melosira, Asterionella* (403).			

pH READINGS		REFS
min 6.4	date February 1971	403
max 8.2	date July 1971	403
Remarks:		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Egeria	371
		Ceratophyllum	517,560
		Elodea canadensis	403
Remarks: No significant changes since *Egeria* established as dominant species in late 1971 (371). Complex series of changes in species (123).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae	560
eutrophic	algae, productivity	404,406
Remarks: Nutrients from Maraetai (403).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	141,404,560
macrophytes	371,517,560
zooplankton	560
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

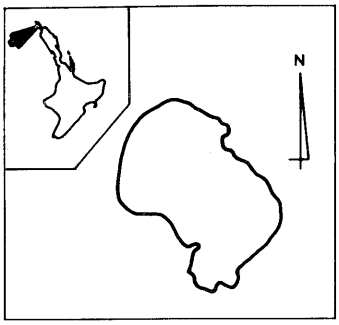
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	405,560	particulates	-
major ions	560	redox	405,560
trace elements	560	salinity	560
organic matter	-	alkalinity	405,560
toxic organics	-	hardness	405,560
pigments	-	silica	-
optical properties	-	other tannins	560
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIPARERA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Mangonui	ALTITUDE (m a.s.l.)	0.3
WATER BOARD	Northland	LONG AXIS (km)	1.4 (NNW)
MAP REF (NZMS1)	N6 681895	MEAN DEPTH (m)	3.2 (136)
MAP REF (260 ser.)	N04 273954	MAX DEPTH (m)	6.0 (351)
LAKE TYPE	dune	LAKE AREA (km²)	1.15
MAIN INFLOW	surface stream	CATCHMENT AREA (km²) (land and lake)	3.80
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	22 WAIPARR

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	62.6	flat (0–3°)	11.3	type \ severity	1	2	3	4	5
sand dune	7.1	tussock	-	undulating (4–7°)	10.5	sheet	-	-	-	-	-
cropland	-	lakes	30.3	rolling (8–15°)	-	wind	-	-	7.1	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	47.9	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	30.3	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	-	-	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	-	-	-	-	-
						deposition	-	-	-	-	-
						negligible	62.6				
						lakes	30.3				

GENERAL REMARKS

- NNW of Waiharara (351)
- between coastal sand dunes and scrub covered country (351)
- some peat on lake margin (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1950).
196	1975	Flint	Phytoplankton.
200	1975	Forsyth	Benthic fauna.
347	1974a	Irwin	Water clarity (1970).
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 WAIPARERA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	-	t°C	-	date -	
max	107%	t°C	22.2	date 2/50	136
mean	-	n	-	period -	
period of lowest oxygen -					
Remarks: Single value only (136).					

TEMPERATURE (°C)				REFS
min	-	(surface) -	(bottom)	
max	22.2 (2/50)	(surface) -	(bottom)	136
max difference top to bottom -				
stratification mixed				136
Remarks: Single value only (136).				

SECCHI DISC DEPTH (m)				REFS
min	1.5	date	7/70	347
max	2.5	date	2/50	136
mean	-	n -	period -	
period of worst clarity -				
causes -				
Remarks: 1 site, 2 readings (347). Single value only (136).				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date -	
period of blooms -				
algae *Anacystis, Ceratium, Peridinium*				196
Remarks:				

pH READINGS				REFS
min	-	date	-	
max	6.6	date	2/50	136
Remarks: Single value only (136).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Eleocharis *Cladium*	136 136	*Chara australis*	136
Remarks:			

TROPHIC STATUS	BASIS	REFS
Remarks: No data found.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136,196
macrophytes	136
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	-
Remarks:	

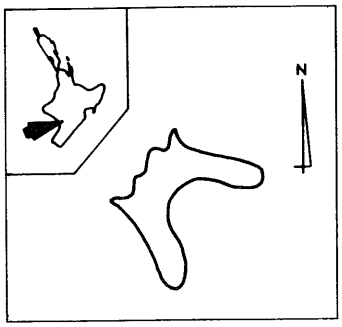
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136	particulates	-
major ions	136	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIPU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Rangitikei	ALTITUDE (m a.s.l.)	21
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	0.8 (N)
MAP REF (NZMS1)	N143 679731	MEAN DEPTH (m)	2.2 (RWB)
MAP REF (260 ser.)	R23 940270	MAX DEPTH (m)	4.7 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.12
MAIN INFLOW	1, occasionally 2 streams	CATCHMENT AREA (km^2) (land and lake)	5.64
MAIN OUTFLOW	1 intermittent stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	306 WAIPU

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	100
sand dune	-	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°)	80.1
undulating (4–7°)	0.2
rolling (8–15°)	16.7
strongly rolling (16–20°)	-
moderately steep (21–25°)	2.8
steep (26–35°)	0.2
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	0.2	2.5	-	-	-
scree creep	-	-	-	-	-
soil slip	0.2	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	16.7	-	-	-	-
deposition	-	-	-	-	-
negligible	80.5				
lakes	n.d.				

GENERAL REMARKS

- SSE of Whangaehu (351)
- landward side of coastal dunes
- used for duck shooting stock and domestic water supply (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
351	1975	Irwin	Checklist of NZ lakes.
-	1979	RWB pers comm	Water quality data (1978-79).
579	1982	Vant	Trophic status (1982).

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

LAKE WAIPU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN	REFS
min 4.7 g m^{-3} t°C n.s. date 1978-79	RWB
max 8.4 g m^{-3} t°C n.s. date 1978-79	RWB
mean - n - period -	
period of lowest oxygen -	
Remarks: 23 samples (RWB).	

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 0.35	date March 1982		579
max -	date -		
mean 0.37	n 23	period 1978-79	RWB
period of worst clarity –			
causes mud			RWB
Remarks: Single reading (579).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	date -		
max -	date -		
mean 65 mg m^{-3}	n 1	date 3/82	579
period of blooms -			
algae -			
Remarks: Few algae (RWB).			

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Remarks: Sparse weeds, restricted to outlet area (RWB).			

TROPHIC STATUS	BASIS	REFS
eutrophic	total P, chlorophyll	579
Remarks:		

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

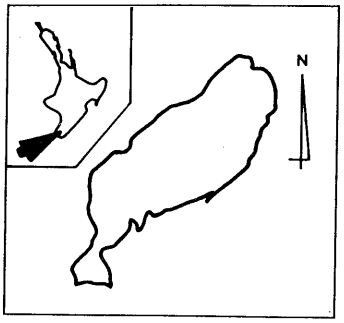
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAIRARAPA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Featherston	ALTITUDE (m a.s.l.)	0.1
WATER BOARD	Wairarapa	LONG AXIS (km)	18.2 (NE)
MAP REF (NZMS1)	N161 777323	MEAN DEPTH (m)	1.5 (196)
MAP REF (260 ser.)	S27 993980	MAX DEPTH (m)	2.5 (351)
LAKE TYPE	riverine	LAKE AREA (km²)	79.84
MAIN INFLOW	Tauherenikau River	CATCHMENT AREA (km²) (land and lake)	3167.65
MAIN OUTFLOW	Ruamahanga River	CATCHMENT No. (MWD)	292060
LEVEL CHANGES	-	DATA BASE CODE (MAF)	356 WAIRARP

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-77)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	0.1	pasture	70.9
sand dune	-	tussock	1.6
cropland	0.1	lakes	2.5
lowland scrub	7.0	rivers	0.5
subalpine scrub	0.7	ice and snow	-
native forest	15.3	urban	0.7
exotic forest	0.6	other	-

DOMINANT SLOPE (% CATCH.AREA)	
flat (0–3°)	28.2
undulating (4–7°)	3.1
rolling (8–15°)	3.4
strongly rolling (16–20°)	8.0
moderately steep (21–25°)	24.6
steep (26–35°)	16.1
very steep (>35°)	12.9
lakes	2.5

DOMINANT EROSION (% CATCH.AREA) type \ severity	1	2	3	4	5
sheet	4.6	0.9	-	-	-
wind	0.4	0.1	-	-	-
scree creep	7.3	0.9	0.1	-	-
soil slip	11.8	4.5	0.6	0.1	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	3.3	3.6	1.3	-	-
earthflow	4.8	3.9	0.5	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	0.3	0.1	0.1	-	-
tunnel gully	3.1	0.5	-	-	-
streambank	2.9	0.2	-	-	-
deposition	-	-	-	-	-
negligible	41.1				
lakes	2.5				

GENERAL REMARKS

- SSW of Featherston (351)
- valuable recreational resource for fishing, boating, shooting, wildlife
- used for floodwater storage

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
1	1949	Allen	Brief description.
92	1975	Chapman *et al*	Zooplankton.
109-	ongoing	Chemistry Division	Water analyses.
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.

LAKE WAIRARAPA

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 *Pediastrum*				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
eutrophic	algae	196
Remarks:		

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

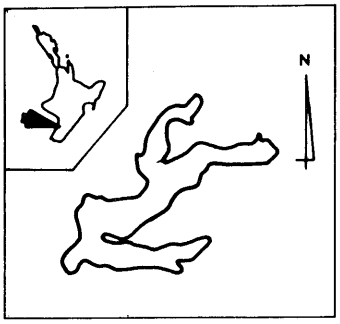
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	-	particulates	-
major ions	-	redox	-
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks: Check Chemistry Division (109).			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WAITAWA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Horowhenua	ALTITUDE (m a.s.l.)	0.3
WATER BOARD	Manawatu	LONG AXIS (km)	1.1 (ENE)
MAP REF (NZMS1)	N152 696903	MEAN DEPTH (m)	3.9 (136)
MAP REF (260 ser.)	R25 934512	MAX DEPTH (m)	7.5 (136)
LAKE TYPE	dune	LAKE AREA (km^2)	0.32
MAIN INFLOW	surface stream	CATCHMENT AREA (km^2) (land and lake)	2.56
MAIN OUTFLOW	to Waikawa River?	CATCHMENT No. (MWD)	320000
LEVEL CHANGES	-	DATA BASE CODE (MAF)	345 WAITAWA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1974-79)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	-	pasture	100	flat (0–3°)	-	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	97.3	sheet	-	-	-	-	-
cropland	-	lakes	n.d.	rolling (8–15°)	-	wind	-	-	-	-	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	2.7	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	100				
						lakes	n.d.				

GENERAL REMARKS

- WSW of Manakau
- youth camp ground, swimming, boating (RWB)
- stock watering, irrigation (RWB)
- lake sheltered, surrounded by raupo (136)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1949, 1952).
137*	1980	Currie & Gilliland	Baseline water quality survey (1978).
196	1975	Flint	Phytoplankton.
351	1975a	Irwin	Checklist of NZ lakes.
-*	1979	RWB pers comm	Water clarity (1976-79).

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

LAKE WAITAWA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min	0%	t°C 16	date	1/49	136
max	48%	t°C 10	date	8/52	136
mean	-	n -	period	-	
period of lowest oxygen	January				136
Remarks: 2 visits, 1 site, 3 samples (136). Low oxygen also reported in 1977, 1978 (RWB).					

TEMPERATURE (°C)				REFS
min	9 (6/78)	(surface) -	(bottom)	137
max	24 (1/49)	(surface) -	(bottom)	136
max difference top to bottom	8°C			136
stratification	stratified			136
Remarks: Single visit (136). 5 visits (137).				

SECCHI DISC DEPTH (m)				REFS
min	0.35	date	2/76	RWB
max	2.3	date	6/78	137
mean	2.0	n 5	period 5,6/78	137
period of worst clarity	-			
causes	probably algae			RWB
Remarks:				

CHLOROPHYLL A, PHYTOPLANKTON				REFS
min	-	date	-	
max	-	date	-	
mean	-	n -	date -	
period of blooms	-			
algae	*Anacystis, Melosira, Closterium*			136,196
Remarks: Algal scum observed (RWB).				

pH READINGS				REFS
min	6.9	date	6/78	137
max	7.9	date	1/49	136
Remarks: 5 visits (137). Single visit (136).				

