

Significant Natural Areas of the Waikato Region – Lake Ecosystems

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The "Significant Natural Areas of the Waikato Region: Lake Ecosystems" data are derived from analysis and interpretation of aerial photography along with information from ecological reports and data (where available), local ecological knowledge and, where possible, field surveys. The data comprises an extensive yet provisional inventory and ranking of SNA of lake ecosystems of the Waikato region. It is subject to revision through consultation with district councils and other appropriate sources. The Waikato Regional Council strongly advises that the data be used only in conjunction with subsequent field surveys, especially if the data will be used to help with decisions on resource consents, the development of district plan and regional plan schedules, or funding priorities. The absence of an existing natural lake ecosystem area from the "Significant Natural Areas of the Waikato Region: Lake Ecosystems" data does not imply that such an area is not, or cannot be considered, a significant natural area, a significant area of indigenous vegetation or significant habitat for indigenous species. Such areas should be assessed when and if required.



SIGNIFICANT NATURAL AREAS OF THE
WAIKATO REGION: LAKE
ECOSYSTEMS

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CONTENTS

1.	INTRODUCTION	1
2.	METHODS	1
2.1	Collation of information for scoring lakes	1
2.2	Scoring criteria	2
2.3	Auditing assessments and addressing data deficiencies	3
2.3.1	Expert panel workshop	3
2.3.2	Interviews with other experts	4
2.3.3	Finalising assessments	4
3.	RESULTS	4
	ACKNOWLEDGMENTS	7
	REFERENCES	7
	APPENDICES	
1.	Lakes scored and ranked for biodiversity management in the Waikato Region	12
2.	Wildland Consultants Ltd Contract Report No. 2029	15
3.	Threatened species that may occur in Waikato lake ecosystems	69
4.	Scoring sheets for all lakes	71
5.	Abbreviations used in this report	416
6.	Maps	417
	INDEX	428

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1. INTRODUCTION

Environment Waikato (EW) has been undertaking a process of prioritising natural areas in the Waikato Region for biodiversity management. As part of this process, Wildland Consultants Ltd was engaged firstly, to refine the method developed by Environment Waikato for ranking lake ecosystems. The refined method is described in Wildland Consultants Contract Report No. 2029: 'Methodologies for ranking of lake ecosystems for biodiversity management in the Waikato Region' which is included as Appendix 2 to this report.

The project then moved into its second stage, which involved the scoring and ranking of 85 natural lakes (six different types) and 11 human-made lakes within the Waikato Region (see Appendix 1 for a list of the lakes). Wildland Consultants was contracted to undertake this second stage in two phases. The first phase, for which an interim report was produced in December 2008 (Wildland Consultants Contract Report No. 2091) scored and ranked lake ecosystems in the Waikato, Hamilton, Waipa, and Matamata-Piako Districts. The second phase focused on the remaining lake ecosystems within the Waikato Region, and incorporated further revisions to the ranking system, and re-assessment of some of the scores assigned in the Phase 1 exercise.

The lakes that have been assessed have included land of all tenures ranging from conservation estate administered by the Department of Conservation and other Crown owned lands, to local authority reserves and private lands both protected (e.g. QE II or Nga Whenua Rahui covenants) and unprotected.

This report supercedes the interim report, and presents the scores and rankings for all of the lakes considered, based on the most up to date information that was able to be obtained.

2. METHODS

Phase 1 lakes were initially scored using the methods set out in Wildland Consultants Contract Report No. 2029, as described. Refinements subsequently made to some categories and criteria were used to review these scores and rankings, and to assess the Phase 2 lakes. A copy of Report No. 2029 is presented in Appendix 2.

Other details of the process undertaken to score the lake ecosystems are set out below:

2.1 Collation of information for scoring lakes

Information for scoring lakes was obtained from the following sources:

- *Environment Waikato Lakes Database*. The database contains a variety of useful information, including tenure, controlling agency, name of management plan document, lake area, lake depth, reserve area and status, minimum lake level, district, geology, predominant vegetation, water quality status, public access, Lake SPI score, presence of lake level recorder or structure, care group, extent of fencing, a chronological record of actions that have taken place at a lake, and a

bibliography. The lakes database is not complete, but 78 of the 96 lakes had at least some of this information entered into it (44/49 Phase 1 lakes and 34/47 Phase 2 lakes).

- *Relevant reports, scientific papers, and internal documents from both Environment Waikato and the Department of Conservation.* Key references were identified from the Environment Waikato Lakes Database bibliographic list for each lake and sourced. For lakes with no key references, an internet search was conducted to find additional information.
- *Other relevant databases.* The Freshwater Biodata Information System (FBIS) available on NIWA's website was used to compile lists of fish, some threatened invertebrates (i.e. *Hyridella menziesii*, *Paranephrops planifrons*), and macrophyte and wetland species that occur at each lake. Information was extracted from the database into an excel spreadsheet which contained the scientific name, common name, relative abundance of species, locality name, catchment, sampling date, sampling effort, and minimum and maximum depth of plant species. Of the 96 lakes, 43 had FBIS records for either the lake or its key tributary.
- Permission to search for threatened plant species records using Department of Conservation's Bioweb database was requested but not obtained. Other methods were used to source this data, including searching reports for records, compiling a list of threatened plant species that may occur at lakes, then determining the likelihood of the species being present based on knowledge of their habitat requirements, and discussion with local experts. A similar approach was used to identify other threatened species (birds, fish, and some invertebrates) present or likely to be present. Appendix 3 lists threatened species that could be present within lake ecosystems in the Waikato Region.
- *Maps and GIS analysis.* A map for each of the lakes (except Rotokaraka, Unnamed 9, and Penewaka) was created with information contained in Environment Waikato's Geographic Information System (GIS). Information displayed on the maps, subject to its availability, included: aerial photograph, catchment boundary, native vegetation and type, and waterways (including drains) within the catchment coded to indicate impairment to fish passage (i.e. location of culverts, dams, floodgates and waterfalls). Percentage of native vegetation remaining within each lake catchment was also generally available.

2.2 Scoring criteria

Several criteria couldn't be scored for any of the lakes due to relevant information not yet being available from the Department of Conservation's lake classification and prioritisation project. These criteria were:

- Best national example of a lake type.
- Ranked within the top 2-5 lakes nationally of a lake type.
- Best regional example of Level 2 lake type.
- Ranked within the top 3 lakes of a Level 2 lake type for the region.

All other criteria were scored where it was possible to confidently do so for each lake. In many instances, information was over 10 years old and judgements were made based on catchment changes, recent aerial photographs from the EW GIS, lake maps, and actions listed for a lake in the EW lakes database or other indicators, as to whether dated information was still likely to reflect current status. If no information was available in relation to certain criteria, default values based on those commonly assigned to similar lakes for those categories were used if it was considered reasonable to do so. Where a default score was assigned, or a score was otherwise estimated, this has been indicated with an asterisk. If a judgement simply couldn't be made, no score was entered and/or 'data deficient' was recorded in the comments box.

2.3 Auditing assessments and addressing data deficiencies

2.3.1 Expert panel workshop

Upon completion of a preliminary assessment of the Phase 1 lakes, a workshop was held on 11 November 2008 with a group of people with knowledge of the ecological values and management of the lakes concerned. Attendees included Keri Neilson (Environment Waikato), Tony Roxburgh (Waipa District Council), Allan Turner (Waikato District Council), Shannon Patterson (Department of Conservation), David Klee (Auckland/Waikato Fish and Game New Zealand), Mary de Winton (NIWA Hamilton), Aareka Hopkins (private consultant), and Keith Thompson (private consultant).

The purpose of the workshop was to address gaps in the scoring, update information using the attendees' knowledge of specific lakes, and to ensure consistency of scoring between lakes. Decisions were also made in relation to how some criteria should be interpreted, and recommendations made on amendments required to others. The latter included the following:

- When scoring the 'threatened species' criterion it was agreed that only species that were likely to be regular visitors or inhabitants should be included.
- Due to the widespread hybridization of grey duck (*Anas superciliosa superciliosa*) with mallards (*Anas platyrhynchos*) in the Waikato region it was decided not to include records of grey duck in the 'threatened species' scores.
- Descriptions for the criterion 'catchment/surrounding landscape' were clarified to enable more transparent scoring (see Appendix 2).
- Another sub-criterion was added to the 'vulnerable' criterion (see Appendix 2). The new category was labeled 'moderate-low vulnerability', and provides for lakes that are reasonably degraded but could be degraded further if coarse fish species such as koi (*Cyprinus carpio*) and rudd (*Scardinius erythrophthalmus*) were to invade the system.

Twenty-nine of the 49 Phase 1 lakes were discussed with the expert panel.

2.3.2 Interviews with other experts

Following the expert panel workshop, the key method used to address the outstanding Phase 1 lake data deficiencies, and all of those associated with Phase 2, was to contact local ‘experts’. These people comprised both scientists and managers, and included Grant Barnes (ARC), Andrea Brandon (MfE), Paul Champion, Mary de Winton, Rohan Wells and Kerry Bodman (NIWA), Hamish Dean (QEII National Trust), John Dyer (AWF&GNZ), Matthew McDougall (ERF&GNZ), Kevin Hutchinson, Paul Cashmore, Johlene Kelly, John Gibbs, Nick Singers and Dave Smith (DoC), and Kemble Pudney (Hamilton City Council).

2.3.3 Finalising assessments

To ensure consistency of approach between Phase 1 and Phase 2, a ‘mini’ workshop was convened on 26 August 2009 to review all assessments, and finalise scores and rankings. Participants in this exercise were Keri Neilson, Paula Reeves, Tracie Dean-Speirs, and Andy Garrick.

3. RESULTS

Scoring sheets for each of the lakes are provided in Appendix 4, along with notes relating to the features of the lake and the key sources of information used to score these. The total scores and ranking for each lake are summarised in Table 1.

Of the 49 lakes covered in Phase 1, five (10%) did not have enough information to complete the scoring sheet and score the lake. Of the 47 lakes assessed in Phase 2, 18 (38%) had insufficient data to do this. These lakes were often, but not exclusively, small lakes on private land, and are described as ‘data deficient’ in Table 1. A lake was classified as Data Deficient if more than 5 scoring criteria were estimated or couldn’t be scored.

Nineteen lakes had very little published information on them and were primarily scored based on discussions with a relevant land/lake manager. These lakes are indicated by a double asterisk (**) in Table 1, indicating 3-5 criteria had to be estimated. A larger group of lakes (34) had one or two criteria with little or no information on which to score them. In these instances, as indicated in Section 2.2 above, scores were assigned on the basis of what they were most likely to be taking into account the features and values of other lakes within the immediate vicinity. These lakes are indicated by a single asterisk (*) in Table 1.

The information most commonly missing in the Phase 1 exercise related to fauna values, and abundance and diversity of exotic fish. Across all of the Phase 2 lakes however, information was lacking for most criteria. Water quality, and diversity and abundance of flora and fauna, both native and exotic, were the most common deficiencies, but so too was insight into restoration potential, and what could be achieved with funding and management input.

Table 1: Summary of the ranking and scores for all lakes assessed within the Waikato Region. Lakes where 1-2 criteria scores have been estimated are marked *. Lakes with 3-5 criteria estimated are marked **. Lakes with more than 5 criteria that had to be estimated or couldn't be scored are recorded as 'data deficient'.

Ranking	Lake	District	Score
1	Taupo	Taupo	136
2=	Rotopounamu*	Taupo	124
2=	Tama Lake (Lower)**	Taupo	124
2=	Tama Lake (Upper)**	Taupo	124
5	Blue Lake**	Taupo	122
6=	Maratoto*	Waipa	119
6=	Ngakoro**	Rotorua	119
8=	Harihari	Waitomo	116
8=	Koraha**	Otorohanga	116
10=	Emerald Lakes**	Taupo	115
10=	Taharoa*	Waitomo	115
12	Rotoaira*	Taupo	113
13	Whangioterangi**	Rotorua	109
14	Orotu**	Rotorua	108
15	Rotopiko*	Waipa	107
16=	Kuratau*	Taupo	105
16=	Otamatearoa	Waikato	105
18	Rotomanuka	Waipa	94
19=	Mangakaware*	Waipa	90
19=	Ngahewa*	Rotorua	90
21	Rotowhero*	Rotorua	88
22	Rotokawau	Waikato	86
23	Waahi	Waikato	85
24=	Mangahia*	Waipa	84
24=	Parangi**	Otorohanga	84
24=	Rotokawa**	Taupo	84
27	Opouri**	Rotorua	82
28	Ruatuna*	Waipa	81
29	Okowhao*	Waikato	80
30	Millicich**	Waipa	79
31=	Hotoananga	Waikato	78
31=	Ohakuri**	Taupo/Rotorua	78
33=	Arapuni*	Otorohanga/SW/Waipā	76
33=	Areare	Waikato	76
33=	Ngaroto	Waipa	76
33=	Penewaka*	Waikato	76
37	Rotongaro*	Waikato	73
38	Whangape	Waikato	72
39	Waikare	Waikato	70
40	Parkinsons*	Waikato	69
41=	Kaituna	Waikato	68
41=	Rotokauri	Waikato	68
43=	Henderson's Pond*	Waipa	65
43=	Moananui*	South Waikato	65
43=	Posa*	Waipa	65
46=	Pataka*	Waipa	64
47=	Kainui*	Waikato	63
47=	Koromatua*	Waipa	63
47=	Waipapa**	Taupo/SW/Otorohanga	63
50=	Karapiro**	SW/Waipā	64

Ranking	Lake	District	Score
50=	Maraetai**	Taupo/SW	62
50=	Puketirini*	Waikato	62
50=	Whakamaru**	Taupo/SW	62
54	Cameron*	Waipa	61
55=	Rotokaeo*	Hamilton	60
55=	Waiwhakareke	Hamilton	58
57=	Kopuera*	Waikato	54
57=	Rotopataka*	Waipa	54
59=	Leesons Pond**	Matamata/Piako	53
59=	Pikopiko	Waikato	52
59=	Whakatangi*	Waikato	52
62	Rotoroa	Hamilton	51
63=	Hakanoa	Waikato	49
63=	Ohinewai	Waikato	49
65	Tutaeinanga*	Rotorua	48
66	Komakorau	Waikato	45
67	Rotongata*	Waipa	41
68=	Kimihia	Waikato	39
68=	Te Otamanui**	Waikato	39
70	Tunawhakaheke	Waikato	38
71	Rotongaroiti*	Waikato	35
72	Ngarotoiti*	Waipa	34
73	Te Koutu*	Waipa	16
	Sulphur Lagoon	Taupo	Data Deficient
	Rotoroa	Waitomo	Data Deficient
	Numiti	Waitomo	Data Deficient
	Rotongaio	Taupo	Data Deficient
	Rotoiti	Waikato	Data Deficient
	Puketi	Waikato	Data Deficient
	Hinemaiaia	Taupo	Data Deficient
	Aratiatia	Taupo	Data Deficient
	Hamareha Lakes	South Waikato	Data Deficient
	Patetonga	Hauraki	Data Deficient
	Okoroire	South Waikato	Data Deficient
	Kopuatai Burn Pools	Hauraki	Data Deficient
	Disappear	Waikato	Data Deficient
	Rototapu	Waitomo	Data Deficient
	Unnamed 3	Waikato	Data Deficient
	Te Rotopupu	Otorohanga	Data Deficient
	Rotokotuku	Waitomo	Data Deficient
	Piopio	Waitomo	Data Deficient
	Waiwhata	Waikato	Data Deficient
	Waitamoumou	Waikato	Data Deficient
	Unnamed 9 (Opuatia)	Waikato	Data Deficient
	Te Kapa	Waikato	Data Deficient
	Rotokaraka	Waikato	Data Deficient

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LAKES SCORED AND RANKED FOR BIODIVERSITY MANAGEMENT IN THE WAIKATO REGION

Lake Name	Territorial Authority	Lake Type	Land Tenure	Lake Ranking
Lake Areare	Waikato	Peat	DOC	33
Lake Disappear	Waikato	Karst	Private	DD
Lake Hakanoa	Waikato	Riverine	DOC	63=
Lake Hotoananga	Waikato	Riverine	DOC/Private	31=
Lake Kainui	Waikato	Peat	District Council	47=
Lake Kaituna	Waikato	Peat	DOC	41=
Lake Kimihia	Waikato	Riverine	DOC	68=
Lake Komakorau	Waikato	Peat	DOC	66
Lake Kopuera	Waikato	Riverine	DOC	57=
Lake Ohinewai	Waikato	Riverine	DOC	63=
Lake Okowhao	Waikato	Riverine	DOC	29
Lake Penewaka	Waikato	Riverine	DOC	33=
Lake Pikopiko	Waikato	Peat	DOC	59=
Lake Puketirini	Waikato	Artificial	District Council	50=
Lake Rotokaraka	Waikato	Unknown	Private	DD
Lake Rotokauri	Waikato	Peat	DOC	41=
Lake Rotokawau	Waikato	Peat	DOC	22
Lake Rotongaro	Waikato	Riverine	DOC	37
Lake Rotongaroiti	Waikato	Riverine	DOC	71
Lake Te Kapa	Waikato	Riverine	Private	DD
Lake Tunawhakaheke	Waikato	Peat	DOC/Private	70
Lake Waahi	Waikato	Riverine	District Council	23
Lake Waikare	Waikato	Riverine	LINZ	39
Lake Waitamoumou	Waikato	Dune	Private	DD
Lake Waiwhata	Waikato	Riverine	Private	DD
Lake Whakatangi	Waikato	Peat	Private	59=
Lake Whangape	Waikato	Riverine	DOC	38
Te Otamanui Lagoon	Waikato	Riverine	LINZ	68=
Unnamed 9	Waikato	Unknown	Private	DD
Lake Rotokaeo (Forest Lake)	Hamilton	Peat	City Council	55=
Lake Rotoroa	Hamilton	Peat	City Council	62
Lake Waiwhakareke (Horseshoe Lake)	Hamilton	Peat	City Council	55=
Leesons Pond	Matamata/Piako	Unknown	Private	59=
Henderson's Pond	Waipa	Peat	Private	43=
Lake Cameron	Waipa	Peat	District Council	54
Lake Koromatua	Waipa	Peat	DOC	47=
Lake Mangakaware	Waipa	Peat	District Council	19=
Lake Mangahia	Waipa	Peat	Private	24=
Lake Maratoto	Waipa	Peat	Private	6=
Lake Milicich	Waipa	Peat	Private	30
Lake Ngaroto	Waipa	Peat	District Council	33=
Lake Ngarotoiti	Waipa	Peat	DOC	72
Lake Pataka	Waipa	Peat	Private	46=
Lake Posa	Waipa	Peat	Private	43=
Lake Rotomanuka	Waipa	Peat	DOC	18
Lake Rotongata	Waipa	Peat	Private	67

Lake Name	Territorial Authority	Lake Type	Land Tenure	Lake Ranking
Lake Rotopiko (Serpentine)	Waipa	Peat	DOC	15
Lake Rotopataka	Waipa	Peat	DOC	57=
Lake Ruatuna	Waipa	Peat	DOC	28
Lake Te Koutu	Waipa	Riverine	District Council	73
Lake Otamatearua	Waikato (ex Franklin)	Dune	Private	16=
Lake Parkinsons	Waikato (ex Franklin)	Dune	Private	40
Lake Puketi	Waikato (ex Franklin)	Dune	DOC	DD
Lake Rotoiti	Waikato (ex Franklin)	Dune	Private	DD
Unnamed 3	Waikato (ex Franklin)	Dune	Private	DD
Kopuatai Burn Pools	Hauraki	Peat	Private	DD
Lake Patetonga	Hauraki	Riverine	Private	DD
Lake Koraha	Otorohanga	Karst	DOC	8=
Lake Parangi	Otorohanga	Dune	Private	24=
Lake Te Rotopupu	Otorohanga	Unknown	Private	DD
Lake Harihari	Waitomo	Dune	Maori Trust	8=
Lake Numiti	Waitomo	Dune	Maori Trust	DD
Lake Piopio	Waitomo	Dune	Maori Trust	DD
Lake Rotokotuku	Waitomo	Riverine	Private	DD
Lake Rotorua	Waitomo	Dune	Maori Trust	DD
Lake Rototapu	Waitomo	Dune	Maori Trust	DD
Lake Taharua	Waitomo	Dune	Maori Trust	10=
Hamareha Lakes	South Waikato	Unknown	Private	DD
Lake Moananui	South Waikato	Artificial	District Council	43=
Lake Okoroire	South Waikato	Peat	Private	DD
Lake Ngahewa	Rotorua	Volcanic	Maori Trust	19=
Lake Ngakoro	Rotorua	Geothermal	Private	6=
Lake Opouri	Rotorua	Volcanic	Maori Trust	27
Lake Orotu	Rotorua	Volcanic	DOC	14
Lake Rotowhero	Rotorua	Geothermal	DOC	21
Lake Tutaeinanga	Rotorua	Volcanic	Maori Trust	65
Lake Whangioterangi	Rotorua	Geothermal	Private	13
Blue Lake	Taupo	Volcanic	DOC	5
Emerald Lakes	Taupo	Volcanic	DOC	10=
Lake Rotoaira	Taupo	Volcanic	Maori Trust	12
Lake Rotokawa	Taupo	Geothermal	DOC	24=
Lake Rotongaio	Taupo	Volcanic	Maori Trust	DD
Lake Rotopounamu	Taupo	Volcanic	DOC	2=
Lake Taupo	Taupo	Volcanic	Maori Trust	1
Sulphur Lagoon	Taupo	Volcanic	DOC	DD
Tama Lake (Upper)	Taupo	Volcanic	DOC	2=
Tama Lake (Lower)	Taupo	Volcanic	DOC	2=
Lake Arapuni	Otorohanga/SW /Waipa	Hydro		33=
Lake Aratiatia	Taupo	Hydro		DD
Lake Hinemaiaia	Taupo	Hydro		DD
Lake Karapiro	SW/Waipa	Hydro		50=
Lake Kuratau	Taupo	Hydro		16=
Lake Maraetai	Taupo/SW	Hydro		50=
Lake Ohakuri	Taupo/Rotorua	Hydro		31=
Lake Waipapa	Taupo/SW/Otor	Hydro		47=

Lake Name	Territorial Authority	Lake Type	Land Tenure	Lake Ranking
Lake Whakamaru	ohanga Taupo/SW	Hydro		50=

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CONTRACT REPORT NO. 2029



METHODOLOGIES FOR RANKING
OF LAKE ECOSYSTEMS FOR
BIODIVERSITY MANAGEMENT
IN THE WAIKATO REGION

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Report No. 2029

Prepared for:

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CONTENTS

1.	INTRODUCTION	1
2.	METHODS	1
2.1	Review and refinement of ranking method	1
2.2	Trial of ranking method	2
2.3	Summary of additional information for ranking lakes	2
3.	REFINED RANKING METHOD	2
3.1	Guidelines for scoring ranking method criteria	4
3.1.1	National priority	4
3.1.2	Threatened species	5
3.1.3	Regional priority	6
3.1.4	Habitat diversity	7
3.1.5	Impairment to natural state of fish passage	8
3.1.6	Connectivity - terrestrial	8
3.1.7	Catchment/surrounding landscape	9
3.1.8	Hydrology	9
3.1.9	Water quality	10
3.1.10	Native condition - plants	11
3.1.11	Native condition - fauna	11
3.1.12	Exotic condition - plants	12
3.1.13	Exotic condition - fish	13
3.1.14	Vulnerability	13
3.1.15	Degree of legal protection	15
3.1.16	Co-ordination of biodiversity management between agencies and groups	15
3.1.17	Funding and management input	15
3.1.18	Restoration potential	17
4.	TRIAL OF RANKING METHOD	18
5.	SUMMARY AND RECOMMENDATIONS	18
	ACKNOWLEDGMENTS	19
	REFERENCES	19
	APPENDICES	
1.	Environment Waikato ecosystem draft ranking method	21
2.	Lake ecosystem ranking method	24
3.	Scoring sheets for trial lakes	27

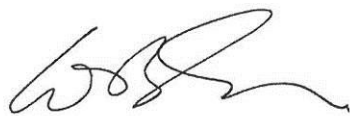
PROJECT TEAM

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Tracie Dean-Speirs, Water Ways Environmental Services - Development of ranking method, collation of existing lake information for trial lakes.

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1. INTRODUCTION

Environment Waikato is currently developing a process for prioritising natural areas in the Waikato Region for biodiversity management. Draft criteria were initially developed for ranking lake ecosystems which were based on national criteria and those included in the Regional Policy Statement (Appendix 1). The lake ecosystem component of the project involves ranking all named lakes in the Waikato Region, including a total of 103 natural lakes plus *c.*15 hydro-power lakes. Wetlands connected to a lake have also been included in the assessment process.

The draft method developed by Environment Waikato for ranking lake ecosystems was trialled on three lakes - Waikare, Serpentine, and Kaituna - which identified some problems with this method. The key issues included the following:

- Lakes with different ecological values were not well differentiated;
- Representativeness of lake types was not well addressed;
- Some of the criteria didn't work well for aquatic ecosystems (e.g. 'threatened environment classification' and 'region's priority land' which used the LENZ classification system);
- The ecological condition of lakes was not given adequate weighting;
- Limited guidance was provided for scoring criteria.

Wildland Consultants Ltd was commissioned to address the problems identified with the prioritisation method for lakes by refining the method and trialling it on seven lakes, including Lakes Waikare, Serpentine, Kaituna, and Harihari.

2. METHODS

2.1 Review and refinement of ranking method

Information was collated and reviewed on existing methods for ranking lakes for biodiversity management in New Zealand and also included a brief search on the internet for international examples. Good examples were scarce. In New Zealand, information was obtained on ranking systems used by Northland Regional Council (Wells *et al.* 2007), Waipa District Council (Thompson and Greenwood 1997), and the Department of Conservation (Chadderton *et al.* 2004). As a result, we widened the review to include more general assessments of ecological value and condition for other ecosystem types (e.g. Whaley *et al.* 1995; Clarkson *et al.* 2004).

Sources of information that could be used to assess the ecological condition, value, and vulnerability of lakes were reviewed and deficiencies noted.

The project team met on 12 May 2008 to refine the Environment Waikato ranking method. A revised set of criteria was compiled that addressed the problems of the original ranking method. Care was taken to develop scoring systems for criteria that used existing datasets often combined with best professional judgment. We also attempted to keep scoring relatively simple to prevent the need for collection of additional data and complicated analysis that could be costly and time-intensive.

2.2 Trial of ranking method

The refined ranking method was trialed on seven lakes, four of which were pre-selected by Environment Waikato. An additional three lakes were chosen to ensure a good cover of lake types (Table 1). We also included some lakes that had poor quality information (i.e. few reports, outdated) to test the robustness of the method.

Table 1: Lake type, size, depth, and quality of existing information of trial lakes used to evaluate a potential ranking system for the Waikato Region.

Lake	Lake Type	Size of Lake (ha)	Depth of Lake (m)	Quality of Existing Information
Harihari	Dune	18	c.8	Good
Kaituna	Peat	15	1.3	Very good
Ngahewa	Volcanic	11	7.5	Good
Okowhao	Riverine	12	2.2	Poor
Serpentine	Peat	15	4.4	Very good
Tutaenanga	Volcanic	3.1	11.5	Poor
Waikare	Riverine	3440	2	Very good

Information on each lake from the Environment Waikato lakes database was used to score the criteria along with aerial photos and NZMS 260 maps of the lakes and their catchments. In addition, key people who manage or have specific knowledge of a lake were contacted to address data deficiencies.