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	136		
Remarks: Sparse submerged vegetation and fauna (136).			

TROPHIC STATUS	BASIS	REFS
Remarks: Not determined.		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	137
phytoplankton (algae)	136, 196
macrophytes	136
zooplankton	-
macroinvertebrates	136
fish	136
wildlife	136
Remarks:	

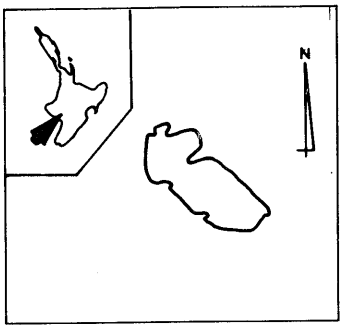
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,137	particulates	137
major ions	137	redox	137
trace elements	137	salinity	-
organic matter	-	alkalinity	137
toxic organics	-	hardness	137
pigments	-	silica	136
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WESTMERE

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Waitotara	ALTITUDE (m a.s.l.)	93
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	1.0 (NNW)
MAP REF (NZMS1)	N137 532908	MEAN DEPTH (m)	2.8 (RWB)
MAP REF (260 ser.)	R22 810435	MAX DEPTH (m)	5.6 (RWB)
LAKE TYPE	dune	LAKE AREA (km²)	0.04
MAIN INFLOW	single surface stream	CATCHMENT AREA (km²) (land and lake)	1.45
MAIN OUTFLOW	single surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	292 WESTMR 1

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)			
swamp assoc.	-	pasture	100
sand dune	-	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°)	55.9
undulating (4–7°)	-
rolling (8–15°)	8.3
strongly rolling (16–20°)	-
moderately steep (21–25°)	35.9
steep (26–35°)	-
very steep (>35°)	-
lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	22.1	-	-	-	-
wind	13.8	-	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	64.1				
lakes	n.d.				

GENERAL REMARKS

- NNE of Castlecliff, 4.5 km from coast (351)
- very sheltered; scattered sedges, raupo (136)
- dense bottom fauna (136)
- lake surrounded by willow (385)
- wildlife reserve (RWB)
- septic tank seepage 40 residents (RWB)
- stockwatering (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham	Survey of dune lakes (1949).
351	1975	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1978).
-	1979	RWB pers comm	Water quality data (1978-79).
579	1982	Vant	Trophic status (1982).

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

LAKE WESTMERE

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN					REFS
min 0 g m^{-3}	**t °C** n.s.	**date** 1978-79			RWB
max 11.0 g m^{-3}	**t °C** n.s.	**date** 1978-79			RWB
mean -	**n** -	**period** -			
period of lowest oxygen summer					136
Remarks: Sampling strategy not specified (RWB).					

TEMPERATURE (°C)			REFS
min -	**(surface)** -	**(bottom)**	
max 24 (1/49)	**(surface)** 17 (1/49)	**(bottom)**	136
max difference top to bottom 8°C			136
stratification stratified			136
Remarks: Single visit only (136).			

SECCHI DISC DEPTH (m)			REFS
min 0.66	**date** January 1949		136
max 0.8	**date** 3/82, 1/78		579,385
mean 0.5	**n** 40	**period** 1/77-12/78	RWB
period of worst clarity -			
causes algae; much organic matter			385,136
Remarks:			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min -	**date** -		
max -	**date** -		
mean 72 mg m^{-3}	**n** 1	**date** 3/82	579
period of blooms extensive in summer			RWB
algae -			
Remarks:			

pH READINGS		REFS
min -	**date** -	
max 8.4	**date** January 1949	136
Remarks: Single reading only (136).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	**refs.**	**submergent sp.**	**refs.**
Typha	385	*Potamogeton crispus*	385
Scirpus	385	*P. ochreatus*	385
		Myriophyllum elatinoides	385
Remarks: Extent of macrophytes restricted by willows in shallows of lake (385). *P. ochreatus* found no deeper than 1.5 m because of high turbidity (385).			

TROPHIC STATUS	BASIS	REFS
eutrophic	chlorophyll, total P	579
eutrophic	algae	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136,385
macrophytes	136,385
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	136.385
Remarks: Dominant species of zooplankton is *Ceratium* (136).	

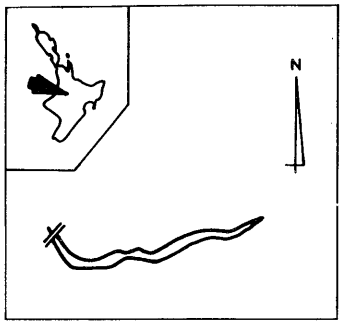
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	136,579	**particulates**	-
major ions	-	**redox**	-
trace elements	-	**salinity**	-
organic matter	-	**alkalinity**	-
toxic organics	-	**hardness**	-
pigments	-	**silica**	136
optical properties	-	**other**	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WHAKAMARU

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Taupo/Matamata Border	ALTITUDE (m a.s.l.)	229
WATER BOARD	Waikato Valley Authority	LONG AXIS (km)	15.0 (WNW/ENE)
MAP REF (NZMS1)	N84 320682	MEAN DEPTH (m)	-
MAP REF (260 ser.)	T16 576036	MAX DEPTH (m)	38 (403)
LAKE TYPE	reservoir	LAKE AREA (km²)	7.21
MAIN INFLOW	Waikato River	CATCHMENT AREA (km²) (land and lake)	561.86
MAIN OUTFLOW	Waikato River	CATCHMENT No. (MWD)	434002
LEVEL CHANGES	n.d.	DATA BASE CODE (MAF)	203 WHAKAMR

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

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)		DOMINANT EROSION (% CATCH.AREA)					
swamp assoc.	0.4	pasture	40.7	flat (0–3°)	2.2	type \ severity	1	2	3	4	5
sand dune	-	tussock	-	undulating (4–7°)	12.4	sheet	21.4	4.0	-	-	-
cropland	-	lakes	<0.1	rolling (8–15°)	11.4	wind	-	-	-	-	-
lowland scrub	5.4	rivers	1.2	strongly rolling (16–20°)	18.4	scree creep	-	-	-	-	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	37.6	soil slip	0.3	-	-	-	-
native forest	1.0	urban	-	steep (26–35°)	14.8	earth slip	-	-	-	-	-
exotic forest	51.2	other	-	very steep (>35°)	2.0	slump	-	-	-	-	-
				lakes	<0.1	debris avalanche	-	-	-	-	-
						earthflow	-	-	-	-	-
						mudflow	-	-	-	-	-
						rill	-	-	-	-	-
						gully	2.7	1.0	-	-	-
						tunnel gully	-	-	-	-	-
						streambank	2.4	0.1	-	-	-
						deposition	-	-	-	-	-
						negligible	66.8				
						lakes	<0.1				

GENERAL REMARKS

- SE of Mangakino (351)
- 4th reservoir in Waikato hydro-lake sequence (405)
- retention time 4.16 days (403)
- filled in 1956 (403)
- lake exposed to wind (560)
- geothermal discharge in inflow (403)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
76	1974c	Cassie	Algal flora.
98	1970a	Chapman	History of lake weed infestation.
123	1975a	Coffey	Macrophyte distribution.
279	1969c	Hill	Weed survey.
289	1975	Hill	Brief discussion of previous work.
313	1970a	Internal Affairs	Rotorua, weed control.
321	1972c	Internal Affairs	Rotorua, wildlife report.
351	1975a	Irwin	Checklist of NZ lakes.
371	1981	Johnstone	Weed management in hydro-lakes (up to 1981).
403*	1973	Magadza	Comparative limnology.
404	1978	Magadza	Phytoplankton (1970-72).
405*	1979	Magadza	Physical and chemical limnology (1970-72).
406	1980	Magadza	Seasonal productivity.
468	1970c	NZED	Weed control.
517	1972	Robertson-Glasgow	Water plant survey.
522	1966	Shanks	Weeds.
560*	1979	Strachan	Resource survey (1976, 1977).
604	1968	Wilson & Gibbs	Water plant survey.
611	1970	Wright	Weed control.

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

LAKE WHAKAMARU

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN						REFS
min 4.5%	t°C n.s.	date n.s.				405
max 133%	t°C n.s.	date n.s.				405
mean 98.4%	n 18	period 8/70-3/72				405
period of lowest oxygen n.s.						405
Remarks: Monthly sampling at 1 site (405).						

TEMPERATURE (°C)				REFS
min 11.6 (7/71)	(surface) n.s.	(bottom)		403
max 21 (3/77)	(surface) n.s.	(bottom)		560
max difference top to bottom 2.6°C				403
stratification mixed				405,560
Remarks: 2 visits only (560). 15 measurements (403).				

SECCHI DISC DEPTH (m)			REFS
min 1.4	date May 1972		517
max 4.0	date July 1971		405
mean 2.4	n 18	period 8/70-3/72	405
period of worst clarity n.s.			405
causes silt			517
Remarks: Monthly sampling at 1 site (405).			

CHLOROPHYLL A, PHYTOPLANKTON			REFS
min 12.4 mg m^{-3}	date May 1971		404
max 202.9 mg m^{-3}	date January 1971		404
mean 63.2 mg m^{-3}	n 25	date 8/70-3/72	404
period of blooms n.s.			404
algae *Melosira, Asterionella*			404,76
Remarks:			

pH READINGS		REFS
min 6.9	date n.s.	405
max 8.5	date n.s.	405
Remarks: Monthly sampling at 1 site (405).		

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
		Elodea canadensis	123,371
		Ceratophyllum demersum	123,371
		Egeria densa	123,371
		Lagarosiphon	371
Remarks: Macrophyte changes discussed (560). Complex series of changes (123).			

TROPHIC STATUS	BASIS	REFS
eutrophic	algae, primary productivity	404,405
eutrophic	algae	560
Remarks: Nitrogen losses exceed inputs in all seasons (405).		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	560
phytoplankton (algae)	404,560
macrophytes	371,404,560
zooplankton	560
macroinvertebrates	-
fish	-
wildlife	-
Remarks:	

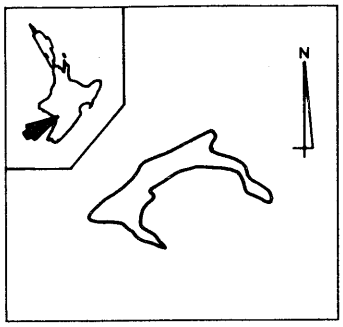
OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	405,560	particulates	-
major ions	560	redox	405,560
trace elements	-	salinity	560
organic matter	-	alkalinity	-
toxic organics	-	hardness	405,560
pigments	-	silica	-
optical properties	-	other tannins	560
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

LAKE WIRITOA

LOCATION MAP



LAKE AND CATCHMENT CHARACTERISTICS

DISTRICT	Wanganui	ALTITUDE (m a.s.l.)	44
WATER BOARD	Rangitikei-Wanganui	LONG AXIS (km)	1.6 (NE)
MAP REF (NZMS1)	N138 615813	MEAN DEPTH (m)	9.1 (RWB)
MAP REF (260 ser.)	R23 883346	MAX DEPTH (m)	19.5 (RWB)
LAKE TYPE	dune	LAKE AREA (km^2)	0.26
MAIN INFLOW	stream from Lake Pauri	CATCHMENT AREA (km^2) (land and lake)	1.19
MAIN OUTFLOW	surface stream	CATCHMENT No. (MWD)	-
LEVEL CHANGES	-	DATA BASE CODE (MAF)	300 WIRITOA

NEW ZEALAND LAND RESOURCE INVENTORY DATA (SURVEYED 1978)

DOMINANT COVER (% CATCH.AREA)				DOMINANT SLOPE (% CATCH.AREA)	
swamp assoc.	-	pasture	100	flat (0–3°)	38.7
sand dune	-	tussock	-	undulating (4–7°)	40.3
cropland	-	lakes	n.d.	rolling (8–15°)	-
lowland scrub	-	rivers	-	strongly rolling (16–20°)	-
subalpine scrub	-	ice and snow	-	moderately steep (21–25°)	21.0
native forest	-	urban	-	steep (26–35°)	-
exotic forest	-	other	-	very steep (>35°)	-
				lakes	n.d.

DOMINANT EROSION (% CATCH.AREA)					
type \ severity	1	2	3	4	5
sheet	-	-	-	-	-
wind	-	21.0	-	-	-
scree creep	-	-	-	-	-
soil slip	-	-	-	-	-
earth slip	-	-	-	-	-
slump	-	-	-	-	-
debris avalanche	-	-	-	-	-
earthflow	-	-	-	-	-
mudflow	-	-	-	-	-
rill	-	-	-	-	-
gully	-	-	-	-	-
tunnel gully	-	-	-	-	-
streambank	-	-	-	-	-
deposition	-	-	-	-	-
negligible	79.0				
lakes	n.d.				

GENERAL REMARKS

- SE of Durie Hill (351)
- coastal lake (351)
- septic tank seepage from 300 residences and Kaitoki Prison treatment plant (RWB)
- used as stock and domestic water supply (RWB)
- very popular for boating, water skiing, swimming (RWB)
- moderately popular for duck shooting (RWB)
- some fishing (RWB)

INFORMATION SOURCES

No.	DATE	AUTHOR(S)	OBJECT OF WORK REPORTED
136	1953	Cunningham *et al*	Survey of dune lakes (1949, 1952).
351	1975a	Irwin	Checklist of NZ lakes.
385	1978	Kelly	Macrophytes (1977-78).
-	1979	RWB pers comm	Water quality data (1978-79).
579	1982	Vant	Trophic status (1982).

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

LAKE WIRITOA

LAKE WATER CHEMISTRY AND BIOLOGY

HYPOLIMNION DISSOLVED OXYGEN		REFS
min <1.5 g m^{-3}	t °C n.s. date March 1982	579
max *12.3 g m^{-3}	t °C n.s. date 1978-79	RWB
mean -	n - period -	
period of lowest oxygen	summer	579
Remarks: Single sample only (579). *May be surface value; zero oxygen recorded at times (RWB).		

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 1.6	date 12/77-1/78	385
max 2.8	date 3/82	579
mean 2.4	n 34 period 1975-1978	RWB
period of worst clarity -		
causes algae		385
Remarks: Single readings only (385, 579). Readings taken twice monthly, intermittent (RWB).		

CHLOROPHYLL A, PHYTOPLANKTON		REFS
min -	date -	
max -	date -	
mean 4.3 mg m^{-3}	n 1 date 3/82	579
period of blooms	known to occur	385
algae -		
Remarks: Generally few algae except near inlet (RWB).		

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

DOMINANT OR PROBLEM GROWTH MACROPHYTES			
emergent sp.	refs.	submergent sp.	refs.
Typha	385	**Potamogeton crispus*	385
Azolla rubra	385	**P. ochreatus*	385
Lemna minor	385	**Myriophyllum elatinoides*	385
Spirodella punctata	385		
Wolffia australiana	385		
Remarks: Problem growths noted (385). *Form a band round the entire lake (385). Only lake in Rangitikei-Wanganui area with *Vallisneria giganta* present (385).			

TROPHIC STATUS	BASIS	REFS
oligotrophic?	chlorophyll, total P	579
eutrophic	macrophytes	385
Remarks:		

BIOLOGICAL INFORMATION AVAILABLE	
bacteria	-
phytoplankton (algae)	136
macrophytes	136,385
zooplankton	136
macroinvertebrates	136
fish	136
wildlife	136
Remarks:	

OTHER WATER QUALITY INFORMATION AVAILABLE			
nutrients	579	particulates	-
major ions	-	redox	385
trace elements	-	salinity	-
organic matter	-	alkalinity	-
toxic organics	-	hardness	-
pigments	-	silica	-
optical properties	-	other	-
Remarks:			

Refer to Introduction for explanation of box contents.

See opposite page for information sources.

Appendix

Table i: Information Sources Continued from Main Sheets

*Indicates data also given in Table ii

Lake Name	Ref No.	Date	Author(s)	Object of Work Reported
Lake Ohakuri	580*	1984	Vant & Davies-Colley	Water clarity (1983).
	604	1968	Wilson & Gibbs	Water plant survey.
Lake Okataina	511	1975	Richmond	Trophic status.
	536	1974a	Starling *et al.*	*Nitella* study.
	537	1974b	Starling *et al.*	*Nitella* study.
	564	1977	Taylor *et al.*	Groundwater influences.
	567	1972	Thomasson	Phytoplankton.
	569	1974	Thomasson	Phytoplankton.
Lake Rotoiti (NI)	163*	1963b	Fish	Weed growth.
	166*	1966a	Fish	Weed destruction effects.
	169*	1969a	Fish	Oxygen content.
	176	1972a	Fish	Lake survey report.
	177	1972b	Fish	Heat from sediments.
	178*	1975a	Fish	Trophic status.
	179	1975b	Fish	Nutrient budget (1967–70).
	182*	1969	Fish & Chapman	Synoptic survey.
	186	1973	Fisheries Research Div. MAF	Biological consequences of diversion.
	199	1972	Forest Service	Lake lowering.
	219	1972a	Freshwater Section, DSIR	Biological consequence of level changes.
	220	1972b	Freshwater Section, DSIR	Biological consequence of level changes.
	238	1961	Golding & Speer	Geochemistry.
	241	1971	Graham	Diquat effects.
	255	1968	Green *et al.*	Internal seiche.
	271	1975	Healy	Lake origin.
	318	1971d	Internal Affairs	Water quality.
	319	1972a	Internal Affairs	Wildlife report.
	325*	1968	Irwin	Temperature.
	326	1969a	Irwin	Bathymetric chart.
	351	1975a	Irwin	Checklist of NZ lakes.
	378*	1968	Jolly	Comparative limnology.
	428	1975	McColl	Chemical and biological conditions.
	496	1923	Phillips & Grigg	Geochemistry and trout conditions.
	511	1975	Richmond	Trophic status.
	532	1970	Spiller	Weed control.
	533	1971a	Spiller	Diquat effects.
	536	1974a	Starling *et al.*	*Nitella* study.
	537	1974b	Starling *et al.*	*Nitella* study.
	548	1972a	Stout	Lake lowering.
	564	1977	Taylor *et al.*	Groundwater influences.
	567	1972	Thomasson	Phytoplankton.
	568	1973	Thomasson	Phytoplankton.
	569	1974	Thomasson	Phytoplankton.
	587	1972	Wendelken	Lake lowering.
	603	1972	Williams	Lake lowering.
	609	1975	Winterbourn & Lewis	Littoral fauna.
Lake Rotoma	568	1973	Thomasson	Phytoplankton.
	569	1974	Thomasson	Phytoplankton.
	602	1971	Wildlife Division	Report on wildlife.
Lake Rotorua (NI)	181	1971	Fish & Andrew	Nutrient budget.
	182*	1969	Fish & Chapman	Synoptic survey (1967).
	187	1975	Fisheries Research Division, MAF	Recent research on Lake Rotorua.
	199	1972	Forest Service	Lake lowering.
	219	1972a	Freshwater Section, DSIR	Biological consequences of lake lowering.
	232*	1976	Gillespie	Heterotrophic potential and trophic status (1972, 1973).
	233	1980	Gillespie & Spencer	Seasonal heterotrophic potential.

Lake Name	Ref No.	Date	Author(s)	Object of Work Reported
	270	1964	Healy	Factors controlling lake levels in Rotorua area.
	271	1975	Healy	Lake origin.
	272	1960	Hellaby	Lake weed.
	290	1980a	Hoare	Inflows.
	291	1980b	Hoare	Sensitivity to nutrients (1976).
	292	1980c	Hoare	Sensitivity to nutrients.
	311	1971	Interdepartmental Committee on Eutrophication	Eutrophication in Lake Rotorua.
	325*	1968	Irwin	Temperature (1966, 1967).
	327	1969b	Irwin	Bathymetric chart.
	351	1975a	Irwin	Checklist of New Zealand lakes.
	367	1977	John & Lock	Groundwater discharge.
	376	1959	Jolly	Limnology study (up to 1958).
	378*	1968	Jolly	Comparative limnology.
	382	1975	Jolly & Irwin	Thermal conditions.
	384	1975	Karlgreen	Lake problems report.
	386	1976	Kloos	Phytoplankton and macrophytes.
	395	1969	Dept. of Lands & Survey	Weed survey.
	423	1967	Matthews	Weed spraying.
	428	1975	McColl	Chemical and biological conditions (1970–71).
	478	1971	Officials Committee	Eutrophication.
	479	1973	Officials Committee	Eutrophication.
	484	1977a	Paerl	Ultraphytoplankton and production (1975–76).
	496	1923	Phillips & Grigg	Geochemistry and trout conditions.
	497	1968	Pittams	Water balance study (1934–1967).
	506	1964a	Reid	Eutrophication.
	513	1976b	Richmond	Weed survey.
	-	-	Richmond pers.comm.	Transparency.
	521	1984	Rutherford	Trends in water quality (1966–1983).
	532	1970	Spiller	Weed control.
	548	1972a	Stout	Lake lowering.
	564	1977	Taylor *et al.*	Groundwater discharge (1970–73).
	567	1972	Thomasson	Phytoplankton.
	568	1973	Thomasson	Phytoplankton.
	569	1974	Thomasson	Phytoplankton.
	580	1984	Vant & Davies-Colley	Water clarity (1983).
	587	1972	Wendelken	Lake lowering.
	588	1974	White	Lake Rotorua problems.
	591	1977a	White	Review of eutrophication in Lake Rotorua.
	596	1978	White & Payne	Chlorophyll and nutrient additions (1975–76).
	598	1978	White *et al.*	Sediments and nutrients (1975–76).
	602	1971	Wildlife Division	Report on wildlife.
	603	1972	Williams	Lake lowering.
	609	1975	Winterbourn & Lewis	Littoral fauna.
Lake Taupo	405	1979	Magadza	Physical and chemical limnology (1970–72).
	428	1975	McColl	Chemical and biological conditions.
	440	1886	McKerrow	Lake origin.
	471	1959	NZ Hydrographic Branch (Navy)	Bathymetric chart.
	484	1977a	Paerl	Ultraphytoplankton and production.
	496	1923	Phillips & Grigg	Geochemistry and trout environment.
	505	1977	Rawlence & Whitton	Elements in water, plants and sediment.
	554*	1975c	Stout	Brief discussion.
	560	1979	Strachan	Resource survey.
	594	1977	White & Downes	Nutrient loads, preliminary assessment.
	595	1977	White & Payne	Chlorophyll and nutrient additions.
	599*	1980	White *et al.*	Physics, chemistry and phytoplankton.
	609	1975	Winterbourn & Lewis	Littoral fauna.
Lake Tikitapu	568	1973	Thomasson	Phytoplankton.
	569	1974	Thomasson	Phytoplankton.