Following the scoring of the trial lakes, weightings of criteria were assessed and adjusted to address key problems of the original ranking system.

The revised ranking system was presented to Environment Waikato and an advisory group on 20 June 2008. Adjustments were then made to the refined ranking system, based on feedback from this meeting.

2.3 Summary of additional information for ranking lakes

Part of this project was to document any additional information that arose during the project that could be added to the Environment Waikato lakes database. The only additional information was some datasets for classifying and ranking lake types that are still being finalised by the Department of Conservation. These are discussed in more detail in Section 3.

3. REFINED RANKING METHOD

A summary of the refined ranking method is set out in Table 2. Further changes were made to this method during the final lake scoring process and these are reflected in the final scoring sheet in Appendix 2. The scoring method retains the overall framework of the original EW ranking system but splits the 'Ecological Values' category into 'Ecological Significance' and 'Ecological Condition', giving the latter a greater weighting than it was accorded in the original ranking system.

Table 2: Summary of the refined ranking method developed for lake ecosystems in the Waikato Region, 2008.

Category	Ecological Significance	Weighting	Max. Value	Ecological Condition	Weighting	Max. Value	Vulnerability	Weighting	Max. Value	Potential Outcomes	Weighting	Max. Value	
Criteria	National priority	3	30	Catchment/ surrounding landscape	3	15	Vulnerability	6	24	Co-ordination of biodiversity management between agencies and groups	1	4	
	Threatened species	1	60*	Hydrology	3	15	Degree of legal protection	1	4				Funding & management input
	Regional priority	2	16	Water quality	3	15				Restoration potential	4	20	
	Habitat diversity	2	10	Native condition - wetland and aquatic plants	1	5							
	Connectivity - aquatic	1	5	Native condition - wetland and aquatic fauna	1	5							
	Connectivity - terrestrial (incl. birds)	1	5	Exotic condition - wetland and aquatic plants	1	5							
					Exotic condition - fish	1	5						
Total Maximum Value			126			65			28			36	

* It is very unlikely that any lake would score more than 40 points for this criterion.

The number of criteria was increased from 10 to 18 partly as a result of incorporating elements of the 'other criteria' from the original ranking method (see Table 3 in Appendix 1) into the scoring sheet. Criteria that didn't work well for aquatic ecosystems have been removed and replaced with additional criteria in the ecological significance and condition categories. This change has increased the differentiation between lakes with different ecological values and better addresses the need to ensure biodiversity management covers a full representation of lake types.

Further refining of the criteria was carried out during the process of scoring all lakes in the period November 2008 to August 2009. This included amending Criteria 18 to "In-lake restoration potential" and adding Criteria 19 "Adjoining margin restoration potential". The weighting for both criteria was set at 3. In addition, the weighting for the vulnerability criteria was reduced from 6 to 5. The preliminary scores for the seven lakes presented in the current report do not include these changes.

3.1 Guidelines for scoring ranking method criteria

Guidelines for scoring each of the criteria are described in the following sections, including relevant information sources.

3.1.1 National priority: Weighting 3

This criterion has four sub-criteria which are all scored separately. The first two sub-criteria are based on the lake classification and ranking system being developed by the Department of Conservation. They are:

- (i) Best national example of a lake type; and
- (ii) Ranked within the top 2-5 of a lake type.

A report on the lake classification and the underlying database that assigns every lake in New Zealand >1 ha a lake type, should be available by the end of August 2008. The report on the ranking system and the associated database should be available by mid-September 2008.

The third sub-criterion is:

- (iii) Contains an 'originally rare terrestrial ecosystem type'.

Originally rare terrestrial ecosystem types are listed in Williams *et al.* 2007. A number of these may occur as part of a lake ecosystem. Of the 72 rare ecosystem types listed in Williams *et al.* 2007, the following may occur in association with lakes in the Waikato Region:

- herbfields or rushland on the margins of inland lakes with a regularly high water table;
- ephemeral wetlands;
- damp sand plains;
- dune slacks;
- domed bogs (with *Sporodanthus*);

- string mires;
- blanket mires;
- tarns;
- estuaries with intact vegetation sequences that include open land, sedgeland, rushland, reedland, herbfield, shrubland, scrub;
- lagoons with intact vegetation sequences that include open land, sedgeland, rushland, reedland, herbfield, shrubland, scrub;
- seepages and flushes;
- snow banks;
- shrubland/scrub on margins of heated or hydrothermally altered ground.

The fourth sub-criterion is:

(iv) Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary. 'Nationally important' is defined using the Chadderton *et al.* 2004 list of nationally important non-riverine and lacustrine freshwater/estuarine systems:

- wetlands of International Importance (Cromarty and Scott 1996);
- estuaries of International Importance (Cromarty and Scott 1996);
- areas of Significant Conservation Value (ASCVs) listed by conservancy experts as part of DOC's submissions to regional coastal plans;
- the least human-disturbed lake in a bio-geographic unit (see Chadderton *et al.* 2004 for the catchment boundaries of biogeographic units), or any lake containing nationally significant bird populations.

An example of a lake that fits two of these criteria is Lake Waikare, which is connected to the internationally significant Whangamarino Wetland and has a nationally significant population of black swan.

3.1.2 Threatened species: Weighting 1

This criterion is scored on the number of species present, or likely to be present based on the available habitat, in each threatened species class listed in the scoring sheet, with greater weighting for species that are more threatened. Threatened species classifications are based on de Lange *et al.* (2009) (vascular plants) Miskelly *et al.* (2008) (birds,) Hitchmough *et al.* (2007) (fish, freshwater invertebrates). Scoring is capped at three or more species in the same category and is calculated as shown in Table 3.

Table 3: How to score threatened species based on the number of species and the threat class.

Number of Species in Each Threatened Species Class	Score Calculation
1	1 x weighting of threat class
2-3	2 x weighting of threat class
>3	3 x weighting of threat class

Weighting of threat classes are as follows (threat categories based on Molloy *et al.* 2002 and Townsend *et al.* 2008):

Threat Category	Weighting
Nationally critical	6
Nationally endangered	5
Nationally vulnerable	4
Declining/Serious decline	3
Recovering/Gradual decline	2
Relict/Naturally uncommon/Sparse/Range restricted	1
Data deficient	1

A worked example for Lake Kaituna is shown in Table 4.

Table 4: Threatened species at Lake Kaituna and how to calculate the overall score for the 'threatened species' criterion, based on Hitchmough *et al.* 2007.

Species in Each Threatened Species Class	Score Calculation (Number of Species x Weighting of Threat Class)	Score
Nationally Endangered - Australasian bittern	1 x 5	5
Gradual Decline - Longfin eel - Black mudfish	2 x 2	4
Sparse - NZ dabchick	1 x 1	1
Total		10

Information sources useful for determining what threatened species are present at a lake or are likely to be based on available habitat, would include reports held in the Environment Waikato lakes database about the biology of the lake, BioWeb (Department of Conservation database containing records of threatened plant species), and FBIS (the Freshwater Biodata Information System from NIWA which contains records of fish, algae, aquatic plants and invertebrate species that have been found in lakes, rivers and streams around New Zealand). If none of these information sources are useful then contacting the key people who manage the lake (e.g. Department of Conservation, Auckland/Waikato or Eastern Region offices of Fish and Game New Zealand, the local district/city council, community care group, local iwi) was found to be an effective way to obtain this information.

3.1.3 Regional priority: Weighting 2

This criterion has four sub-criteria which are all scored separately. The first two sub-criteria are based on the lake classification and ranking system being developed by the Department of Conservation. They are:

- (i) Best regional example of a lake type; and
- (ii) Ranked within the top 2-3 of a lake type for the region.

As discussed in Section 3.2.1 above, the report and the databases to score these criteria won't be available for another 1-2 months. As the ranking system was

developed for ranking national priorities, it is not yet clear whether it can be easily used to rank lakes at a regional level.

The third and fourth sub criteria are:

- (iii) Contains one or more special/rare biological features in a regional context.
- (iv) Critical to the self-sustainability of an indigenous species within a catchment of the Waikato Region, and which contains healthy representative populations of that species.

An example of a lake that meets sub-criterion (iii) is Lake Serpentine which has the oldest population of longfin eel in the region. Information sources that would be useful for determining whether a lake meets these sub-criteria would include reports held in the Environment Waikato lakes database about the biology of the lake. If information is sparse, then contact the key people who manage the lake (e.g. Department of Conservation, Auckland/Waikato or Eastern Region offices of Fish and Game New Zealand, the local district/city council, community care group, local iwi).

3.1.4 Habitat diversity: Weighting 2

This criterion is scored on a scale ranging from ‘Very High’ to ‘Very Low’. Table 5 provides a description of each level.

Table 5: Description and examples for scoring the criterion ‘habitat diversity’ of lakes in the Waikato Region.

Habitat Diversity Scale	Description	Score	Examples
Very High	Lake and its associated wetlands are very large in size (>200 ha) with a high diversity of native vegetation types. Lake depth varies and the lake edge is sinuous providing a wide variety of habitat for aquatic fauna.	5	Taupo
High	Lake and its associated wetlands are relatively large in size (>50 ha) with a high number of native vegetation types. Lake depth varies and the lake edge is sinuous providing a wide variety of habitat for aquatic fauna.	4	Rotoaira
Medium	Lake and its associated wetlands are medium to large in size (>10 ha) but with only a moderate number of native vegetation types. The lake shape may vary in either depth or sinuosity providing a moderate diversity of habitat for aquatic fauna.	3	Kaituna, Waikare
Low	Lake and its associated wetlands are small in size (<10 ha) with only a moderate number of vegetation types. The lake shape may vary in either depth or sinuosity providing a moderate diversity of habitat for aquatic fauna.	1	Cameron
Very Low	Lake is small in size (<10 ha) with either no native vegetation or dominated by small patches of exotic vegetation types such as willow.	0	Tutaeinanga

Information sources that would be useful for determining whether a lake meets this criterion would include reports held in the Environment Waikato lakes database about the biology and/or geomorphology of the lake. If reports are scarce then aerial photos, NZMS260 map series, and a bathymetry map could all be used to make a best professional judgement when scoring a lake.

3.1.5 Impairment to natural state of fish passage: Weighting 1

This criterion has a four point scale based on the degree of impairment to the natural state of fish passage. The four point scale is given in Table 6, with examples of lakes that match the scores.

Table 6: Description and examples for scoring the criterion 'impairment to the natural state of fish passage' of lakes in the Waikato Region.

Impairment to the Natural State of Fish Passage	Score	Examples
Excellent - there are no impairments to the natural state of fish passage in the lake catchment.	5	Okowhao
Good - there are a few minor impairments (e.g. passable culverts) to the natural state of fish passage in the lake catchment.	4	Kaituna, Waikare
Poor - there are a moderate number of impairments to the natural state of the lake catchment.	2	Serpentine
Very poor - there are substantial impairments (e.g. large dams) to the natural state of fish passage in the lake catchment.	0	Karapiro

The Environment Waikato, 'REC Fish Passage Barriers' dataset and the 'Culverts GIS Layer' dataset can be used to help determine how much the natural state of fish passage has been impaired. The 'REC Fish Passage Barriers' dataset contains an assessment of each reach of the NIWA REC (River Environment Classification) network for the Waikato Region, assigning it an attribute of 0 (no presence downstream of a fish barrier), 1 (presence downstream), or 3 (presence on this reach). Note that the dataset is current up to March 2005. The 'Culverts GIS Layer' dataset contains information about the location of culverts and assigns them one of the following fish barrier scores; 3 = fish passage restriction under most flow conditions, 2 = fish passage restriction under low flow conditions only and 1 = fish passage restriction under high flow conditions. This dataset is updated continuously. Local managers of the lake may also know how much impairment to the natural state of fish passage has occurred in the catchment.

3.1.6 Connectivity: Weighting 1

This criterion also has a five-point scale based on how well connected the lake is to other freshwater/geothermal natural areas mainly for movement of birds that require aquatic habitat. The five-point scale is given in Table 7, with examples of lakes that match the scores.

Table 7: Description and examples for scoring the criterion 'connectivity - terrestrial' for lakes in the Waikato Region.

Connectivity - Terrestrial	Score	Examples
Excellent - part of a mostly continuous natural freshwater landscape.	5	Taupo
Very good - part of a semi-continuous natural landscape.	4	Waipapa, Waikare
Good - part of a complex of aquatic habitats all within 5 km of each other.	3	Serpentine, Kaituna
Poor - one of several discrete natural areas with only limited linkages.	2	Te Koutu, Okoroire
Very poor - isolated with no linkages.	0	Lesson's Pond

Vegetation maps, aerial photos and the NZMS260 map series can all be used to score this criterion.

3.1.7 Catchment/surrounding landscape: Weighting 3

This criterion is the first of the ecosystem condition criteria and quantifies how modified the lake catchment is and how well the lake is buffered from adjacent land uses. A five-point scale is used to score this criterion, with descriptions and examples given in Table 8.

Table 8: Description and examples for scoring the criterion 'catchment/surrounding landscape' for lakes in the Waikato Region.

Catchment/Surrounding Landscape	Score	Examples
Catchment mostly covered (> 60%) in indigenous vegetation.*	5	Rotopounamu
Catchment partially covered (>30%) in indigenous vegetation and stock excluded.*	4	Rotoaira
Lake adequately buffered from surrounding landscape by an effective riparian margin.	3	Nгахewa
Catchment partially covered (>30%) in indigenous vegetation but stock have regular access to margin	3	
Lake partially buffered from surrounding land use by riparian margins.	2	Kaituna, Serpentine
Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries, but lake itself has minimal riparian margins.	1	Whangape
No buffer.	0	Tunawhakapeka

* The location of the indigenous vegetation should be taken into account when scoring this criterion. It should be located in such a way that it buffers the effect of land use on the lake (i.e. is located above the lake and close to lake tributaries).

Vegetation maps, aerial photos and the NZMS 260 map series can all be used to score this criterion.

3.1.8 Hydrology: Weighting 3

This criterion assesses the naturalness of the hydrological regime using a four-point scale. Descriptions and examples of the scale are given in Table 9.

Table 9: Description and examples for scoring the criterion 'hydrology' of lakes in the Waikato Region.

Hydrology	Score	Examples
Lakes with a natural hydrological regime. This would include any lake with an unmodified upper catchment that has not been dammed.	5	Rotopounamu
Lakes with a modified hydrological regime but natural hydrological processes are largely intact. This would include lakes where parts of the upper catchment have been cleared but there are no other water control structures. Would <u>not</u> include peat lakes in intensively farmed landscapes.	3	Harihari, Okowhao
Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could partially be restored by installation of a structure. This would include lakes in intensively farmed catchments that have substantially altered average minimum water levels.	1	Ngaroto, Kaituna
Lakes with a highly modified hydrological regime. This would include lakes that are controlled for flood protection or hydro-power generation.	0	Waikare, Waipapa

Information sources for scoring this criterion include reports in the Environment Waikato lakes database or contacting staff in the River and Catchment Services division of Environment Waikato.

3.1.9 Water quality: Weighting 3

This criterion assesses water quality using a six-point scale. Water quality data exists for about 25% of lakes in the Waikato Region and is usually described in terms of the Trophic Level Index. Where this data exists it is has been used in the following way to score this criterion:

Very high:	TLI <2.0
High:	TLI <3.0
Good:	TLI <4.0
Moderate:	TLI <5.0
Poor:	TLI < 6.0
Very poor:	TLI >6.0

Where there is no water quality data for a lake but it has been subject to a LakeSPI survey (43 lakes; Edwards *et al.* 2008) then this can be used as a rough surrogate. We have scored a lake as having 'poor' water quality if 'macrophytes' have disappeared from the lake and 'good' if macrophytes are still present.

For lakes where there is no water quality data or LakeSPI score then it may be possible to use % natural catchment vegetation cover as the lake ranking project being carried out by Department of Conservation found there was a strong relationship between this variable and TLI. This report should be available in September 2008.

For lakes with naturally poor water quality (geothermal lakes) this category is assessed according to how close the current water quality is to that expected in a natural state.

3.1.10 Native condition - plants: Weighting 1

This criterion assesses the native condition of aquatic and wetland plants within the lake ecosystem using a four-point scale. Descriptions and examples of the scale are given in Table 10.

Table 10: Description and examples for scoring the criterion 'native condition - plants' for lakes in the Waikato Region.

Native Condition - Plants	Score	Examples
High native plant diversity and abundance. This would include any lake that contains the full compliment of vegetation zones expected for a lake and associated wetlands of that type (e.g. submerged macrophytes, emergent macrophytes and wetland vegetation), all of which are dominated by native plants.	5	Rotopounamu
Good native plant diversity. All zones have good diversity of native vegetation although native plants may not dominate vegetation zones.	4	Serpentine
Moderate native plant diversity and/or abundance. This would include lakes where at least one of the two or three main vegetation zones has abundant native plants and there was some diversity of native plants in at least two of the main vegetation zones.	3	Harihari, Ngahewa
Low native plant diversity. This would include lakes where there is some diversity of native plants in at least two of the main vegetation zones.	2	Waikare
Very low native plant diversity and abundance. This would include lakes where there are only a few native plant species in very low abundances.	0	Tunawhakapeka, Tutaeinanga

Information sources that would be useful for determining whether a lake meets this criterion would include reports held in the Environment Waikato lakes database about the biology of the lake that contain vegetation maps. Other possible sources would include Protected Natural Area Programme (PNAP) survey reports for the relevant ecological district (note not all ecological districts have a PNAP survey report), Champion *et al.* (1993), which includes vegetation maps for 38 lakes in the Lower Waikato Region, and Edwards *et al.* (2008), which describes the native condition of submerged vegetation for 43 lakes in the Waikato Region. Aerial photos at a reasonable resolution (<0.5 m), could also be used to determine whether emergent and wetland vegetation are dominated by native plants but would require someone experienced at interpreting vegetation types from aerial photos.

3.1.11 Native condition - fauna: Weighting 1

This criterion assesses the native condition of fauna (mainly birds and fish as information is scarce for other fauna types) within the lake ecosystem using a four-point scale. Descriptions and examples of the scale are given in Table 11.

Table 11: Description and examples for scoring the criterion 'native condition - fauna' for lakes in the Waikato Region.

Native Condition - Fauna	Score	Examples
High native fauna diversity and abundance. This would include lakes where both the aquatic fauna and wetland fauna are dominated by native species.	5	Rotopounamu
Good native fauna diversity and/or abundance. This would include lakes where either the aquatic fauna or wetland fauna are dominated by native species or both have a good diversity of fauna.	3	Harihari, Ngahewa, Okowhao, Waikare, Serpentine
Low native fauna diversity and abundance. This would include lakes where there is some diversity of either aquatic native species or wetland native species.	2	Tutaeinanga
Very low native fauna diversity and abundance. This would include lakes where there are only a few native fauna species in very low abundances.	0	

Information sources that would be useful for determining whether a lake meets this criterion would include reports held in the Environment Waikato lakes database about the biology of the lake. Other possible sources would include Protected Natural Area Programme (PNAP) survey reports for the relevant ecological district (note not all ecological districts have a PNAP survey report), FBIS, and contacting the key people who manage the lake.

3.1.12 Exotic condition - plants: Weighting 1

This criterion assesses the exotic condition of aquatic and wetland plants within the lake ecosystem using a four point scale. Descriptions and examples of the scale are given in Table 12. Note that the scores are inverted for this criterion.

Table 12: Description and examples for scoring the criterion 'exotic condition - plants' for lakes in the Waikato Region.

Exotic Condition - Plants	Score	Examples
Dominated by exotic plants. This would include lakes where all main vegetation zones (e.g. submerged macrophytes, emergent macrophytes and wetland vegetation), are dominated by exotic plants.	0	
Exotic plants present in moderate abundance. This would include lakes where one or two of the main vegetation zones have a moderate abundance of exotic plant pests.	2	Waikare, Tutaeinanga, Ngahewa, Kaituna
Exotic plants present in low abundance. This would include lakes where at least two of the main vegetation zones have a low abundance of exotic plant pests.	3	Harihari, Serpentine
No exotic plants.	5	

Information sources that would be useful for determining whether a lake meets this criterion would include reports held in the Environment Waikato lakes database about the biology of the lake that contain vegetation maps. Other possible sources would include Protected Natural Area Programme (PNAP) survey reports for the relevant ecological district (note not all ecological districts have a PNA report), Champion *et al.* (1993) which includes vegetation maps for 38 lakes in the Lower Waikato Region, and Edwards *et al.* (2007) which describes the exotic condition of submerged vegetation for 41 lakes in the Waikato Region. Aerial photos at a reasonable resolution (<0.5 m) could also be used to determine whether emergent and wetland vegetation are dominated by exotic plant pests but would require someone experienced at interpreting vegetation types from aerial photos.

3.1.13 Exotic condition - fish: Weighting 1

This criterion assesses the exotic condition of fish populations within the lake ecosystem using a four-point scale. Descriptions and examples of the scale are given in Table 13. Note that the scores are inverted for this criterion.

Table 13: Description and examples for scoring the criterion 'exotic condition - fish' for lakes in the Waikato Region.

Exotic Condition - Fish	Score	Examples
Fish abundance dominated by exotics.	0	Waikare, Kaituna, Okowhao
Lakes with exotic fish present in moderate density.	2	Ngahewa, Tutaeinanga
Lakes with exotic fish present in low density.	3	Serpentine
Lakes with no exotic fish.	5	Harihari

Information sources that would be useful for determining whether a lake meets this criterion would include reports held in the Environment Waikato lakes database about fish populations in a lake. Other sources include FBIS (although abundance data is unlikely to be accurate), and contacting relevant staff at Environment Waikato, the Department of Conservation or the local office of Fish and Game New Zealand.

3.1.14 Vulnerability: Weighting 5

This criterion assesses the vulnerability of a lake ecosystem and was scored according to the Wildland Consultants Ltd Contract Report No. 1810, with a few minor amendments to make it more suitable for lakes. The vulnerability of an ecosystem relates to its susceptibility to modification. An ecosystem which is vulnerable has a greater likelihood of deteriorating in condition than one which is more robust. High, Medium, and Low states of vulnerability for lakes are described below:

Highly-Vulnerable Lakes (score = 4)

- Lakes which are deteriorating (or have a high probability of deteriorating) in the short-term as a result of adverse impacts from a threat mechanism which is operating, e.g. rapidly developing and/or intensively-farmed catchment, recent introduction of pest fish or aquatic weeds. For example, Lake Serpentine which has recently had *Utricularia.gibba* introduced to it; and lakes Milicich, Posa and Pataka which are unprotected by drainage rules in the regional plan and are currently undergoing changes in land use.

- Lakes which would deteriorate (or disappear) as a result of a threat mechanism which is likely to occur, e.g. Lakes that are subject to a resource consent application for water use, or vegetated lakes that currently have deteriorating water quality which is threatening the viability of the submerged plants (e.g. Lake Taharoa).
- Lakes with a high native condition that are experiencing increasing recreational/commercial use (e.g. eel fishing, water skiing), particularly by boats that could introduce aquatic pests. This may arise from a new use, or improved accessibility.

Moderately-Vulnerable Lakes (score = 3)

- Lakes with moderate-high native condition which have the potential to deteriorate in the medium-term as a result of a low intensity threat, e.g. a lake with low densities of aquatic pests which have the potential to increase in abundance. Lake Maratoto is an example of a lake that meets this criterion due to the ongoing threat of peat shrinkage impacting on lake water levels.
- Lakes with moderate-high native condition which have a low but real chance of a higher intensity threat causing deterioration. For example, lakes with koi immediately downstream (e.g Lake Areare), or lakes with the potential for water quality to decline and destabilise aquatic plants (e.g. Lake Mangakaware).
- Lakes with a moderate native condition that experience a medium to high amount of recreational/commercial use that are at risk from aquatic pests.

Low-Moderate Vulnerability Lakes (score =2)

- Lakes with low native condition that have the potential to deteriorate in the long-term as a result of a low intensity threat.
- Lakes with a low native condition that are subject to a low-medium amount of commercial and recreational use.

Low-Vulnerability Lakes (score = 0)

Sites with low vulnerability are frequently of either very low or very high quality. High quality sites with low vulnerability include natural areas which are largely unmodified, have low levels of introduced plants and animals, and are either large in size or well-buffered by adjacent natural areas. Many sites which have high condition scores will be of low vulnerability (assuming that current management continues). Many sites which have very low condition scores will also have a low level of vulnerability. This is because they are already very highly degraded and are unlikely to experience a further deterioration in condition.

This criterion should be scored in sequence (i.e. after ecological value and condition have been scored) so this information can then be used when determining vulnerability. Information sources for threats/risks to a lake are likely to be most easily obtained by contacting the group or agency responsible for managing the lake.

3.1.15 Degree of legal protection: Weighting 1

This criterion assesses the degree of legal protection using a five-point scale. Usually if a lake has legal protection it is less likely to be vulnerable to threats. As this does not always hold true we have given this criterion a low weighting (1). Descriptions and examples of the scale are given in Table 14. Note that the scores are inverted for this criterion.

Table 14: Description and examples for scoring the criterion 'degree of legal protection' for lakes in the Waikato Region.

Degree of Legal Protection	Score	Examples
Reserve that includes significant legally protected buffers.	0	Nгахewa, Okowhao
Reserve with no or small legally protective buffers.	1	Tutaeinanga, Serpentine, Kaituna, Waikare
Covenant in place.	2	Maratoto
Owned by a statutory body or Trust but not legally protected.	3	Harihari
Privately-owned with no legal protection.	4	

The Environment Waikato lakes database lists the tenure, controlling agency, and reserve status of each lake.

3.1.16 Co-ordination of biodiversity management between agencies and groups: Weighting 1

This criterion assesses the degree of co-ordination of biodiversity management of agencies and groups (e.g. care groups) using a four-point scale. Descriptions and examples of the scale are given in Table 15.

Table 15: Description and examples for scoring the criterion 'co-ordination of biodiversity management between agencies and groups' for lakes in the Waikato Region.

Degree of Co-ordination	Score	Examples
Three or more agencies/groups actively co-ordinating biodiversity management.	4	Kaituna, Waikare, Serpentine
Two agencies/groups actively co-ordinating biodiversity management.	3	Serpentine
Agreement in place for agencies/groups to work together but no co-ordinated work being undertaken.	1	Nгахewa, Tutaeinanga, Maratoto
No co-ordination.	0	Harihari, Okowhao

Information for scoring this criterion can be gained from contacting the agency/group responsible for managing the lake being assessed.

3.1.17 Funding and management input: Weighting 2

This criteria is scored on the basis of Environment Waikato injecting a moderate amount (c.\$100K) of direct funding or management input (staff time) into a lake for 1-5 years. It is likely to be most effective in lakes that currently receive no, or few

resources from other agencies and in small-medium sized lakes. It is scored on a four-point scale, with descriptions and examples given below.

A substantial increase in ecological value/viability (Score = 6) would be expected in lakes where a relatively low cost action would result in a dramatic improvement in the natural functioning of a lake. Examples include installing a simple weir to restore historical water levels in a lake that is being drained progressively, fencing an entire lake margin with good-sized buffers, or pest eradication undertaken when a pest species is in its early stage of invasion and has not fully established, or where eradication is being undertaken in a small, closed system.