Appendix

Table ii: Raw data

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE ALICE								
385 Kelly 1978	Secchi disc	n s	n s	n s	n s	n s	0.37 m (n s)	1.60 m (n s)
—RWB pers. comm.	dissolved oxygen	n s	n s	2	2	–	0.6 g m^{-3}(n s)	9.0 g m^{-3}(n s)
—RWB pers. comm.	Secchi disc	n s	n s	n s	26	0.78 m	–	–
579 Vant 1982	Secchi disc	single visit 3/82	1	1	1	0.8 m	–	–
LAKE ARATIATIA								
403 Magadza 1973	dissolved oxygen	monthly (8/70–3/72)	1	1	22	10.88 g m^{-3}	7.6 g m^{-3}(5/71)	13.8 g m^{-3} (10/70)
403 Magadza 1973	pH	monthly (incomplete)	1	1	14	7.39	6.4 (11/71)	8.5 (7/71)
403 Magadza 1973	surface temp.	irregular	1	1	12	–	12.1°C (5/71)	20.6°C (12/71)
405 Magadza 1979	dissolved oxygen	monthly (8/70–3/72)	1	1	18	115.5%	85.5% (n s)	140.0% (n s)
405 Magadza 1979	surface temp.	monthly (8/70–3/72)	1	1	18	–	11.8°C (9/70)	24.7°C (2/71)
405 Magadza 1979	Secchi disc	monthly (8/70–3/72)	1	1	18	6.07 m	–	–
405 Magadza 1979	pH	monthly (8/70–3/72)	1	1	18	–	6.4 (n s)	8.5 (n s)
518 Robertson-Glasgow 1972	Secchi disc	single visit (5/72)	1	1	1	9.0 m	–	–
560 Strachan 1979	surface temp.	two visits	1	1	2	–	18°C (12/76)	21°C (3/77)
560 Strachan 1979	pH	two visits	1	1	2	–	7.4 (12/76)	7.6 (3/77)
LAKE ATIAMURI								
361 Irwin & Heath 1972	surface temp.	profile (7/67)	1	n s	n s	11.0°C	–	–
403 Magadza 1973	dissolved oxygen	monthly (8/70–3/72)	1	1	23	9.5 g m^{-3}	7.2 g m^{-3}(1/71)	11.9 g m^{-3} (9/71)
403 Magadza 1973	temp. at 20 metres	monthly (8/70–3/72)	1	1	23	–	12.3°C (8/71)	22.4°C (2/71)
403 Magadza 1973	pH	irregular (8/70–3/72)	1	1	14	7.25	6.9 (11/71)	8.5 (7/71)
405 Magadza 1979	dissolved oxygen	monthly (8/70–3/72)	1	1	18	100.8%	73.1% (n s)	132.2% (n s)
405 Magadza 1979	Secchi disc	monthly (8/70–3/72)	1	1	18	2.46 m	0.9 m (10/70)	–
405 Magadza 1979	pH	monthly (8/70–3/72)	1	1	18	–	6.95 (n s)	8.5 (n s)
560 Strachan 1979	surface temp.	two visits	1	1	2	–	18°C (12/76)	21°C (3/77)
560 Strachan 1979	pH	two visits	1	1	2	–	7.2 (3/77)	7.3 (12/76)
LAKE DUDDING								
385 Kelly 1978	Secchi disc	n s	n s	n s	n s	–	1.7 m (n s)	3.1 m (n s)
—RWB pers. comm.	dissolved oxygen	n s	n s	n s	n s	–	0.4 g m^{-3} (n s)	11.0 g m^{-3} (n s)
579 Vant 1982	dissolved oxygen	single visit (3/82)	1	1	1	< 1.5 gm^{-3}	–	–
579 Vant 1982	Secchi disc	single visit (3/82)	1	1	1	2.2 m	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE HAKANOA								
580 Vant & Davies-Colley 1984	Secchi disc	single visit (1/83)	1	1	1	0.12 m	–	–
584 Waikato Valley Authority 1980	dissolved oxygen	weekly (1/80–3/80, 8/80)	2	1	20	n s	2.1 g m^{-3} (1/80)	10.3 g m^{-3} (2/80)
584 Waikato Valley Authority 1980	surface temp.	weekly (1/80–3/80, 8/80)	2	1	20	11.3°C (8/80)	26.5°C (2/80)	
584 Waikato Valley Authority 1980	bottom temp.	weekly (1/80–3/80, 8/80)	2	1	20	–	11.0°C (8/80)	25.0°C (2/80)
584 Waikato Valley Authority 1980	Secchi disc	weekly (1/80–3/80, 8/80)	2	1	20	–	0.3 m (2/80)	1.9 m (8/80)
584 Waikato Valley Authority 1980	pH	weekly (1/80–3/80, 8/80)	2	1	20	–	6.9 (3/80)	8.5 (2/80)
LAKE HEATON								
136 Cunningham *et al.* 1953	dissolved oxygen	single visit (1/49)	1	1	1	75%	–	–
136 Cunningham *et al.* 1953	surface temp.	single visit (1/49)	1	1	1	20°C	–	–
136 Cunningham *et al.* 1953	bottom temp.	single visit (1/49)	1	1	1	18°C	–	–
136 Cunningham *et al.* 1953	Secchi disc	single visit (1/49)	1	1	1	1.25 m	–	–
136 Cunningham *et al.* 1953	pH	single visit (1/49)	1	1	1	> 8.4	–	–
—RWB pers. comm.	dissolved oxygen	n s	n s	n s	n s	n s	1.8 g m^{-3} (n s)	8.8 g m^{-3} (n s)
—RWB pers. comm.	Secchi disc	visits twice a month for unspecified period	n s	n s	36	0.5 m	n s	n s
579 Vant 1982	Secchi disc	single visit (3/82)	1	1	1	0.5 m	–	–
LAKE HOROWHENUA								
40 Brougham & Currie 1976	dissolved oxygen	monthly (11/75–11/77)	1	1	24	n s	< 1 g m^{-3} (3/76)	13.9 g m^{-3} (7/76)
40 Brougham & Currie 1976	surface temp.	monthly (11/75–11/77)	1	1	24	–	7.6°C (7/76)	22.9°C (12/76)
40 Brougham & Currie 1976	bottom temp.	monthly (11/75–11/77)	1	1	24	–	7.5°C (9/77)	22.9°C (12/76)
40 Brougham & Currie 1976	Secchi disc	monthly (5 missed)	1	1	19	0.4 m	0.15 m (2/77)	0.9 m (11/77)
40 Brougham & Currie 1976	pH	monthly (11/75–11/77)	1	1	24	–	7.55 (8/76)	10.10 (12/76)
136 Cunningham *et al.* 1953	dissolved oxygen	single visit (1/49)	1	1	1	65%	–	–
136 Cunningham *et al.* 1953	surface temp.	single visit (1/49)	1	1	1	22°C	–	–
136 Cunningham *et al.* 1953	bottom temp.	single visit (1/49)	1	1	1	21°C	–	–
136 Cunningham *et al.* 1953	Secchi disc	single visit (1/49)	1	1	1	0.75 m	–	–
136 Cunningham *et al.* 1953	pH	single visit (1/49)	1	1	1	8.4	–	–
137 Currie & Gilliland 1980	dissolved oxygen	surface only	–	–	–	–	–	–
137 Currie & Gilliland 1980	surface temp.	5 visits (5–6/78)	1	1	5	–	8.5°C (6/78)	12.0°C (5/78)
137 Currie & Gilliland 1980	pH	5 visits (5–6/78)	1	1	5	–	7.6 (6/78)	9.15 (6/78)
—RWB pers. comm.	Secchi disc	n s	n s	n s	20	0.4 m	0.15 m (2/77)	0.9 m (11/77)
LAKE KANONO								
83 Cassie & Freeman 1980	dissolved oxygen	4 visits (9/76–9/77)	1	1	4	n s	8.2 g m^{-3}(12/76)	11.6 g m^{-3} (9/77)
83 Cassie & Freeman 1980	surface temp.	4 visits (9/76–9/77)	1	1	4	–	11.5°C (9/77)	21.3°C (12/76)
83 Cassie & Freeman 1980	bottom temp.	4 visits (9/76–9/77)	1	1	4	–	11.5°C (9/77)	19.0°C (12/76)
83 Cassie & Freeman 1980	pH	4 visits (9/76–9/77)	1	4	16	–	7.3 (9/77)	8.85 (12/76)
136 Cunningham *et al.* 1953	dissolved oxygen	single visit (2/50)	1	1	1	100%	–	–
136 Cunningham *et al.* 1953	surface temp.	single visit (2/50)	1	1	1	21.8°C	–	–
136 Cunningham *et al.* 1953	bottom temp.	single visit (2/50)	1	1	1	21.5°C	–	–
136 Cunningham *et al.* 1953	Secchi disc	single visit (2/50)	1	1	1	4.6 m	–	–
136 Cunningham *et al.* 1953	pH	single visit (2/50)	1	1	1	6.6	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE KARAPIRO								
403 Magadza 1973	dissolved oxygen	monthly (1970–1972)	1	1	22	8.9 g m^{-3}	0.4 g m^{-3} (1/71)	13.4 g m^{-3} (10/70)
403 Magadza 1973	temp. at 10 m	monthly (1970–1972)	1	1	23	n.d	10.7°C (7/71)	21.6°C (1/71)
403 Magadza 1973	pH	periodic (1970–1972)	1	1	14	7.21	6.4 (2/71)	7.85 (7/71)
405 Magadza 1979	dissolved oxygen	monthly (8/70–3/72)	1	1	18	89.6%	4.7% (n s)	134.8% (n s)
405 Magadza 1979	surface temp.	monthly (8/70–3/72)	1	1	18	–	10.5°C (7/71)	24.2°C (1/71)
405 Magadza 1979	Secchi disc	monthly (8/70–3/72)	1	1	18	2.01 m	1.2 m (9/71)	4.0 m (8/71)
405 Magadza 1979	pH	monthly (8/70–3/72)	1	1	18	–	6.8 (n s)	8.2 (n s)
560 Strachan 1979	surface temp.	2 visits (12/76, 3/77)	1	1	2	–	19°C (12/76)	21°C (3/77)
560 Strachan 1979	pH	2 visits (12/76, 3/77)	1	1	2	–	7.4 (3/77)	8.1 (12/76)
580 Vant & Davies-Colley 1984	Secchi disc	1 visit (2/83)	1	1	1	2.0 m	–	–
LAKE KOPUHEREHERE								
136 Cunningham *et al.* 1953	dissolved oxygen	3 visits (1/49, 1/50, 8/52)	1	1	3	–	13% (1/50)	70% (8/52)
136 Cunningham *et al.* 1953	Secchi disc	2 visits (1/49, 1/50)	1	1	2	1.2 m	0.75 m (1/49)	1.5 m (1/50)
136 Cunningham *et al.* 1953	pH	2 visits (1/49, 1/50)	1	1	2	–	5.9 (1/50)	7.0 (1/49)
137 Currie & Gilliland 1980	dissolved oxygen	surface only	–	–	–	–	–	–
137 Currie & Gilliland 1980	surface temp.	5 visits (5–6/78)	1	1	5	–	9.5°C (6/78)	12.5°C (5/78)
137 Currie & Gilliland 1980	Secchi disc	5 visits (5–6/78)	1	1	5	–	1.15 m (5/78)	2.5 m (6/78)
137 Currie & Gilliland 1980	pH	5 visits (5–6/78)	1	1	5	–	6.8 (6/78)	7.05 (5/78)
—RWB pers. comm.	dissolved oxygen	n s	n s	n s	n s	n s	0.3 g m^{-3} (3/79)	9.9 g m^{-3} (5/77)
—RWB pers. comm.	Secchi disc	n s	n s	n s	n s	n s	0.9 m (3/77)	2.0 m (10/76)
LAKE MARAETAI								
175 Fish 1971b	dissolved oxygen	single visit (1/70)	1	2	2	0.7 g m^{-3}	–	–
175 Fish 1971b	surface temp.	single visit (1/70)	1	2	2	25.5°C	–	–
175 Fish 1971b	bottom temp.	single visit (1/70)	1	2	2	21°C	–	–
560 Strachan 1979	surface temp.	2 visits (12/76, 3/77)	2	1	4	–	17°C (12/76)	23°C (3/77)
560 Strachan 1979	pH	2 visits (12/76, 3/77)	2	1	4	–	7.3 (3/77)	8.0 (12/76)
LAKE NGAHEWA								
206 Forsyth & McColl 1975	dissolved oxygen	3 visits (3/73, 7/73, 11/73) all profiles	4	4	48	n s	0 g m^{-3} (3/11/73)	13 g m^{-3} (7/73)
206 Forsyth & McColl 1975	surface temp.	3 visits (3/73, 7/73, 11/73) all profiles	4	4	48	–	5°C (7/73)	19°C (3/73)
206 Forsyth & McColl 1975	bottom temp.	3 visits (3/73, 7/73, 11/73) all profiles	4	4	48	–	5°C (7/73)	17°C (3/73)
206 Forsyth & McColl 1975	Secchi disc	3 visits (3/73, 7/73, 11/73) all profiles	n s	n s	n s	n s	1.5 m (11/73)	3.3 m (7/73)
206 Forsyth & McColl 1975	pH	3 visits (3/73, 7/73, 11/73) all profiles	n s	n s	54	–	7.25 (3/73)	9.21 (3/73)
428 McColl 1975	pH	1 visit (3/73)	n s	n s	16	7.8	–	–
580 Vant & Davies-Colley 1984	Secchi disc	1 visit (2/83)	1	1	1	1.0 m	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE NGAPOURI								
162 Fish 1963a	dissolved oxygen	ongoing visits 1962	1	n s	30	–	0 g m^{-3} (Dec–May)	7.8 g m^{-3} (6/62)
162 Fish 1963a	surface temp.	ongoing visits 1962	1	n s	20	–	11.0°C (6/62)	20°C (1/62)
162 Fish 1963a	bottom temp.	ongoing visits 1962	1	n s	20	–	10°C (4/62)	1°C (6/62)
171 Fish 1970a	dissolved oxygen	isopleth graphs, monthly visits 1960–6	1	n s	36	–	0 g m^{-3} (Nov–May)	10.7 g m^{-3} (8/65)
171 Fish 1970a	surface temp.	isopleth graphs, monthly visits 1960–6	1	n s	36	–	7.0°C(8/65)	22.3°C (3/61)
171 Fish 1970a	bottom temp.	isopleth graphs, monthly visits 1960–6	1	n s	36	–	7.0°C (8/65)	12°C (5/63)
171 Fish 1970a	Secchi disc	n s	n s	n s	n s	2.3 m	–	–
325 Irwin 1968	temperature	single profile (12/65)	1	n s	n s	n s	9.9°C (bottom)	22.5°C (surface)
378 Jolly 1968	dissolved oxygen	1 visit (4/56)	1	1	1	4%	–	–
378 Jolly 1968	temperature	1 visit (4/56)	1	n s	n s	–	11.4°C (bottom)	16.5°C (surface)
378 Jolly 1968	Secchi disc	1 visit (4/56)	1	1	1	2 m	–	–
378 Jolly 1968	pH	1 visit (4/56)	1	1	1	6.9	–	–
—Jolly pers. comm.	surface temp.	n s	n s	n s	n s	n s	8.5°C (n s)	21.9°C (n s)
—Jolly pers. comm.	bottom temp.	n s	n s	n s	n s	n s	8.3°C (n s)	13.0°C (n s)
425 McColl 1972	dissolved oxygen	monthly visits (4/70–4/71)	2	1	24	–	0% (summer, autumn)	100% (7, 8/70)
425 McColl 1972	surface temp.	monthly visits (4/70–4/71)	2	1	24	–	8.4°C (n s)	22.9°C (n s)
425 McColl 1972	bottom temp.	monthly visits (4/70–4/71)	2	1	24	–	8.2°C (n s)	16.8°C (n s)
425 McColl 1972	Secchi disc	monthly visits (4/70–4/71)	2	1	24	1.58 m	–	–
LAKE OHAKURI								
130 Coulter *et al.* 1983	dissolved oxygen	intensive (7/77–7/79)	5	n s	400	–	0 g m^{-3} (Dec–May)	8 g m^{-3} (7/78)
130 Coulter *et al.* 1983	surface temp.	intensive (7/77–7/79)	5	n s	400	–	10°C (7/78)	24°C (2/78)
130 Coulter *et al.* 1983	bottom temp.	intensive (7/77–7/79)	5	n s	400	–	9°C (6/78)	14°C (3, 4/78)
130 Coulter *et al.* 1983	Secchi disc	intensive (7/77–7/79)	5	n s	200	3 m	1.5 m (4/78)	6 m (9/77)
405 Magadza 1979	dissolved oxygen	monthly (8/70–1/72)	1	1	18	49.3%	0% (summer)	120% (n s)
405 Magadza 1979	surface temp.	monthly (8/70–1/72)	1	1	18	–	12°C (7/71)	23.5°C (2/71)
405 Magadza 1979	bottom temp.	monthly (8/70–1/72)	1	1	18	–	10°C (8/71)	13°C (1/71)
405 Magadza 1979	Secchi disc	monthly (8/70–1/72)	1	1	18	2.54 m	1.0 m (9/70)	4.1 m (7/71)
405 Magadza 1979	pH	monthly (8/70–1/72)	1	1	18	–	6.3 (n s)	8.6 (n s)
560 Strachan 1979	surface temp.	2 visits (12/76, 3/77)	4	n s	n s	–	16.5°C (12/76)	24°C (3/77)
560 Strachan 1979	pH	2 visits (12/76, 3/77)	4	1	8	–	7.1 (3/77)	7.6 (12/76)
580 Vant & Davies-Colley 1984	Secchi disc	single visit (2/83)	1	1	1	3.5 m	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE OKAREKA								
232 Gillespie 1976	surface temp.	2 visits (8/72, 2/73)	3	n s	8	-	9.5°C (8/72)	24.2°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits (8/72, 2/73)	3	n s	4	-	9.5°C (8/72)	17.5°C (2/73)
232 Gillespie 1976	pH	2 visits (8/72, 2/73)	3	4	12	-	6.85 (2/73)	8.4 (2/73)
325 Irwin 1968	temperature	1 profile (2/66)	1	n s	n s	-	10.0°C (bottom)	23.8°C (surface)
378 Jolly 1968	dissolved oxygen	n s	1	n s	n s	-	67% (4/58)	86% (5/56)
378 Jolly 1968	surface temp.	n s	1	n s	n s	-	9.9°C (7/55)	18.75°C (1/56)
378 Jolly 1968	bottom temp.	n s	1	n s	n s	-	9.5°C (7/55)	10.75°C (1/56)
378 Jolly 1968	Secchi disc	n s	1	n s	2	6.7 m	6.5 m (12/55)	7.0 m (7/55)
378 Jolly 1968	pH	n s	1	n s	2	-	7.1 (n s)	7.4 (n s)
425 McColl 1972	dissolved oxygen	monthly (4/70–5/71) profile	2	-	14	60%	0% (5/71)	100% (8/70)
425 McColl 1972	surface temp.	monthly (4/70–5/71)	2	-	14	-	9.8°C (n s)	23.5°C (n s)
425 McColl 1972	bottom temp.	monthly (4/70–5/71)	2	-	14	-	9.4°C (n s)	12.0°C (n s)
425 McColl 1972	Secchi disc	monthly (4/70–5/71)	2	-	14	7.7 m	6.0 m (1/71)	9.5 m (4/70)
425 McColl 1972	pH	monthly (4/70–5/71)	2	-	28	-	< 7 (n s)	> 8 (n s)
428 McColl 1975	pH	n s	n s	n s	48	7.6	-	-
LAKE OKARO								
162 Fish 1963a	dissolved oxygen	fortnightly isopleths (1–6/62)	1	n s	n s	-	< 1 g m^{-3} (1–3/62)	8 g m^{-3} (6/62)
162 Fish 1963a	surface temp.	fortnightly isopleths (1–6/62)	1	n s	12	-	12.3°C (6/62)	> 20°C (1–2/62)
162 Fish 1963a	bottom temp.	fortnightly isopleths (1–6/62)	1	n s	12	-	< 10°C (1/62)	12.3 (6/62)
162 Fish 1963a	Secchi disc	1 visit (1/62)	1	1	1	3.6 m	-	-
168 Fish 1968	surface temp.	isotherms (10/63–6/64)	n s	n s	n s	-	16°C (11/63)	> 18°C (3/64)
168 Fish 1968	bottom temp.	isotherms (10/63–6/64)	n s	n s	n s	-	< 10°C (3/64)	-
169 Fish 1969a	surface temp.	2 summer isotherms	n s	n s	7	-	8.7°C (winter)	22.2°C (summer)
169 Fish 1969a	bottom temp.	2 summer isotherms	n s	n s	7	-	10.7°C (summer)	11.4°C (5/66)
171 Fish 1970a	dissolved oxygen	monthly isopleths, 1960–1966	1	n s	50	-	0 g m^{-3} (summer, autumn)	12.65 g m^{-3} (winter)
171 Fish 1970a	surface temp.	monthly isotherms, 1960–1966	1	n s	50	-	7.05°C (n s)	23.8°C (n s)
171 Fish 1970a	bottom temp.	monthly isotherms, 1960–1966	1	n s	50	-	9.8°C (n s)	11.8°C (n s)
171 Fish 1970a	Secchi disc	n s	n s	n s	n s	-	2.3 m (summer)	-
232 Gillespie 1976	surface temp.	2 visits (8/72, 2/73)	2	n s	14	-	8.5°C (8/72)	24.2°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits (8/72, 2/73)	2	n s	14	-	8.5°C (8/72)	10.3°C (2/73)
232 Gillespie 1976	pH	2 visits (8/72, 2/73)	2	n s	14	-	7.3 (2/73)	9.75 (2/73)
325 Irwin 1968	temperature	single profile (12/65)	1	n s	n s	-	10.1°C (bottom)	20.3°C (surface)
378 Jolly 1968	temperature	single visit (12/55)	1	n s	n s	-	10.75°C (bottom)	19.75°C (surface)
378 Jolly 1968	Secchi disc	single visit (n s)	1	1	1	1.7 m	-	-
378 Jolly 1968	pH	single visit (n s)	1	1	1	7.2	-	-