A moderate increase in ecological value/viability (Score = 4) would be expected from actions that target a specific biodiversity aspect of a lake. For example, regular removal of problematic fish species (e.g. rudd, koi, catfish), willow removal, installing a fish pass, or predator control to protect vulnerable species. Gains would be greatest in small to medium sized lakes where the size of the resources enables a gain to the whole lake system and not just a portion e.g. revegetation of a wide riparian margin, or expansion of an existing protective margin.

A minor increase in ecological value/viability (Score = 2) would be expected from actions that target a specific biodiversity aspect of a lake (as described above) or improve water quality of a lake inflow (e.g. planting riparian buffers along the inflow or installing a silt trap) but only address a small portion of the lake.

No increase in ecological value/viability (Score = 0) would be expected in a lake that has been aesthetically improved (e.g. removal of exotic vegetation) but requires substantial funding (>\$100,000) to restore the natural functioning of the lake, if it can be restored at all.

A rough guide to some costs (GST exclusive):

- Willow removal (drill and inject) per hectare = c.\$3.5K
- Planting, per hectare with three years of maintenance = c.\$20K-\$35K
- Daily removal of exotic fish from small lake (<10 ha) though summer months = c.\$15K
- Construct and install a simple weir for a small lake = c.\$10K-\$15K
- Investigations, consent costs, construction for a water level control structure for restoring water level regimes = c.\$150K-\$200K
- Silt trap c.\$20k-\$50K

Information sources that would be useful for scoring this criterion include management plans held in the Environment Waikato lakes database, and discussing management needs and costs with the key people who manage the lake (e.g. Department of Conservation, Auckland/Waikato or Eastern Region offices of Fish and Game New Zealand, the local district/city council, community care group, local iwi).

3.1.18 Restoration potential: In lake - weighting 3, margins - weighting 3

This criterion separately assesses the restoration potential of a lake and the land adjoining it using the same four point scale. Restoration is defined as restoring lake or wetland function for this criterion. There may be some lakes that don't require restoration but may require some action to ensure their condition is safeguarded in the long term. Actions might include covenanting the lake and a protective buffer, ensuring District and/or Regional Plan rules prevent inappropriate development, and in some cases it may be appropriate to seek public ownership and/or a reserve status. Descriptions and examples of the scale are given in Tables 16 and 17.

Table 16: Description and examples for scoring the criterion 'in lake restoration potential' for lakes in the Waikato Region.

Restoration Potential	Score	Examples
Lake in excellent condition but may require some action (e.g. planning protection) to ensure its condition is safeguarded in the long term.	5	Blue lake, Upper and Lower Tama lakes, Rotopounamu
Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 5-10 years.	3	Harihari, Maratoto
Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs that would resolve key problems within 10-50 years.	2	Serpentine, Ngahewa, Okowhao, Tutaeinanga
Significant barriers to restoring the lake (e.g. highly unnatural hydrology, lake infilling) that are unlikely to be resolved within 50 years.	0	Waikare, Kaituna

Table 17: Description and examples for scoring the criterion 'restoration potential of land adjoining lake' for lakes in the Waikato Region.

Restoration Potential	Score	Examples
Lake margin in excellent condition but may require some action (e.g. covenanting, planning protection) to ensure its condition is safeguarded in the long term.	5	Rotowhero, Rotopounamu
Restoration issues can probably be addressed through achievable actions confined to the lake margin which would resolve key problems within 5-10 years (e.g. fencing, weed control, planting etc.).	3	Harihari, Otamatearua, Mangakaware
Restoration issues can probably be addressed through achievable actions confined to the lake margin which would resolve key problems within 10-50 years.	2	Parangi, Ruatuna
Significant barriers to restoring the lake margin that are unlikely to be resolved within 50 years.	0	Lake Rotorua (Hamilton Lake), Lake Te Koutu

Information sources that would be useful for scoring this criterion include management plans held in the Environment Waikato lakes database, and discussing management needs and viability of restoration options with the key people who manage the lake (e.g. Department of Conservation, Auckland/Waikato or Eastern Region offices of Fish and Game New Zealand, the local district/city council, community care group, local iwi).

4. TRIAL OF RANKING METHOD

The scoring sheets for the seven lakes that the ranking method was trialed on are provided in Appendix 3. Scoring was carried out using the scoring guidelines described in Section 3 (prior to modifications carried out during the final scoring process). We were able to score all of the criteria relatively easily for lakes with good information but relied on discussions with the relevant staff from the key management agency for lakes with poor information (e.g. Tutaeinanga, Okowhao).

Table 18 provides a summary of the scores for each of the lakes including a comparison with the score from the original EW ranking method.

Table 18: Summary of scores for trial lakes used to evaluate the system for ranking lakes in the Waikato Region.

Lake	Scores for Criteria					Score from Original Ranking Method
	Ecological Significance	Ecological Condition	Vulnerability	Potential Outcomes	Total	
Harihari	15	39	22	22	98	
Kaituna	23	17	1	8	49	199
Ngahewa	22	32	0	13	67	
Okowhao	16	23	19	16	74	
Serpentine	32	28	25	20	105	209
Tutaeinanga	10	21	19	13	63	
Waikare	34	13	1	8	56	199

As can be seen from Table 18, scores had a far wider range than the original ranking method. The method also ranked lakes in the order the advisory group would have expected. We would expect further differentiation between lakes of different ecological value once the datasets on lake classification and lake ranking are received, allowing the scores for the four sub-criteria in the national and regional priority criteria to be calculated and added to the total for each lake.

5. SUMMARY AND RECOMMENDATIONS

The Environment Waikato ecosystem ranking method was refined to address the problems of applying the method to lake ecosystems. The refined method expanded the number of criteria from 10 to 18 (and eventually to 19) and adjusted the weightings between criteria categories. Criteria that didn't work well for aquatic ecosystems were removed and replaced with additional criteria in the ecological significance and condition categories.

The LENZ classification system that was used in the EW ecosystem ranking method was replaced with the lake classification and ranking system being developed by the Department of Conservation, although the datasets were not yet available at August 2009. Once completed, the DOC rankings should address the need to assess the

ecological significance of lake types in a national and regional context, to ensure that a full range of lake types are targeted for biodiversity management.

The refined ranking method was trialled on seven lakes and was found to have increased the differentiation between lakes with different ecological values. Scoring was carried out using the scoring guidelines described in Section 3.2. We were able to score all of the criteria relatively easily for lakes where good information was available but relied on discussions with relevant staff from the key management agency for lakes with poor information.

Further refinement of the method is recommended, with specific actions listed below:

- When the Department of Conservation lake classification and ranking datasets become available, they should be used to complete the scoring sheets for the seven trial lakes. Amendments to the sub-criteria may be needed at that stage.
- Score another set of diverse lakes (15-20 lakes) and then review the method to ensure it is delivering expected outcomes. Add in additional examples to the scoring guidelines to fill current gaps (completed November 2008).
- To increase the efficiency of scoring lakes, it is recommended that an advisory panel that includes key lake managers in the region is brought together in several short workshops to determine criteria scores.

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ENVIRONMENT WAIKATO ECOSYSTEM DRAFT RANKING METHOD

The draft Environment Waikato ecosystem ranking method comprised three tables which are presented below.

Table 1: Hierarchical Classification System and Priority Ranking System for Ecosystem Data Sheet.

Criteria	1 National Priority	Ecological Values						Vulnerability				Potential Outcomes			
		2 Threatened Environment Classification*	3 Ecosystem Condition	4 Regional Representativeness	5 Region's Priority Land*	6 Vulnerability	7 Extinction Threat	8 Outcome Objectives for LTCCP	9 Funding and Management Input (non-EW)	10 Restoration Potential					
Weighting	6	5	5	5	5	2	6	4	2	2	5				
Priority score	20% or less remaining in indigenous cover	6 Acutely Threatened	6 Unmodified	4 Regionally scarce ecosystem types	6 80-100% of LENZ IV in the region●	4 High	4 Prevent local extinctions of species	10 Community involvement	4 Unresourced & unmanaged	5 High	4				
	Sand dunes and wetlands that have become uncommon due to human activity	6 Chronically Threatened	5 Slightly degraded	3 Regionally threatened species	6 40-80% LENZ IV in the region●	3 Medium	3 Re-introduce 'lost' biota	8 Updating ecosystem inventories	3 Intermittently resourced & managed	4 Medium	2				
	'Originally rare' terrestrial ecosystem types●. (List of original rare ecosystems, page 18 & Table 5), EW Doc #1230153.Williams P, 2007.	6 At Risk	4 Moderately degraded	2 Representative of the region's ecosystems	6 10-40% LENZ IV in the region●	2 Low	2 Enhance quality of degraded systems in specified areas		3 Moderately resourced & managed	3 Low	1				
	Presence of acutely and chronically threatened indigenous species ▲ (Tables 6 & 7), EW Doc #1230153 & (Hitchmough et al. 2007).	6 Critically Underprotected	3 Extremely degraded	1					2 Adequately resourced & managed						
		Underprotected	2												
		Less reduced and better protected	1												
Rank	144	105	50	90	18	144	96	14	28	20					

SUB-TOTALS	Ecological values	0
	Vulnerability	0
	Potential Outcomes	0

Key:

* GIS involved

Results = score x weighting

● Score = (No. of types of the land IV environments x score of the environment in the same column)* weighting

▲ Score = ((acutely (6) x No. of species) + (chronically (3) x No. of species)) * weighting

Note: **Acutely threatened** includes nationally critical, nationally endangered and nationally vulnerable categories of NZ threat classification list. **Chronically threatened** includes serious decline and gradual decline categories of NZ threat classification list (Hitchmough *et al.* 2007).

Table 2: Checklist for assessing significant ecosystem types. For all scored thresholds, provide the information requested below to justify your decision and to assist with determining level of criteria. N/A= non-applicable

Criteria	Score		Comments
1 National Priority		Percentage of indigenous cover Name the ecosystem type that have become uncommon due to human activity Which type of rare ecosystem in Table 5, using the tentative common name. Which species in Tables 6 & 7, including both scientific and common names, page numbers.	
2 Threatened environment classification		Which type of Threatened environment classification	
3 Ecosystem condition		Basis for judgment in ecosystem condition	
4 Regional representativeness		Name of your scarce ecosystem type/threatened species/representativeness (Regional ecosystem type)	
5 Region's priority land		Which type of land environment IV, percentage categories	
6 Vulnerability		Basis for judgment in vulnerability	
7 Extinction threat		Name of the species?	
8 Outcome objectives for LTCCP		The programme name for community involved and the community name	
9 Funding and management input		Name of the funding	

Table 3: Appendix (Others)

Criteria	Rank/Score	Comments
A Representativeness		
B SNA size of area (ha)		
C Ecological sequence and habitat mosaics		
D Proximity to other natural areas		
SUB-TOTAL (OTHERS)	0	

Scoring
High = 20
Medium = 15
Low = 5

LAKE ECOSYSTEM RANKING METHOD

The scoring sheet for ranking lake ecosystems in the Waikato Region for biodiversity management is presented below. Criteria were reviewed in August 2009 prior to completion of scoring and ranking exercise.

Criteria	Ecological Significance										Ecosystem Condition									
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish							
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1							
Score	6	6	5	5	5	5	5	5	5	5	5	0	0							
	Best national example of a lake type.	Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08).	Very high	Excellent - no impairment to the natural state of fish passage in the lake catchment.	Excellent - part of a mostly continuous natural freshwater or geothermal landscape.	Catchment mostly (>60%) covered in indigenous vegetation or in natural state	Lakes with a natural hydrological regime	Very high	High native plant diversity and abundance (c.f. natural state)	High native fauna diversity and abundance	Dominated by exotic plants	Abundance dominated by exotic fish							
	Ranked within the top 2-5 lakes of a lake types.	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08).	High	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment.	Very good - part of a semi-continuous freshwater or geothermal natural landscape.	Catchment partially (>30%) covered in indigenous vegetation	Lakes with a modified hydrological regime but natural hydrological processes largely intact	High	Good native plant diversity	Good native fauna diversity and/or abundance	Exotic plants present in moderate abundance	Lakes with exotic fish present in moderate density							
	Contains an 'Originally rare' terrestrial ecosystem type.	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel).	Medium	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment.	Good - part of a complex of aquatic habitats all within 5 km of each other.	Lake adequately buffered from surrounding land uses by an effective riparian margin OR Catchment partially covered (>30%) in indigenous vegetation but stock have access to margin	Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could partially be restored by installation of a structure.	Good	Moderate native plant diversity and/or abundance	Low native fauna diversity and abundance.	Exotic plants present in low abundance	Lakes with exotic fish present in low density							
	Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary	Declining/serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	Poor - one of several discrete natural areas with some linkages.	Lake partially buffered from surrounding land use by riparian margin	Lakes with a modified hydrological regime where water levels are tightly controlled.	Moderate	Low native plant diversity.	Very low native fauna diversity and abundance	No exotic plants	Lakes with no exotic fish							

Criteria	Ecological Significance						Ecosystem Condition										
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish				
		Recovering/Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	Very Low	0	Very poor - isolated natural area with no linkages.	0	Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.	1	Poor	1	Very low native plant diversity and abundance	0				
		Relict/Naturally uncommon/Sparse/Range restricted species have been recorded at this site or are likely to be there based on available habitat.	1					No buffer.	0	Very Poor	0						
		Data deficient species have been recorded at this lake or are likely to be there based on available habitat.	1														
Total																	
Sub-totals	Ecological Significance																
	Ecological Condition																
	Vulnerability Potential Outcomes																
Total																	

SCORING SHEETS FOR TRIAL LAKES

Table 1: Scoring sheet for Lake Kaituna.