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
425 McColl 1972	dissolved oxygen	monthly (4/70–5/71)	2	–	14	20%	0% (Jan–May)	100% (7, 8/70)
425 McColl 1972	surface temp.	monthly (4/70–5/71)	2	–	14	–	8.8°C (n s)	22.8°C (n s)
425 McColl 1972	bottom temp.	monthly (4/70–5/71)	2	–	14	–	8.8°C (n s)	12.4°C (n s)
425 McColl 1972	Secchi disc	monthly (4/70–5/71)	2	–	14	2.0 m	1.0 m (8, 11/70)	4.0 m (3/71)
425 McColl 1972	pH	monthly (4/70–5/71)	n s	n s	n s	–	< 6.9 (n s)	> 9.0 (n s)
428 McColl 1975	pH	n s	–	–	52	8.0	–	–
580 Vant & Davies-Colley 1984	Secchi disc	single visit (2/83)	1	1	1	0.8 m	–	–
LAKE OKATAINA								
162 Fish 1963a	dissolved oxygen	fortnightly (1–6/62)	1	1	12	n s	6.6 g m^{-3} (5/62)	> 8 g m^{-3} (n s)
162 Fish 1963a	surface temp.	fortnightly (1–6/62)	1	1	12	–	12°C (6/62)	> 20°C (1, 2/62)
162 Fish 1963a	bottom temp.	fortnightly (1–6/62)	1	1	12	–	12°C (1/62)	12°C (6/62)
162 Fish 1963a	Secchi disc	1 visit (1/62)	1	1	1	13.0 m	–	–
169 Fish 1969a	dissolved oxygen	up to 1968	n s	n s	n s	10.3 g m^{-3}	6.9 g m^{-3} (May)	–
169 Fish 1969a	surface temp.	up to 1968	n s	n s	n s	n s	10.3°C (n s)	20.2°C (n s)
169 Fish 1969a	bottom temp.	up to 1968	n s	n s	n s	n s	10.3°C (n s)	11°C (n s)
171 Fish 1970a	dissolved oxygen	monthly profiles 1960–1966	1	–	50	–	6.34 g m^{-3} (summer 1963)	10.3 g m^{-3} (9/65)
171 Fish 1970a	surface temp.	monthly profiles 1960–1966	1	–	60	–	10°C (8/65)	> 20°C (2/64)
171 Fish 1970a	bottom temp.	monthly profiles 1960–1966	1	–	60	–	9.6°C (7/65)	12.3°C (6/66)
171 Fish 1970a	pH	n s	n s	n s	n s	–	< 7.2 (n s)	8.3 (n s)
232 Gillespie 1976	surface temp.	2 visits (8/72, 2/73)	3	4	12	–	10.5°C (8/72)	20.6°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits (8/72, 2/73)	3	4	12	–	10.5°C (8/72)	10.7°C (2/73)
232 Gillespie 1976	pH	2 visits (8/72, 2/73)	3	4	12	–	7.1 (2/73)	7.8 (8/72)
253 Green 1975b	Secchi disc	monthly (1955–56)	n s	n s	12	–	6.0 m (n s)	14.2 m (n s)
325 Irwin 1968	surface temp.	2 visits (12/65, 5/67)	–	–	27	–	14.2°C (4/67)	20.8°C (12/65)
325 Irwin 1968	bottom temp.	2 visits (12/65, 5/67)	–	–	27	–	10.0°C (12/65)	–
378 Jolly 1968	dissolved oxygen	monthly for 1 yr	n s	n s	n s	n s	58% (6/56)	93% (1/56)
378 Jolly 1968	surface temp.	monthly for 1 yr	1	1	12	–	11°C (7/55)	22.0°C (n s)
378 Jolly 1968	bottom temp.	monthly for 1 yr	1	1	12	–	10.75°C (7/55)	11.75°C (2/55)
378 Jolly 1968	Secchi disc	monthly for 1 yr	1	1	12	9.5 m	6.0 m (8/55)	14.2 m (12/55)
378 Jolly 1968	pH	irregular for 1 yr	1	2 depths	8	–	6.8 (3, 6/55)	7.5 (1/56)
425 McColl 1972	dissolved oxygen	monthly profiles (4/70–5/71)	2	–	13	–	50% (3/70)	104% (10/70)
425 McColl 1972	surface temp.	monthly (4/70–5/71)	2	–	13	–	11°C (n s)	22°C (n s)
425 McColl 1972	bottom temp.	monthly (4/70–5/71)	2	–	13	–	10.6°C (n s)	11.7°C (n s)
425 McColl 1972	Secchi disc	monthly (4/70–5/71)	2	–	12	11.9 m	8.0 m (8/70)	13.9 m (4/71)
425 McColl 1972	pH	monthly (4/70–5/71)	2	–	23	7.7	–	–
428 McColl 1975	pH	n s	n s	–	48	7.4	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE OTOTOA								
136 Cunningham *et al.* 1953	dissolved oxygen	1 visit (2/50)	1	8	8	–	55% (@ 25 m depth)	–
136 Cunningham *et al.* 1953	temperature	1 visit (2/50)	1	2	2	–	20°C (bottom)	23.5°C (surface)
136 Cunningham *et al.* 1953	Secchi disc	1 visit (2/50)	1	1	1	9.0 m	–	–
136 Cunningham *et al.* 1953	pH	1 visit (2/50)	1	1	1	6.6	–	–
252 Green 1975a	dissolved oxygen	weekly (3/69–3/70)	3	50	50	n s	24% (3/70)	105% (11/69)
252 Green 1975a	surface temp.	weekly (3/69–3/70)	3	50 profiles	150	–	10.2°C (8/69)	25.2°C (1/69)
252 Green 1975a	bottom temp.	weekly (3/69–3/70)	3	50 profiles	150	–	9.7°C (8/69)	17.5°C (n s)
252 Green 1975a	pH	weekly (3/69–3/70)	3	50	150	–	6.0 (2/70)	8.5 (5/69)
252 Green 1975a	Secchi disc	weekly (3/69–3/70)	3	50	150	7 m	5 m (6/69)	9.2 m (12/69)
347 Irwin 1974a	Secchi disc	1 visit (1970)	1	1	1	8.0 m	–	–
382 Jolly & Irwin 1975	surface temp.	n s	n s	n s	n s	–	10.2°C (n s)	25.2°C (n s)
382 Jolly & Irwin 1975	bottom temp.	n s	n s	n s	n s	–	10.1°C (n s)	16.7°C (n s)
509 Reid 1976	dissolved oxygen	surface only	–	–	–	–	–	–
509 Reid 1976	surface temp.	5 visits (11/76)	1	1	5	–	17.5°C (n s)	20.8°C (n s)
509 Reid 1976	pH	5 visits (11/76)	1	1	5	–	7.2 (n s)	7.9 (n s)
LAKE PAPAITONGA								
136 Cunningham *et al.*	dissolved oxygen	1 visit (1/49)	1	1	1	63%	–	–
136 Cunningham *et al.*	temperature	1 visit (1/49)	1	2	2	–	21°C (bottom)	21°C (surface)
136 Cunningham *et al.*	Secchi disc	1 visit (1/49)	1	1	1	0.75 m	–	–
136 Cunningham *et al.*	pH	1 visit (1/49)	1	1	1	> 8.4	–	–
137 Currie & Gilliland 1980	dissolved oxygen	surface only	–	–	–	–	–	–
137 Currie & Gilliland 1980	surface temp.	5 visits (5–6/78)	1	1	5	–	8.5°C (6/78)	12.0°C (6/78)
137 Currie & Gilliland 1980	Secchi disc	5 visits (5–6/78)	1	1	5	0.5 m	–	–
137 Currie & Gilliland 1980	pH	5 visits (5–6/78)	1	1	5	–	7.7 (6/78)	9.1 (6/78)
—RWB pers. comm.	Secchi disc	n s (1976–78)	n s	n s	n s	0.7 m	0.35 m (5/77)	> 0.9 m (10/78)
LAKE PUPUKE								
9 Auckland RWB 1979	dissolved oxygen	regular (2/76–5/79)	5	n s	n s	10%	0.1% (n s)	9.7% (9/77)
9 Auckland RWB 1979	surface temp.	regular (2/76–5/79)	5	n s	n s	n s	13.7°C (n s)	26°C (n s)
9 Auckland RWB 1979	bottom temp.	regular (2/76–5/79)	5	n s	n s	–	12.1°C (n s)	14.3°C (n s)
9 Auckland RWB 1979	pH	regular (2/76–5/79)	n s	4 depths	n s	–	6.9 (n s)	9.3 (n s)
16 Barker 1970	dissolved oxygen	frequent (11/66–11/67)	1	n s	150	6 g m^{-3}	2.5 g m^{-3} (2/67)	11.4 g m^{-3} (11/66)
16 Barker 1970	surface temp.	frequent (11/66–11/67)	1	n s	23	–	12.0°C (8/67)	24.2°C (1–4/67)
16 Barker 1970	bottom temp.	frequent (11/66–11/67)	1	1	23	–	11.3°C (8/67)	14.5°C (1/67)
16 Barker 1970	Secchi disc	frequent (11/66–11/67)	1	1	23	n s	1.0 m (12/66)	5.5 m (n s)
16 Barker 1970	pH	frequent (11/66–11/67)	1	6 depths	138	n s	7.9 (8/67)	9.5 (12/66)
509 Reid 1976	surface temp.	10 visits (1975–76)	2	n s	10	–	15.3°C (6/75)	22.1°C (1/76)
509 Reid 1976	pH	10 visits (1975–76)	2	n s	10	–	7.34 (6/75)	9.11 (1/76)
554 Stout 1975c	dissolved oxygen	n s	n s	n s	n s	–	24% (n s)	–
554 Stout 1975c	temperature	n s	n s	n s	n s	–	11.3°C (bottom)	24.2°C (surface)
554 Stout 1975c	Secchi disc	n s	n s	n s	n s	–	1.0 m (n s)	5.2 m (n s)
554 Stout 1975c	pH	n s	n s	n s	n s	–	7.8 (n s)	9.5 (n s)
580 Vant & Davies-Colley 1984	Secchi disc	1 visit (12/82)	1	1	1	2.9 m	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE REREWHAKAAITU								
93 Chapman *et al.* 1981	dissolved oxygen	frequent (main lake) (1971–7/74)	1	profiles	100	n s	2 g m^{-3} (7/74)	7 g m^{-3} (10/73)
93 Chapman *et al.* 1981	dissolved oxygen	frequent (crater lake) (1971–7/74)	1	profiles	100	n s	0 g m^{-3}(often)	10 g m^{-3} (12/73)
93 Chapman *et al.* 1981	surface temp.	frequent (main lake) (1971–7/74)	1	profiles	100	n s	7°C (7/73)	24°C (1/73)
93 Chapman *et al.* 1981	surface temp.	frequent (crater lake) (1971–7/74)	1	profiles	100	n s	9°C (7/73)	25°C (1/74)
93 Chapman *et al.* 1981	bottom temp.	frequent (main lake) (1971–7/74)	1	profiles	100	n s	7°C (7/73)	18°C (1/74)
93 Chapman *et al.* 1981	bottom temp.	frequent (crater lake) (1971–7/74)	1	profiles	100	n s	8°C (8/72)	10°C (7/74)
93 Chapman *et al.* 1981	Secchi disc	frequent (main lake) (1971–7/74)	1	–	15	2.0 m	1.6 m (2/74)	3 m (4/73)
93 Chapman *et al.* 1981	Secchi disc	frequent (crater lake) (1971–7/74)	1	–	15	3.9 m	3 m (2/74)	6 m (7/74)
180 Fish 1978	bottom temp.	n s (10/72–11/74)	3	n s	n s	–	14°C (n s)	20°C (n s)
180 Fish 1978	Secchi disc	n s (10/72–11/74)	3	n s	n s	2.0 m	1.2 m (11/74)	2.9 m (4/73)
378 Jolly 1968	surface temp.	n s (main lake)	1	n s	n s	–	6.9°C (7/55)	24.0°C (n s)
378 Jolly 1968	surface temp.	n s (crater lake)	1	n s	n s	–	8.5°C (7/55)	23.0°C (3/56)
378 Jolly 1968	bottom temp.	n s (main lake)	1	n s	n s	–	6.5°C (n s)	19.5°C (n s)
378 Jolly 1968	bottom temp.	n s (crater lake)	1	n s	n s	–	8.5°C (7/55)	9.6°C (3/56)
378 Jolly 1968	dissolved oxygen	n s (crater lake)	1	1	1	25% (3/56)	–	–
378 Jolly 1968	Secchi disc	1 visit (main lake)	1	1	1	2.0 m (7/55)	–	–
378 Jolly 1968	Secchi disc	n s (crater lake)	n s	n s	n s	3.0 m (7/55)	–	–
378 Jolly 1968	pH	n s (crater lake)	1	1	1	6.8 (7/55)	–	–
381 Jolly & Flint 1975	dissolved oxygen	16 monthly readings (crater lake)	n s	n s	16	–	< 1 g m^{-3} (autumn)	–
381 Jolly & Flint 1975	surface temp.	16 monthly readings (main lake)	n s	n s	16	–	7.5°C (n s)	24.0°C (n s)
381 Jolly & Flint 1975	surface temp.	16 monthly readings (crater lake)	n s	n s	16	–	9°C (n s)	24.5°C (n s)
381 Jolly & Flint 1975	bottom temp.	16 monthly readings (main lake)	n s	n s	16	–	6.5°C (n s)	19.5°C (n s)
381 Jolly & Flint 1975	bottom temp.	16 monthly readings (crater lake)	n s	n s	16	–	9°C (n s)	
381 Jolly & Flint 1975	Secchi disc	16 monthly readings (main lake)	n s	n s	16	1.98 m	–	–
381 Jolly & Flint 1975	Secchi disc	16 monthly readings (crater lake)	n s	n s	16	3.88 m	–	–
428 McColl 1975	pH	n s (4/70–4/71)	–	–	4	7.5	–	–
—MAF pers. comm.	dissolved oxygen	n s (1972–1973)	–	–	–	3.7 g m^{-3} (3/73)	–	–
—MAF pers. comm.	surface temp.	n s (1972–1973)	–	–	–	–	8.1°C (7/73)	21.8°C (1/73)
—MAF pers. comm.	Secchi disc	n s (1972–1973)	–	–	–	2.0 m	1.9 m (n s)	2.9 m (n s)