Criteria	Ecological Significance						Ecosystem Condition						
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality*	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1
Score	Best national example of a lake type.	Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08).	Very high	Excellent - no impairment to the natural state of fish passage in the lake catchment.	Excellent - part of a mostly continuous natural landscape.	Catchment mostly (>60%) covered in indigenous vegetation	Lakes with a natural hydrological regime	Very high	High native plant diversity and abundance	High native fauna diversity and abundance	Dominated by exotic plants	Dominated by exotic fish
	Ranked within the top 2-5 lakes of a lake types.	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08).	High	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment.	Very good - part of a semi-continuous natural landscape.	Catchment partially (>30%) covered in indigenous vegetation	Lakes with a modified hydrological regime but natural hydrological processes largely intact	High	Good native plant diversity	Good native fauna diversity and/or abundance	Exotic plant pests present in moderate abundance	Lakes with exotic fish present in moderate density
	Contains an 'Originally rare' terrestrial ecosystem type.	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel).	Medium	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment.	Good - part of a complex of aquatic habitats all within 5 km of each other.	Lake adequately buffered from surrounding land uses by an effective riparian margin	Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could easily be restored by installation of a structure.	Good	Moderate native plant diversity and/or abundance	Low native fauna diversity and abundance.	Exotic plant pests present in low abundance	Lakes with exotic fish present in low density
	Best national example of a lake type.	Serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	Poor - one of several discrete natural areas with some linkages.	Lake partially buffered from surrounding land use by riparian margin	Lakes with a highly modified hydrological regime.	Moderate	Low native plant diversity.	Very low native fauna diversity and abundance	No exotic plant pests	Lakes with no exotic fish

Criteria	Ecological Significance						Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality*	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	4		Very Low		Very poor - isolated natural area with no linkages.	Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins. No buffer.		Poor	Very low native plant diversity and abundance			
		Sparse species have been recorded at this site or are likely to be there based on available habitat.								Very Poor	0			
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	1											
Total			10	0	6	4	3	6	3	0	3	3	2	0
Sub-totals	Ecological Significance	23												
	Ecological Condition	17												
	Vulnerability Potential Outcomes	1												
Total		8												
Total		49												

Table 2: Scoring sheet for Lake Serpentine.

Criteria	Ecological Significance							Ecosystem Condition						
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality*	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1	
Score	Best national example of a lake type.	? Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	1 Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08).	2 Very high	1 Excellent - no impairment to the natural state of fish passage in the lake catchment.	1 Excellent - part of a mostly continuous natural landscape.	3 Catchment mostly covered (>60%) in indigenous vegetation	3 Lakes with a natural hydrological regime	3 Very high	1 High native plant diversity and abundance	1 High native fauna diversity and abundance	1 Dominated by exotic plants	1 Dominated by exotic fish	
	Ranked within the top 2-5 lakes of a lake types.	? Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	10 Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08).	High	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment.	Very good - part of a semi-continuous natural landscape.	Catchment partially (>30%) covered in indigenous vegetation	Lakes with a modified hydrological regime but natural hydrological processes largely intact	High	4 Good native plant diversity	3 Good native fauna diversity and/or abundance	Exotic plant pests present in moderate abundance	Lakes with exotic fish present in moderate density	
	Contains an 'Originally rare' terrestrial ecosystem type.	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	3 Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel).	3 Medium	3 Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment.	3 Good - part of a complex of aquatic habitats all within 5 km of each other.	3 Lake adequately buffered from surrounding land uses by an effective riparian margin	1 Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could easily be restored by installation of a structure.	Good	Moderate native plant diversity and/or abundance	Low native fauna diversity and abundance.	3 Exotic plant pests present in low abundance	3 Lakes with exotic fish present in low density	

Criteria	Ecological Significance								Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality*	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish			
	Best national example of a lake type.	Serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	2 Poor - one of several discrete natural areas with some linkages.	Lake partially buffered from surrounding land use by riparian margin	2 Lakes with a highly modified hydrological regime.	Moderate	2 Low native plant diversity.	Very low native fauna diversity and abundance	No exotic plant pests	Lakes with no exotic fish			
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	Very Low		Very poor - isolated natural area with no linkages.	Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.		Poor	Very low native plant diversity and abundance						
		Sparse species have been recorded at this site or are likely to be there based on available habitat.					No buffer.		Very Poor							
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	3													
Total	0	10	6	6	2	3	6	3	6	4	3	3	3			
Sub-totals	Ecological Significance	27														
	Ecological Condition	28														
	Vulnerability Potential Outcomes	25														
Total		100														

Table 3: Scoring sheet for Lake Waikare.

Criteria	Ecological Significance										Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish					
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1					
Score	Best national example of a lake type.	Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/6/08).	Very high	Excellent - no impairment to the natural state of fish passage in the lake catchment.	Excellent - part of a mostly continuous natural landscape.	Catchment mostly (>60%) covered in indigenous vegetation	Lakes with a natural hydrological regime	Very high	High native plant diversity and abundance	High native fauna diversity and abundance	Dominated by exotic plants	Dominated by exotic fish					
	Ranked within the top 2-5 lakes of a lake types.	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/6/08).	High	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment.	Very good - part of a semi-continuous natural landscape.	Catchment partially (>30%) covered in indigenous vegetation	Lakes with a modified hydrological regime but natural hydrological processes largely intact	High	Good native plant diversity	Good native fauna diversity and/or abundance	Exotic plant pests present in moderate abundance	Lakes with exotic fish present in moderate density					
	Contains an 'Originally rare' terrestrial ecosystem type.	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel).	Medium	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment.	Good - part of a complex of aquatic habitats all within 5 km of each other.	Lake adequately buffered from surrounding land uses by an effective riparian margin	Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could easily be restored by installation of a structure.	Good	Moderate native plant diversity and/or abundance	Low native fauna diversity and abundance.	Exotic plant pests present in low abundance	Lakes with exotic fish present in low density					

Criteria	Ecological Significance							Ecosystem Condition						
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	2	Serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	Poor - one of several discrete natural areas with some linkages.	Lake partially buffered from surrounding land use by riparian margin.	Lake with a highly modified hydrological regime.	Moderate	Low native plant diversity.	Very low native fauna diversity and abundance	No exotic plant pests	Lakes with no exotic fish	
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.		Very Low		Very poor - isolated natural area with no linkages.	Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.		Poor	Very low native plant diversity and abundance				
		Sparse species have been recorded at this site or are likely to be there based on available habitat.					No buffer.		Very Poor	0				
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	1											
Total	6		14	6	6	4	4	6	0	0	2	3	2	0
Sub-totals	Ecological Significance	34												
	Ecological Condition	13												
	Vulnerability Potential Outcomes	1												
Total		8												
Total		56												

Criteria	Vulnerability			Potential Outcomes						
	14 Vulnerability		15 Degree of Legal Protection	16 Co-ordination of Biodiversity Management Between Agencies and Groups		17 Funding and Management Input		18 Restoration Potential		
Weighting		6		1		1		2		4
Score	High		Reserve that includes significant fenced protective buffers		Three or more agencies/groups actively co-ordinating biodiversity management	4	Substantial increase in ecological value/viability if moderate funding and resources were made available.		Lake in excellent condition but may require some action to ensure its condition is safeguarded in the long term.	
	Medium		Reserve with no, small or unfenced protective buffers	1	Two agencies/groups actively co-ordinating biodiversity management		Moderate increase in ecological value/viability if moderate funding and resources were made available.		Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 5-10 years.	
	Low	0	Covenant in place		Agreement in place for agencies to work together but no co-ordinated work being undertaken.		Minor increase in ecological value/viability if moderate funding and resources were made available.	2	Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 10-50 years.	
			Owned by a statutory body or Trust but not legally protected		No co-ordination		No increase in ecological value/viability if moderate funding and resources were made available		Significant barriers to restoring the lake (e.g. highly unnatural water regime, catchment wide problems) that are unlikely to be resolved within 50 years.	0
			No protection							
Total		0		1		4		4		0
Sub-totals										

Total

Table 4: Scoring sheet for Lake Harihari.

Criteria	Ecological Significance						Ecosystem Condition						
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1
Score	Best national example of a lake type. ?	Nationally critical species have been recorded at this site or are likely to be there based on available habitat. 1	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08). ?	Very high 2	Excellent - no impairment to the natural state of fish passage in the lake catchment. 1	Excellent - part of a mostly continuous natural landscape. 1	Catchment mostly (>60%) covered in indigenous vegetation. 3	Lakes with a natural hydrological regime 5	Very high 3	High native plant diversity and abundance 1	High native fauna diversity and abundance 1	Dominated by exotic plants 1	Dominated by exotic fish 1
	Ranked within the top 2-5 lakes of a lake types. ?	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat. 1	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08). ?	High 2	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment. 4	Very good - part of a semi-continuous natural landscape. 4	Catchment partially (>30%) covered in indigenous vegetation. 3	Lakes with a modified hydrological regime but natural hydrological processes largely intact 3	High 3	Good native plant diversity 4	Good native fauna diversity and/or abundance 3	Exotic plant pests present in moderate abundance 3	Lakes with exotic fish present in moderate density 3
	Contains an "Originally rare" terrestrial ecosystem type".	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat. 1	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel). 1	Medium 3	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment. 3	Good - part of a complex of aquatic habitats all within 5 km of each other. 3	Lake adequately buffered from surrounding land uses by an effective riparian margin 3	Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could easily be restored by installation of a structure. 3	Good 3	Moderate native plant diversity and/or abundance 3	Low native fauna diversity and abundance. 3	Exotic plant pests present in low abundance 3	Lakes with exotic fish present in low density 3
	Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	Serious decline species have been recorded at this site or are likely to be there based on available habitat. 1	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy representative populations of that species. 1	Low 2	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment. 2	Poor - one of several discrete natural areas with some linkages. 2	Lake partially buffered from surrounding land use by riparian margin. 2	Lakes with a highly modified hydrological regime. 2	Moderate 2	Low native plant diversity. 2	Very low native fauna diversity and abundance 2	No exotic plant pests 2	Lakes with no exotic fish 2

Criteria	Ecological Significance						Ecosystem Condition										
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish				
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2		Very Low		Very poor - isolated natural area with no linkages.		Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.		Poor	Very low native plant diversity and abundance					
		Sparse species have been recorded at this site or are likely to be there based on available habitat.							No buffer.		Very Poor						
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.															
Total			2	0	6	4	3	6	9	9	4	3	3	5			
Sub-totals	Ecological Significance	15															
	Ecological Condition	39															
	Vulnerability Potential	22															
	Outcomes	22															
Total		98															

Criteria	Vulnerability			Potential Outcomes				
	14 Vulnerability	15 Degree of Legal Protection	16 Co-ordination of Biodiversity Management Between Agencies and Groups	17 Funding and Management Input	18 Restoration Potential			
Weighting		6	1	1	2		4	
Score	High		Reserve that includes significant fenced protective buffers	Three or more agencies/groups actively co-coordinating biodiversity management	Substantial increase in ecological value/viability if moderate funding and resources were made available.	5	Lake in excellent condition but may require some action to ensure its condition is safeguarded in the long term.	
	Medium	3	Reserve with no, small or unfenced protective buffers	Two agencies/groups actively co-coordinating biodiversity management	Moderate increase in ecological value/viability if moderate funding and resources were made available.		Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 5-10 years.	3
	Low		Covenant in place	Agreement in place for agencies to work together but no co-ordinated work being undertaken.	Minor increase in ecological value/viability if moderate funding and resources were made available.		Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, that would resolve key problems within 10-50 years.	
			Owned by a statutory body or Trust but not legally protected	3	No co-ordination	0	No increase in ecological value/viability if moderate funding and resources were made available	Significant barriers to restoring the lake (e.g. highly unnatural water regime, catchment wide problems) that are unlikely to be resolved within 50 years.
			No protection					
Total		18		3		0	10	12
Sub-totals								

Total

Table 5: Scoring sheet for Lake Ngahewa.

Criteria	Ecological Significance										Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish					
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1					
Score	Best national example of a lake type. ?	Nationally critical species have been recorded at this site or are likely to be there based on available habitat. 1	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08). ?	Very high 2	Excellent - no impairment to the natural state of fish passage in the lake catchment. 1	Excellent - part of a mostly continuous natural landscape. 1	Catchment mostly (>60%) covered in indigenous vegetation 3	Lakes with a natural hydrological regime 3	Very high 3	High native plant diversity and abundance 1	High native fauna diversity and abundance 1	Dominated by exotic plants 1	Dominated by exotic fish 1					
	Ranked within the top 2-5 lakes of a lake types. ?	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat. 5	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08). ?	High 2	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment. 2	Very good - part of a semi-continuous natural landscape. 3	Catchment partially (>30%) covered in indigenous vegetation 3	Lakes with a modified hydrological regime but natural hydrological processes largely intact 3	High 3	Good native plant diversity 3	Moderate native fauna diversity and abundance 3	Exotic plant pests present in moderate abundance 3	Lakes with exotic fish present in moderate density 2					
	Contains an 'Originally rare' terrestrial ecosystem type*. 1	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat. 1	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel). 1	Medium 3	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment. 2	Good - part of a complex of aquatic habitats all within 5 km of each other. 3	Lake adequately buffered from surrounding land uses by an effective riparian margin 3	Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could easily be restored by installation of a structure. 3	Good 3	Moderate native plant diversity and/or abundance 3	Low native fauna diversity and abundance 3	Exotic plant pests present in low abundance 3	Lakes with exotic fish present in low density 3					

Criteria	Ecological Significance						Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
	Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	Serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	Poor - one of several discrete natural areas with some linkages.	Lake partially buffered from surrounding land use by riparian margin.	Lakes with a highly modified hydrological regime.	Moderate	Low native plant diversity.	No native fauna	No exotic plant pests	Lakes with no exotic fish	
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	6	Very Low		Very poor - isolated natural area with no linkages.	Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.		Poor	1	Very low native plant diversity and abundance			
		Sparse species have been recorded at this site or are likely to be there based on available habitat.					No buffer.		Very Poor					

Criteria	Ecological Significance						Ecosystem Condition						
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.											
Total	0	11	0	6	2	3	9	9	3	3	3	3	2
Sub-totals	Ecological Significance	22											
	Ecological Condition	32											
	Vulnerability Potential Outcomes	0											
Total		13											
Total		67											

Criteria	Vulnerability				Potential Outcomes					
	14 Vulnerability		15 Degree of Legal Protection		16 Co-ordination of Biodiversity Management Between Agencies and Groups		17 Funding and Management Input		18 Restoration Potential	
Weighting		6		1		1		2		4
Score	High		Reserve that includes significant fenced protective buffers	0	Three or more agencies/groups actively co-ordinating biodiversity management		Substantial increase in ecological value/viability if moderate funding and resources were made available.		Lake in excellent condition but may require some action to ensure its condition is safeguarded in the long term.	
	Medium		Reserve with no, small or unfenced protective buffers		Two agencies/groups actively co-ordinating biodiversity management		Moderate increase in ecological value/viability if moderate funding and resources were made available.		Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 5-10 years.	
	Low	0	Covenant in place		Agreement in place for agencies to work together but no co-ordinated work being undertaken.	1	Minor increase in ecological value/viability if moderate funding and resources were made available.	2	Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 10-50 years.	2
			Owned by a statutory body or Trust but not legally protected		No co-ordination		No increase in ecological value/viability if moderate funding and resources were made available		Significant barriers to restoring the lake (e.g. highly unnatural water regime, catchment wide problems) that are unlikely to be resolved within 50 years.	
			No protection							
Total		0		0		1		4		8
Sub-totals										

Total

Table 6: Scoring sheet for Lake Okowhao.

Criteria	Ecological Significance						Ecosystem Condition								
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish		
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1		
Score	Best national example of a lake type. ?	Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08). ?	Very high	Excellent - no impairment to the natural state of fish passage in the lake catchment.	Excellent - part of a mostly continuous natural landscape.	Catchment mostly (>60%) covered in indigenous vegetation	Lakes with a natural hydrological regime	Very high	High native plant diversity and abundance	High native fauna diversity and abundance	Dominated by exotic plants	Dominated by exotic fish	0	
	Ranked within the top 2-5 lakes of a lake types. ?	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08). ?	High	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment.	Very good - part of a semi-continuous natural landscape.	Catchment partially (>30%) covered in indigenous vegetation	Lakes with a modified hydrological regime but natural hydrological processes largely intact	High	Good native plant diversity	Good native fauna diversity and/or abundance	Exotic plant pests present in moderate abundance	Lakes with exotic fish present in moderate density		
	Contains an 'Originally rare' terrestrial ecosystem type*.	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel).	Medium	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment.	Good - part of a complex of aquatic habitats all within 5 km of each other.	Lake adequately buffered from surrounding land uses by an effective riparian margin	Lakes with a modified hydrological regime where the natural hydrological processes have been partially restored or could easily be restored by installation of a structure.	Good	Moderate native plant diversity and/or abundance	Low native fauna diversity and abundance.	Exotic plant pests present in low abundance	Lakes with exotic fish present in low density		

Criteria	Ecological Significance						Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
	Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	Serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	Poor - one of several discrete natural areas with some linkages.	Lake partially buffered from surrounding land use by riparian margin	2 Lakes with a modified hydrological regime where water levels are tightly controlled.	Moderate	Low native plant diversity.	Very low native fauna diversity and abundance	No exotic plant pests	Lakes with no exotic fish	
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.		Very Low		Very poor - isolated natural area with no linkages.	Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.		Poor	1 Very low native plant diversity and abundance				
		Sparse species have been recorded at this site or are likely to be there based on available habitat.					No buffer.		Very Poor					

Criteria	Ecological Significance						Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	3											
Total	0		3	0	6	4	3	6	6	3	3	3	2	0
Sub-totals	Ecological Significance	16												
	Ecological Condition	23												
	Vulnerability Potential Outcomes	18												
Total		16												
Total		74												

Criteria	Vulnerability				Potential Outcomes					
	14 Vulnerability		15 Degree of Legal Protection		16 Co-ordination of Biodiversity Management Between Agencies and Groups		17 Funding and Management Input		18 Restoration Potential	
Weighting		6		1		1		2		4
Score	High		Reserve that includes significant fenced protective buffers	0	Three or more agencies/groups actively co-ordinating biodiversity management		Substantial increase in ecological value/viability if moderate funding and resources were made available.		Lake in excellent condition but may require some action to ensure its condition is safeguarded in the long term.	
	Medium	3	Reserve with no, small or unfenced protective buffers		Two agencies/groups actively co-ordinating biodiversity management		Moderate increase in ecological value/viability if moderate funding and resources were made available.	4	Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 5-10 years.	
	Low		Covenant in place		Agreement in place for agencies to work together but no co-ordinated work being undertaken.		Minor increase in ecological value/viability if moderate funding and resources were made available.		Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 10-50 years.	2
			Owned by a statutory body or Trust but not legally protected		No co-ordination	0	No increase in ecological value/viability if moderate funding and resources were made available		Significant barriers to restoring the lake (e.g. highly unnatural water regime, catchment wide problems) that are unlikely to be resolved within 50 years.	
			No protection							
Total		18		0		0		8		8
Sub-totals										

Total

Table 7: Scoring sheet for Lake Tutaeinanga.

Criteria	Ecological Significance						Ecosystem Condition									
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality*	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish			
Weighting	3	1	2	2	1	1	3	3	3	1	1	1	1			
Score	Best national example of a lake type.	Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08).	Very high	Excellent - no impairment to the natural state of fish passage in the lake catchment.	Excellent - part of a mostly continuous natural landscape.	Catchment mostly (>60%) covered in indigenous vegetation	Lakes with a natural hydrological regime	Very high	High native plant diversity and abundance	High native fauna diversity and abundance	Dominated by exotic plants	Dominated by exotic fish			
	Ranked within the top 2-5 lakes of a lake types.	Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	Ranked within the top 3 lakes of a Level 2 Lake Type for the region (based on DOC's lake prioritisation project, report due 30/8/08).	High	Good - there are a few minor impairments to the natural state of fish passage in the lake catchment.	Very good - part of a semi-continuous natural landscape.	Catchment partially (>30%) covered in indigenous vegetation	Lakes with a modified hydrological regime but natural hydrological processes largely intact	3	High	Good native plant diversity	Good native fauna diversity and/or abundance	Exotic plant pests present in moderate abundance	2	Lakes with exotic fish present in moderate density	2
	Contains an 'Originally rare' terrestrial ecosystem type*.	Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	Contains a special/rare biological feature in a regional context (e.g. oldest population of longfin eel).	Medium	Poor - there are a moderate number of impairments to the natural state of fish passage in the lake catchment.	Good - part of a complex of aquatic habitats all within 5 km of each other.	3	Lake adequately buffered from surrounding land uses by an effective riparian margin	Good	Moderate native plant diversity and/or abundance	Low native fauna diversity and abundance.	2	Exotic plant pests present in low abundance		Lakes with exotic fish present in low density	

Criteria	Ecological Significance						Ecosystem Condition									
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality*	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish			
	Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	Serious decline species have been recorded at this site or are likely to be there based on available habitat.	Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	Low	1	Very Poor - there are substantial impairments to the natural state of fish passage in the lake catchment.	Poor - one of several discrete natural areas with some linkages.	2	Lake partially buffered from surrounding land use by riparian margin	Lakes with a modified hydrological regime where water levels are tightly controlled.	Moderate	2?	Low native plant diversity.	Very low native fauna diversity and abundance	No exotic plant pests	Lakes with no exotic fish
		Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	Best regional example of a Level 2 Lake Type (based on DOC's lake prioritisation project, report due 30/8/08).	Very Low			Very poor - isolated natural area with no linkages.		Lake partially buffered from surrounding land use by good riparian margins on incoming tributaries but lake itself has minimal riparian margins.		Poor	1	Very low native plant diversity and abundance	0		
		Sparse species have been recorded at this site or are likely to be there based on available habitat.							No buffer.		Very Poor					

Criteria	Ecological Significance						Ecosystem Condition							
	1 National Priority	2 Threatened Species	3 Regional Priority	4 Habitat Diversity	5 Impairment to the Natural State of Fish Passage	6 Connectivity - Terrestrial (incl. all birds)	7 Catchment/ Surrounding Landscape	8 Hydrology	9 Water Quality	10 Native Condition - Plants	11 Native Condition - Fauna	12 Exotic Condition - Plants	13 Exotic Condition - Fish	
		Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	1											
Total	0		1	0	2	4	3	2	9	3	0	2	2	2
Sub-totals	Ecological Significance	10												
	Ecological Condition	21												
	Vulnerability Potential Outcomes	19												
Total		63												

Criteria	Vulnerability				Potential Outcomes					
	14 Vulnerability		15 Degree of Legal Protection		16 Co-ordination of Biodiversity Management Between Agencies and Groups		17 Funding and Management Input		18 Restoration Potential	
Weighting		6		1		1		2		4
Score	High		Reserve that includes significant fenced protective buffers		Three or more agencies/groups actively co-ordinating biodiversity management		Substantial increase in ecological value/viability if moderate funding and resources were made available.		Lake in excellent condition but may require some action to ensure its condition is safeguarded in the long term.	
	Medium	3	Reserve with no, small or unfenced protective buffers	1	Two agencies/groups actively co-ordinating biodiversity management		Moderate increase in ecological value/viability if moderate funding and resources were made available.		Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 5-10 years.	
	Low	0	Covenant in place		Agreement in place for agencies to work together but no co-ordinated work being undertaken.	1	Minor increase in ecological value/viability if moderate funding and resources were made available.	2	Restoration issues can probably be addressed through achievable actions confined to the lake and its immediate environs, which would resolve key problems within 10-50 years.	2
			Owned by a statutory body or Trust but not legally protected		No co-ordination		No increase in ecological value/viability if moderate funding and resources were made available		Significant barriers to restoring the lake (e.g. highly unnatural water regime, catchment wide problems) that are unlikely to be resolved within 50 years.	
			No protection							
Total		18		1		1		4		8
Sub-totals										

Total

THREATENED SPECIES THAT MAY OCCUR IN WAIKATO LAKE ECOSYSTEMS

VASCULAR PLANTS

Table 1: Threatened or at risk indigenous plant species found within Waikato Lake Ecosystems as per de Lange *et al.* 2009

Scientific Name	Threat Status	Habitat
<i>Amphibromus fluitans</i>	Nationally Endangered	Lake turfs, ephemeral wetlands
<i>Anzybas carsei</i> ¹	Nationally Critical	Whangamarino Wetland
<i>Baumea complanata</i>	Nationally Vulnerable	
<i>Carex litorosa</i>	Declining	Dune lake turfs
<i>Cyclosorus interruptus</i>	Declining	Semi-mineralised wetlands
<i>Fimbristylis velata</i>	Naturally Uncommon	Lake turfs
<i>Gratiola concinna</i>	Nationally Vulnerable	Lake turfs
<i>Isolepis basilaris</i>	Nationally Endangered	Dune lake turfs
<i>Isolepis fluitans</i>	Nationally Vulnerable	
<i>Lycopodiella serpentina</i>	Nationally Vulnerable	Openly vegetated bogs
<i>Mazus novaezeelandiae</i> subsp. <i>impolitus</i>	Nationally Vulnerable	
<i>Mazus novaezeelandiae</i> subsp. <i>novaezeelandiae</i>	Declining	Coastal damp hollows, lowland wet swampy forests
<i>Mimulus repens</i>	Naturally Uncommon	
<i>Myriophyllum robustum</i>	Declining	Submerged plant of wetlands and peaty lakes
<i>Ophioglossum petiolatum</i>	Nationally Critical	
<i>Prasophyllum hectorii</i>	Relict	Bogs
<i>Pterostylis micromega</i>	Nationally Critical	Bogs and swamps
<i>Pterostylis paludosa</i>	Declining	Openly vegetated bogs
<i>Ranunculus limosella</i>	Declining	Lake turfs
<i>Ranunculus macropus</i>	Data Deficient	
<i>Schoenus carsei</i>	Nationally Endangered	
<i>Sporadanthus ferrugineus</i>	Relict	Peat bogs
<i>Stuckenia pectinata</i> ²	Naturally Uncommon	Submerged macrophyte
<i>Urtica linearifolia</i>	Declining	Wetlands, stream margins
<i>Utricularia australis</i>	Nationally Endangered	Submerged plant of wetlands and peaty lakes
<i>Utricularia delicatula</i>	Relict	Openly vegetated bogs

¹ Previously known as '*Corybas carsei*'

² Previously known as '*Potamogeton pectinatus*'

BIRDS

Table 2: Threatened or at risk indigenous bird species found within Waikato Lake Ecosystems as per Miskelly *et al.* 2008

Scientific Name	Common Name	Threat Status
<i>Anas chlorotis</i> "North Island"	Brown teal	Recovering
<i>Anas superciliosa superciliosa</i>	Grey duck	Nationally Critical
<i>Botaurus poiciloptilus</i>	Australasian bittern	Nationally Endangered
<i>Bowdleria punctata vealeae</i>	NI fernbird	Declining
<i>Charadrius bicinctus bicinctus</i>	Banded dotterel	Nationally Vulnerable
<i>Egretta alba modesta</i>	White heron	Nationally Critical
<i>Gallirallus philippensis assimilis</i>	Banded rail	Naturally Uncommon
<i>Haematopus finschi</i>	New Zealand pied oystercatcher	Declining
<i>Himantopus himantopus leucocephalus</i>	Pied stilt	Declining
<i>Larus bulleri</i>	Black billed gull	Nationally Endangered
<i>Larus novaehollandiae scopulinus</i>	Red billed gull	Nationally Vulnerable
<i>Phalacrocorax carbo novaehollandiae</i>	Black shag	Naturally Uncommon
<i>Phalacrocorax melanoleucos brevirostris</i>	Little shag	Naturally Uncommon
<i>Phalacrocorax sulcirostris</i>	Little black shag	Naturally Uncommon
<i>Platalea regia</i>	Royal spoonbill	Naturally Uncommon
<i>Poliiocephalus rufopectus</i>	New Zealand dabchick, weweia	Nationally Vulnerable
<i>Porzana pusilla affinis</i>	Marsh crake	Relict
<i>Porzana tabuensis plumbea</i>	Spotless crake	Relict
<i>Sterna caspia</i>	Caspian tern	Nationally Vulnerable