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE ROTOEHU								
81 Cassie 1978	dissolved oxygen	n s (data from other work)	n s	n s	n s	n s	95% (n s)	145% (n s)
81 Cassie 1978	surface temp.	n s (data from other work)	n s	n s	n s	n s	5.0°C (n s)	21.0°C (n s)
81 Cassie 1978	bottom temp.	n s (data from other work)	n s	n s	n s	n s	8.8°C (n s)	21.0°C (n s)
169 Fish 1969a	dissolved oxygen	graphed 1 summer's result	n s	n s	12	n s	6.5 g m^{-3}(n s)	11.2 g m^{-3} (11/62)
169 Fish 1969a	surface temp.	graphed 1 summer's result	n s	n s	12	n s	9.0°C (n s)	21.1°C (n s)
169 Fish 1969a	bottom temp.	graphed 1 summer's result	n s	n s	12	n s	9.0°C (n s)	20.0°C (n s)
171 Fish 1970a	dissolved oxygen	monthly (1960–66)	1	n s	50	n s	7 g m^{-3} (10/66)	12 g m^{-3} (11/62)
171 Fish 1970a	surface temp.	monthly (1960–66)	1	n s	60	–	8°C (7/65)	22.5°C (1/65)
171 Fish 1970a	bottom temp.	monthly (1960–66)	1	n s	60	–	8°C (8/65)	20°C (2/65)
325 Irwin 1968	temperature	1 profile (12/66)	1	n s	n s	–	17°C (bottom)	21.7°C (surface)
378 Jolly 1968	dissolved oxygen	monthly (pre 1958)	1	1	12	–	90% (4/56)	110% (2/56)
378 Jolly 1968	surface temp.	monthly (pre 1958)	1	1	12	–	8.2°C (7/55)	21.0°C (3/56)
378 Jolly 1968	bottom temp.	monthly (pre 1958)	1	1	12	–	8.8°C (7/55)	21°C (3/56)
378 Jolly 1968	Secchi disc	monthly (pre 1958)	1	1	12	4.5 m	4.0 m (8/55, 2/56)	5.6 m (10/55)
378 Jolly 1968	pH	monthly (pre 1958)	1	1	12	–	7.4 (6/56)	8.1 (12/55)
428 McColl 1975	Secchi disc	n s (4/70–4/71)	n s	n s	4	8.3 m	–	–
LAKE ROTOITI								
74 Cassie 1974a	dissolved oxygen	n s (1966–69)	n s	n s	n s	–	29% (n s)	122% (n s)
74 Cassie 1974a	bottom temp.	n s (1966–69)	n s	n s	n s	–	10.5°C (winter)	12.8°C (n s)
81 Cassie 1978	dissolved oxygen	n s (1973–74)	n s	n s	n s	–	29% (n s)	130% (n s)
81 Cassie 1978	surface temp.	n s (1973–74)	n s	n s	n s	–	11.7°C (n s)	21.95°C (n s)
81 Cassie 1978	bottom temp.	n s (1973–74)	n s	n s	n s	–	11.3°C (n s)	13.5°C (n s)
81 Cassie 1978	Secchi disc	n s (1973–74)	n s	n s	n s	–	4.5 m (n s)	9.0 m (n s)
163 Fish 1963b	pH	single visit (6/61)	1	2	4	–	6.2 (6/61)	6.6 (6/61)
166 Fish 1966a	dissolved oxygen	monthly (2/64–3/65)	3	n s	18	n s	0 g m^{-3}(Feb–Mar)	10.2 g m^{-3} (5/64)
166 Fish 1966a	surface temp.	monthly (2/64–3/65)	3	n s	18	n s	11.6°C (8/64)	26°C (1/65)
166 Fish 1966a	bottom temp.	monthly (2/64–3/65)	3	n s	18	n s	10.5°C (5/64)	20.5°C (2/64)
169 Fish 1969a	dissolved oxygen	fortnightly samples	1	n s	12	–	0.08 g m^{-3}(5/68)	10.0 g m^{-3} (9/67)
169 Fish 1969a	surface temp.	fortnightly samples	1	n s	9	–	11.4°C (9/67)	20°C (3/68)
169 Fish 1969a	bottom temp.	fortnightly samples	1	n s	9	–	10.7°C (9/67)	12.5°C (5/68)
178 Fish 1975a	dissolved oxygen	frequently 1967–1970	4	n s	80	–	0 g m^{-3}(4/70)	10.5 g m^{-3} (7/68)
178 Fish 1975a	surface temp.	frequently 1967–1970	4	n s	80	–	9.4°C (7/69)	24.8°C (1/70)
178 Fish 1975a	bottom temp.	frequently 1967–1970	4	n s	80	–	10.0°C (7/69)	13.8°C (5/69)
178 Fish 1975a	Secchi disc	frequently 1967–1970	4	n s	200	5 m	3.0 m (6/68)	7.5 m (12/68)
178 Fish 1975a	pH	frequently 1967–1970	4	n s	527	7.0	5.9 (n s)	8.3 (n s)

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
182 Fish & Chapman 1969	dissolved oxygen	2 day study (Feb. 66)	12	n s	n s	–	0 g m^{-3}	–
182 Fish & Chapman 1969	temperature	2 day study (Feb. 66)	12	n s	n s	–	< 12°C (bottom)	20.5°C (surface)
325 Irwin 1968	surface temp.	2 days data (Feb. 66)	n s	n s	18	–	22.5°C (2/66)	24.5°C (2/66)
325 Irwin 1968	bottom temp.	2 days data (Feb. 66)	n s	n s	18	–	11.9°C (2/66)	12.8°C (2/66)
378 Jolly 1968	dissolved oxygen	monthly for 1 yr	3	1	24	–	29% (2/56)	130% (9/55)
378 Jolly 1968	surface temp.	monthly for 1 yr	2	n s	n s	–	11.0°C (7/55)	22.6°C (3/57)
378 Jolly 1968	bottom temp.	monthly for 1 yr	2	n s	n s	–	10.5°C (7/55)	12.6°C (3/57)
378 Jolly 1968	Secchi disc	monthly for 1 yr	2	1	24	6.5 m	4.5 m (5, 6/56)	9.0 m (2/56)
378 Jolly 1968	pH	monthly for 1 yr	n s	n s	12	–	6.0 (2/56)	7.2 (12/55)
LAKE ROTOKAKAHI								
232 Gillespie 1976	surface temp.	2 visits (9/72, 2/73)	2	3	12	–	9.5°C (9/72)	20.9°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits (9/72, 2/73)	2	3	12	–	9.5°C (9/72)	10.8°C (2/73)
232 Gillespie 1976	pH	2 visits (9/72, 2/73)	2	3	12	–	6.15 (2/73)	7.55 (2/73)
325 Irwin 1968	surface temp.	2 visits (11/66, 5/67)	1	n s	n s	–	15.0°C (5/67)	16.0°C (11/66)
325 Irwin 1968	bottom temp.	2 visits (11/66, 5/67)	1	n s	n s	–	10.2°C (11/66)	11.5°C (5/67)
378 Jolly 1968	temperature	1 visit (7/55)	1	–	1	–	9.0°C (bottom)	9.2°C (surface)
378 Jolly 1968	Secchi disc	1 visit (7/56)	1	–	1	8 m	–	–
425 McColl 1972	dissolved oxygen	monthly (4/70–5/71)	2	14	28	40%	0% (Mar–May)	100% (10/70)
425 McColl 1972	surface temp.	monthly (4/70–5/71)	2	14	28	–	9.6°C (n s)	22.6°C (n s)
425 McColl 1972	bottom temp.	monthly (4/70–5/71)	2	14	28	–	9.6°C (n s)	13.6°C (n s)
425 McColl 1972	Secchi disc	monthly (4/70–5/71)	2	–	10	7.9 m	6.2 m (n s)	10.5 m (n s)
425 McColl 1972	pH	monthly (2 depths)	2	n s	n s	–	< 6.9 (n s)	> 7.8 (n s)
LAKE ROTOMA								
232 Gillespie 1976	surface temp	2 visits, 3 depths	2	n s	10	–	10.1°C (8/72)	21.2°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits, 3 depths	2	n s	10	–	10.0°C (8/72)	17.6°C (2/73)
232 Gillespie 1976	pH	2 visits, 3 depths	2	n s	10	–	7.3 (8/72)	7.65 (2/73)
325 Irwin 1968	temperature	2 visits	1	n s	n s	–	10.2°C (4/67) (bottom)	21.°C (12/65) (surface)
378 Jolly 1968	dissolved oxygen	up to 1958	1	1	1	–	n s	96% (1/56)
378 Jolly 1968	surface temp.	up to 1958	1	n s	n s	–	11.0°C (7/55)	21.5°C (1/56)
378 Jolly 1968	Secchi disc	up to 1958	1	n s	2	10.25 m	10.0 m (1/56)	10.5 m (7/55)
425 McColl 1972	dissolved oxygen	monthly (4/70–5/71)	2	13	26	70%	50% (autumn)	95% (8/70)
425 McColl 1972	surface temp.	monthly (4/70–5/71)	2	13	26	–	10.8°C (n s)	24°C (n s)
425 McColl 1972	bottom temp.	monthly (4/70–5/71)	2	13	26	–	10.4°C (n s)	11.4°C (n s)
425 McColl 1972	Secchi disc	monthly (4/70–5/71)	2	13	26	11.0 m	–	–
425 McColl 1972	pH	monthly (4/70–5/71)	2	13	26	7.7	–	–
LAKE ROTORUA (N.I)								
76 Cassie 1974c	dissolved oxygen	n s (1966–69)	n s	n s	n s	–	94% (n s)	130% (n s)
76 Cassie 1974c	surface temp.	n s (1966–69)	n s	n s	n s	–	8.6°C (7/68)	24.5°C (2/66)
169 Fish 1969a	dissolved oxygen	n s (1967–68)	n s	n s	n s	–	4.5 g m^{-3} (n s)	11.5 g m^{-3} (7/67)
178 Fish 1975a	dissolved oxygen	frequent (1967–70)	4	80	n s	9%	1% (3/70)	11.5% (7/67)

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
178 Fish 1975a	surface temp.	frequent (1967–70)	4	80	n s	–	8°C (7/67–69)	24.5°C (2/70)
178 Fish 1975a	bottom temp.	frequent (1967–70)	4	80	n s	–	8°C (7/69)	21.5°C (1/70)
178 Fish 1975a	Secchi disc	frequent (1967–70)	4	n s	200	2.5 m	1.5 m (2/70)	4.5 m (7/68)
178 Fish 1975a	pH	frequent (1967–70)	4	n s	415	6.9	6.1 (n s)	8.8 (n s)
182 Fish & Chapman 1969	dissolved oxygen	2 day survey (2/67)	39	n s	n s	8.0 g m^{-3}	–	–
182 Fish & Chapman 1969	surface temp.	2 day survey (2/67)	39	n s	n s	21°C	–	–
182 Fish & Chapman 1969	bottom temp.	2 day survey (2/67)	39	n s	n s	18.8°C	–	–
232 Gillespie 1976	surface temp.	2 visits (8/72, 2/73)	2	10	20	–	9.7°C (8/72)	22.1°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits (8/72, 2/73)	2	10	20	–	9.7°C (8/72)	20.1°C (2/73)
232 Gillespie 1976	pH	2 visits (8/72, 2/73)	2	10	20	–	6.6 (2/73)	7.2 (8/72)
325 Irwin 1968	surface temp.	2 visits (11/66, 5/67)	20	n s	n s	–	13°C (5/67)	17°C (11/66)
325 Irwin 1968	bottom temp.	2 visits (11/66, 5/67)	20	n s	n s	–	14.5°C (11/66, 5/67)	–
378 Jolly 1968	dissolved oxygen	monthly for 1 yr	3	n s	n s	–	94% (7/57)	130% (9/55)
378 Jolly 1968	surface temp.	monthly for 1 yr	3	n s	n s	–	9.0°C (7/55)	21.6°C (3/57)
378 Jolly 1968	bottom temp.	monthly for 1 yr	3	n s	n s	–	9.0°C (7/55)	21.25°C (3/57)
378 Jolly 1968	Secchi disc	monthly for 1 yr	3	n s	n s	3.5 m	2.7 m (9, 10/55)	4.6 m (3/56)
378 Jolly 1968	pH	monthly for 1 yr	3	n s	n s	–	6.6 (4/56)	6.7 (1, 6/56)
LAKE ROTOWHERO								
431 McColl & Forsyth 1973	dissolved oxygen	4 visits (11/70–5/71)	4	4	24	5.5 g m^{-3}	5.2 g m^{-3} (11/70)	5.8 g m^{-3} (11/70)
431 McColl & Forsyth 1973	surface temp.	4 visits (11/70–5/71)	4	1	4	–	29.5°C (8/70)	78°C (11/70)
431 McColl & Forsyth 1973	bottom temp.	4 visits (11/70–5/71)	4	1	4	–	33.2°C (11/70)	34°C (11/70)
431 McColl & Forsyth 1973	Secchi disc	n s	n s	n s	n s	0.9 m	n s	n s
431 McColl & Forsyth 1973	pH	n s	n s	n s	n s	–	3.07 (5/71)	3.10 (11/70)
LAKE TAHAROA (Massey Basin)								
83 Cassie & Freeman 1980	dissolved oxygen	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	16	–	1.4 g m^{-3}(4/76)	10.2 g m^{-3} (9/77)
83 Cassie & Freeman 1980	surface temp.	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	4	–	12.8°C (9/77)	20.0°C (12/76)
83 Cassie & Freeman 1980	bottom temp.	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	4	–	12.8°C (9/77)	17.0°C (12/76)
83 Cassie & Freeman 1980	pH	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	16	–	6.10 (4/76)	6.80 (12/76)
LAKE TAHAROA (Hauhatoki Bay)								
83 Cassie & Freeman 1980	dissolved oxygen	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	16	–	1.8 g m^{-3} (4/76)	11.1 g m^{-3} (9/77)
83 Cassie & Freeman 1980	surface temp.	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	4	–	12.8°C (9/77)	20.0°C (4/76)
83 Cassie & Freeman 1980	bottom temp.	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	4	–	12.8°C (9/77)	17.0°C (12/76)
83 Cassie & Freeman 1980	pH	4 visits (4/76, 12/76, 5/77, 9/77)	1	4	16	–	6.05 (12/76)	6.75 (9/77)

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE TARAWERA								
169 Fish 1969a	dissolved oxygen	single visit (4/68)	1	1	1	6.2 g m^{-3}	–	–
169 Fish 1969a	temperature	single visit (4/68)	1	n s	n s	–	11°C (bottom)	20°C (surface)
LAKE TAUPO								
—Cudley pers. comm.	dissolved oxygen	monthly (4/69–8/72)	1	1	26	–	6.9 g m^{-3} (4/71)	10.0 g m^{-3} (8/72)
—Cudley pers. comm.	surface temp.	monthly (4/69–8/72)	1	n s	n s	–	10.5°C (8/72)	22.7°C (1/70)
—Cudley pers. comm.	bottom temp.	monthly (4/69–8/72)	1	n s	n s	–	10.4°C (12/70, 8/72)	11.3°C (12/71–4/72)
—Cudley pers. comm.	Secchi disc	monthly (4/69–8/72)	1	1	36	–	11.0 m (1/72)	18.6 m (11/70)
253 Green 1975b	Secchi disc	n s (1955–56)	n s	n s	17	–	8.0 m (n s)	18.0 m (n s)
378 Jolly 1968	dissolved oxygen	monthly for 1 yr	2	n s	n s	–	80% (3, 5/56)	120% (9/55)
378 Jolly 1968	surface temp.	monthly for 1 yr	2	n s	n s	–	10.6°C (8/55)	10.8°C (2/56)
378 Jolly 1968	Secchi disc	monthly for 1 yr	2	n s	n s	14 m	8.0 m (11/55)	18.0 m (1/56)
378 Jolly 1968	pH	monthly for 1 yr	2	n s	n s	–	7.0 (3/56)	7.6 (3/56)
554 Stout 1975c	dissolved oxygen	n s	n s	n s	n s	–	78% (n s)	–
554 Stout 1975c	temperature	n s	n s	n s	n s	–	10.6°C (bottom)	19.1°C (surface)
554 Stout 1975c	Secchi disc	n s	n s	n s	n s	14 m	–	18 m (n s)
554 Stout 1975c	pH	n s	n s	n s	n s	–	7.0 (n s)	7.6 (n s)
599 White *et al.* 1980	dissolved oxygen	monthly (8/74–3/76)	3	1	32	–	n s	103% (a few occasions)
599 White *et al.* 1980	surface temp.	monthly (8/74–3/76)	3	1	32	–	10.6°C (winter)	22°C (1/75)
599 White *et al.* 1980	bottom temp.	monthly (8/74–3/76)	3	1	32	–	10.6°C (8, 9/75)	n s
599 White *et al.* 1980	Secchi disc	monthly (8/74–3/76)	3	n s	100	15.2–17 m	–	–
599 White *et al.* 1980	pH	monthly (8/74–3/76)	n s	n s	84	–	6.8 (7/75)	8.5 (4/75)
LAKE TIKITAPU								
232 Gillespie 1976	surface temp.	2 visits (8/72, 2/73)	2	n s	12	–	9.5°C (8/72)	20.5°C (2/73)
232 Gillespie 1976	bottom temp.	2 visits (8/72, 2/73)	2	n s	12	–	9.5°C (8/72)	17.7°C (2/73)
325 Irwin 1968	surface temp.	2 visits (2/66, 4/67)	1	n s	n s	–	15.6°C (4/67)	23.0°C (2/66)
325 Irwin 1968	bottom temp.	2 visits (2/66, 4/67)	1	n s	n s	–	10.3°C (2/66)	11.2°C (4/67)
378 Jolly 1968	dissolved oxygen	monthly for 1 yr	1	1	12	–	53% (3/56)	112% (11/55)
378 Jolly 1968	surface temp.	monthly for 1 yr	1	1	12	–	10.0°C (8/55)	20.45°C (2/56)
378 Jolly 1968	bottom temp.	monthly for 1 yr	1	1	12	–	9.5°C (8/55)	14.5°C (2/56)
378 Jolly 1968	Secchi disc	monthly for 1 yr	1	1	12	7.5 m	5.0 m (1/56)	10.0 m (12/55)
378 Jolly 1968	pH	monthly for 1 yr	1	n s	n s	–	5.8 (3/56)	6.8 (12/55)
425 McColl 1972	dissolved oxygen	monthly (4/70–5/71) (profile graphs)	1	2	24	50%	0% (late summer)	104% (10/70)
425 McColl 1972	surface temp.	monthly (4/70–5/71) (profile graphs)	1	1	12	–	9.8°C (n s)	22.1°C (n s)
425 McColl 1972	bottom temp.	monthly (4/70–5/71) (profile graphs)	1	1	12	–	10.4°C (n s)	12.8°C (n s)
425 McColl 1972	Secchi disc	monthly (4/70–5/71) (profile graphs)	2	1	24	11.0 m	–	–
425 McColl 1972	pH	monthly (4/70–5/71) (profile graphs)	2	1	24	7.0	–	–

LAKE NAME/ REFERENCES	PARAMETER	SAMPLING STRATEGY	No. SITES	No. SAMPLES PER SITE	TOTAL No. SAMPLES	MEAN	MINIMUM (DATE)	MAXIMUM (DATE)
LAKE TUTIRA								
—RWB pers. comm.	dissolved oxygen	n s (1977–79)	2	1	22	–	0.1 g m^{-3} (2/78)	8.0 g m^{-3} (11/77)
—RWB pers. comm.	Secchi disc	n s (1977–79)	2	1	22	1.47 m	–	–
LAKE WAIKAREMOANA								
81 Cassie 1978	dissolved oxygen	n s (1973–74)	n s	n s	n s	–	55% (n s)	95% (n s)
81 Cassie 1978	surface temp.	n s (1973–74)	n s	n s	n s	–	9.0°C (n s)	17.1°C (n s)
81 Cassie 1978	bottom temp.	n s (1973–74)	n s	n s	n s	–	8.5°C (n s)	8.5°C (n s)
81 Cassie 1978	Secchi disc	n s (1973–74)	n s	n s	n s	–	7.0 m (n s)	15.0 m (n s)
378 Jolly 1968	dissolved oxygen	n s (1957)	1	3	3	–	85% (7/57)	95% (3/57)
378 Jolly 1968	surface temp	n s (1957)	1	3	3	–	9.0°C (7/57)	20.0°C (2/57)
378 Jolly 1968	bottom temp.	n s (1957)	1	3	3	–	8.5°C (7/57)	8.5°C (3/57)
378 Jolly 1968	Secchi disc	n s (1957)	1	3	3	8.3 m	7.0 m (7/57)	9.0 m (3/57)
408 Main 1976	temperature	1 visit (9/72)	1	2	2	–	8.8°C (bottom)	9.1°C (surface)
408 Main 1976	Secchi disc	1 visit (9/72)	1	3	3	12.2 m	9.5 m	15 m
554 Stout 1975c	dissolved oxygen	n s	n s	n s	n s	–	85%	–
554 Stout 1975c	temperature	n s	n s	n s	n s	–	8.5°C (bottom)	17.1°C (surface)
554 Stout 1975c	Secchi disc	n s	n s	n s	n s	–	7 m (n s)	9 m (n s)
LAKE WAIPAPA								
403 Magadza 1973	dissolved oxygen	9/70–3/72	n s	n s	21	9.2	6.2 g m^{-3} (1/71)	11.8 g m^{-3} (9/70)
403 Magadza 1973	bottom temp.	9/70–1/72	n s	n s	15	–	11.1°C (7/71)	20.5°C (2/71)
403 Magadza 1973	pH	10/70–3/72	n s	n s	15	7.1	6.4 (2/71)	8.2 (7/71)
405 Magadza 1979	dissolved oxygen	monthly (8/70–3/72)	1	1	18	95%	75.4% (n s)	116.1% (n s)
405 Magadza 1979	Secchi disc	monthly (8/70–3/72)	1	1	18	2.25 m	1.5 m (11/70–1/71)	3.5 m (8/71)
405 Magadza 1979	pH	monthly (8/70–3/72)	1	1	18	–	6.5 (n s)	8.0 (n s)
560 Strachan 1979	surface temp.	2 visits (12/76, 3/77)	1	n s	n s	–	17.5°C (12/76)	21°C (3/77)
560 Strachan 1979	pH	2 visits (12/76, 3/77)	1	n s	n s	–	7.5 (3/77)	7.6 (12/76)
LAKE WHAKAMARU								
403 Magadza 1973	dissolved oxygen	8/70–3/72	n s	n s	23	94%	4% (4/71)	132% (9/70)
403 Magadza 1973	bottom temp.	10/70–1/72	n s	n s	15	–	11.6°C (7/71)	20.4 (1/71)
403 Magadza 1973	pH	11/70–1/72	n s	n s	15	7.39	6.8 (11/71)	8.4 (7/71)
405 Magadza 1979	dissolved oxygen	monthly 8/70–3/72	1	1	18	98.4%	4.5% (n s)	133% (n s)
405 Magadza 1979	Secchi disc	monthly 8/70–3/72	1	1	18	2.4 m	1.4 m (5/72)	4.0 m (7/71)
405 Magadza 1979	pH	monthly 8/70–3/72	1	1	18	–	6.9 (n s)	8.5 (n s)
560 Strachan 1979	surface temp.	2 visits (12/76, 3/77)	1	1	2	–	18°C (12/76)	21°C (3/77)
560 Strachan 1979	pH	2 visits (12/76, 3/77)	1	1	2	–	7.5 (3/77)	7.7 (12/76)

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