FISH

Table 3. Threatened or at risk indigenous fish species found within Waikato Lake Ecosystems as per Hitchmough *et al.* 2007

Scientific Name	Common Name	Threat Status
<i>Anguilla dieffenbachii</i>	Longfin eel	Gradual decline
<i>Galaxias argenteus</i>	Giant kokopu	Gradual decline
<i>Neochanna diversus</i>	Black mudfish	Gradual decline

FRESHWATER INVERTEBRATES

Table 4. Threatened or at risk indigenous freshwater invertebrate species found within Waikato Lake Ecosystems as per Hitchmough *et al.* 2007

Scientific Name	Common Name	Threat Status
<i>Hyridella menziesii</i>	Freshwater mussel	Gradual decline
<i>Paranephrops planifrons</i>	Koura	Gradual decline

SCORING SHEETS FOR
ALL LAKES

LAKE ARAPUNI

LAKE AREA (HA)	940	LAKE DEPTH (M)	40 MAX	MAP REFERENCE		LAKE TYPE	Hydro
DISTRICT	Otorohanga, South Waikato, Waipa	SIZE OF CATCHMENT (HA)	701,053	% NATIVE VEGETATION COVER IN CATCHMENT		11.7%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Lake catchment map, Environment Waikato 2009. • FBIS. • Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices. • Sagar P. and Kelly G. 2005: Numbers and distribution of wetland birds on the Upper Waikato River and Lakes Ohakuri and Arapuni, September 2004 and January 2005. <i>NIWA Client Report CHC2005-054</i>. Prepared for Mighty River Power Ltd. 16 pp. • Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. <i>NIWA Client Report HAM2002-021</i>. Prepared for Mighty River Power. 30 pp. • Garrick A.S., Jones C., and Saunders A.J. 1986: Wildlife Values of Lake Arapuni. A Wildlife Service Environmental Projects Unit report prepared for the New Zealand Electricity Division of the Ministry of Energy. 67 pp. • Taupo Waikato Resource Consents AEE Mar 2001. • Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. <i>New Zealand Journal of Marine and Freshwater Research</i> 13(4): 561-572. • Paula Reeves pers. comm. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	2	8	NZ dabchick, Caspian tern (one 1985 record).
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	Pied stilt, NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Black shag, little shag, little black shag, banded rail (one 1985 record).
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, koura.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	4	8	Large lake with varying depth and edge profiles but only a moderate diversity of native vegetation types. Most significant of Waikato River hydrolakes in terms of wildlife and wildlife habitat values.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Prior to the hydro dam, there were natural barriers in the form of rapids in the vicinity of Horahora, and large falls at Maungatautari. The latter was a little upstream of the Arapuni Dam and blocked even eels and koaro.
6. CONNECTIVITY Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River.
7. CATCHMENT/SURROUNDING LANDSCAPE >60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Lake well buffered in parts, but poorly buffered in others.
8. HYDROLOGY Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic in 1979.
10. NATIVE CONDITION - PLANTS High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Highly representative marginal herbaceous vegetation and relatively high diversity of indigenous species associated with this vegetation. Low diversity in other two zones.
11. NATIVE CONDITION - FAUNA High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Good diversity of wetland birds, and some species abundant (e.g. shags, scaup). Four native fish species.
12. EXOTIC CONDITION - PLANTS Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Exotic plants dominate submerged macrophytes.
13. EXOTIC CONDITION - FISH Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, rudd, catfish. Regionally important trout fishery.
14. VULNERABILITY Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Wetland vegetation vulnerable to further encroachment of weeds such as willow.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned? and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato. Adjacent land mainly privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	LINZ, EW and Mighty River Power all involved, but active co-ordinated management not yet underway.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control within areas supporting wetland vegetation.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control within areas supporting wetland vegetation?
TOTAL SCORE		76	1 ESTIMATE

LAKE ARATIATIA

LAKE AREA (HA)	60	LAKE DEPTH (M)		MAP REFERENCE		LAKE TYPE	Hydro
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	12,323 (EXCL TAUPO)	% NATIVE VEGETATION COVER IN CATCHMENT			6.8%

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- FBIS.
- Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices.
- Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. *NIWA Client Report HAM2002-021*. Prepared for Mighty River Power. 30 pp.
- Taupo Waikato Resource Consents AEE Mar 2001.
- Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. *New Zealand Journal of Marine and Freshwater Research* 13(4): 561-572.
- Paula Reeves pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag. Little black shag may occur.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	3	6	Longfin eel, koura, <i>Hyridella menziesii</i> .
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	60 ha lake with a relatively low diversity of indigenous aquatic/wetland vegetation types due to it being more riverine than lacustrine in nature. Lake Aratiatia's aquatic turf species are however, better represented and more abundant than in the other hydro lakes.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	While there are artificial structures affecting fish passage both above and below the lake, natural barriers also existed that precluded fish passage historically.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2*	6	Lake well buffered in parts, but poorly buffered in others.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3	9	Mesotrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Some diversity of indigenous species associated with wetland vegetation. Water velocity precludes extensive submerged macrophytes but turf communities present in the varial zone.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Limited diversity of aquatic and wetland fauna.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2*	2	Little information available.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, catfish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Ephemeral turf communities vulnerable to water level management regimes if these were to change.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	ERF&GNZ, MRP, DoC.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control within areas supporting wetland vegetation?
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3*	9	Weed control within areas supporting wetland vegetation?
TOTAL SCORE		65	DATA DEFICIENT (6 ESTIMATES)

LAKE AREARE

LAKE AREA (HA)	32	LAKE DEPTH (M)	5.1	MAP REFERENCE	S14 045-905	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	123	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • FBIS data. • BIMS database. • Expert panel. • Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend et al. 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake is reasonably large in size with a sinuous shape and up to 5.1 m depth. There are several different native vegetation types that are currently being restored.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake would have been a closed system, now connected by drains to other waterways.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of the complex of lakes and wetlands in the Horsham Downs Management Reserve.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	20-30 m fenced buffer of wetland vegetation around 95% of the lake. Stock have access to small part of lake.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Weir has been recently constructed to restore minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic (EW Lakes Database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Emergent vegetation is dominated by native species and there is a reasonable diversity of native species due to restoration efforts in the wetland margin.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity of native birds however native fish fauna is depauperate.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Both the wetland and emergent vegetation contain a moderate abundance of exotic plants.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Catfish, goldfish and mosquito fish were recorded in a recent survey of the lake fishery.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	At risk from koi introduction which would impact on lake water quality. Motorway stormwater ponds likely to be directed into lake which could also affect water quality.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with fenced buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Lake Areare Caregroup, Department of Conservation, Environment Waikato.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Water quality poor and unlikely to improve without significant costs being incurred. Extent of vegetative habitat limited so gains from planting and weed control will have minor impacts on overall ecological value of lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Best land management practices in the catchment could significantly reduce nutrient and sediment loads to the lake but this unlikely to happen within the next 10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Large Council reserves currently grazed but if retired could allow wide vegetated margin. Existing DOC reserve being managed.
TOTAL SCORE		76	

BLUE LAKE

LAKE AREA (HA)	17 HA	LAKE DEPTH (M)		MAP REFERENCE	N112 701846	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	71.7	% NATIVE VEGETATION COVER IN CATCHMENT		9.54%	

INFORMATION USED TO SCORE LAKE

- Department of Conservation, unpublished data.
- Email from Jessica Wallace (Department of Conservation).
- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	One of very few lakes regionally that is close to pristine. Tongariro-Taupo FW Strategy classifies as regionally important.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Species poor, no aquatic macrophytes, flora comprises mosses, liverworts and algae only, but lake is larger than 10 ha.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers only.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of a complex of high altitude lakes in the Tongariro National Park.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	Vegetation cover of catchment only 19% but composition of vegetation predominantly indigenous (remainder bare substrate).
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	5	15	Low nutrients, acidic (pH in range of 3.14-5.2).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5	5	Non vascular plant species present only. Naturally low diversity of plants dominated by native species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	0	Little information. A few species of aquatic invertebrates present only.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3*	3	Low abundance probable.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	No fish likely to be present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Could be invaded by the exotic rush <i>Juncus bulbosus</i> .
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Situated within Tongariro National Park.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	0	Department of Conservation and Tongariro Natural History Society.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed surveillance.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5*	15	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	Ongoing surveillance required to ensure lake is not invaded by <i>Juncus bulbosus</i> .
TOTAL SCORE		116	4 ESTIMATES

LAKE CAMERON

LAKE AREA (HA)	3.34	LAKE DEPTH (M)	<1.5	MAP REFERENCE	S15 128-964	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	31	% NATIVE VEGETATION COVER IN CATCHMENT			0
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M., and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Coffey B. 1999: Lake Cameron: Rukuhia, Waikato. An Issues and Options Analysis for the Maintenance/Enhancement of Aquatic Habitat Quality. Prepared for Environment Waikato. • Fisher S. 1998: The future of Lake Cameron...back to nature. Prepared for the Lake Cameron Care Group. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Thompson K. and J. Greenwood 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. • Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. • FBIS data. • BIMS database. • Expert panel. • Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small shallow lake (3.4 ha, max depth <1.5 m) with a reasonably wide band of wetland vegetation around the majority of the lake edge.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system, now linked to the wider catchment via inlets and outlet.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several small lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Marginal vegetation around 85% of the lake. Fenced. Needs additional buffer on some of the boundaries.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Agreement to set minimum lake level, silt-trap on main inlet drain but extensive drainage of catchment has occurred. Needs a 75 m margin as peat containing the water level.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	No TLI OR LakeSPI score - DRP is very high (Thompson and Greenwood 1997) and water quality is likely to be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	No submerged species, marginal vegetation has been dominated by exotics although extensive willow control has occurred in the last four years.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	17 native birds have been recorded at this lake but the only native fish records are for eels.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Until recently the vegetation was dominated by exotics however recent willow control is likely to have reduced them to moderate abundance.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Goldfish, catfish and mosquito fish likely to be common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Lake in poor condition, catchment highly modified, but shrinkage of surrounding land an ongoing threat.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve with partial fencing and a pressing need to increase width of reserve.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Lake Cameron Care Group, Waipa District Council, Environment Waikato, F&G all involved in improving ecological condition of lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Funding has been provided in recent years to improve indigenous component of wetland vegetation and there are initiatives to ensure a wider fenced buffer is implemented around the lake within the next few years. Additional funding could be used to further enhance habitat values but substantial funding is required to improve hydrology and reduce catchment inputs.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Hydrology may be too compromised to make substantial improvements in viability. Lake has high nutrient and sediment loads and is very shallow. Likely to need dredging to make significant difference in lake water quality.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Most of the work that can be done has been. Current issues are land tenure and drainage which are more likely to be resolved over the longer term.
TOTAL SCORE		61	2 ESTIMATES

LAKE DISAPPEAR

LAKE AREA (HA)		LAKE DEPTH (M)		MAP REFERENCE	R15 792 629	LAKE TYPE	Karst - ephemeral polje
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	599.52	% NATIVE VEGETATION COVER IN CATCHMENT		13.47%	
INFORMATION USED TO SCORE LAKE							
Insufficient information to score lake values Likely to be a national priority as an originally rare ecosystem type (ephemeral lake)							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type. Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*. Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	2	6	Ephemeral lake - originally rare ecosystem type.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)			Insufficient info to score.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)			
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)			
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)			
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)			
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)			
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)			
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)			
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)			
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)			
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)			
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)			
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)			
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)			
TOTAL SCORE		15	CURRENTLY DATA DEFICIENT

EMERALD LAKES

LAKE AREA (HA)	c.1 ha	LAKE DEPTH (M)		MAP REFERENCE	T19:395-266	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	264.03	% NATIVE VEGETATION COVER IN CATCHMENT		19%	

INFORMATION USED TO SCORE LAKE

- Department of Conservation, unpublished data.
- Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation.
- Email from Jessica Wallace (Department of Conservation).
- Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	One of very few lakes regionally that is close to pristine. Tongariro-Taupo FW Strategy classifies as regionally important.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Species poor, no aquatic macrophytes, flora comprises mosses, liverworts and algae only. <1 ha in size.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers only.
6. CONNECTIVITY - TERRESTRIAL			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of a complex of high altitude lakes in the Tongariro National Park.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	Vegetation cover of catchment only 19% but composition of vegetation predominantly indigenous (remainder bare substrate).
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	5*	15	Low nutrients, acidic (pH in range of 3.14-5.2). Howard-Williams and Vincent (1984) described one of the Emerald lakes as being oligotrophic and the other as being turbid.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Naturally low diversity of plants but <i>Juncus bulbosus</i> also present.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Little information. A few species of aquatic invertebrates present only.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3*	3	Little information. The exotic rush <i>Juncus bulbosus</i> invaded the north-eastern lake in 1989 and now occupies all available habitat in the marginal zone both above and below waterline.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	No fish likely to be present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	<i>Juncus bulbosus</i> already occupies all available habitat present.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Situated within Tongariro National Park.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Department of Conservation and Tongariro Natural History Society.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4*	8	Eradication of <i>Juncus bulbosus</i> may be possible.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Eradication of <i>Juncus bulbosus</i> .
TOTAL SCORE		115	4 ESTIMATES

LAKE HAKANOA

LAKE AREA (HA)	52	LAKE DEPTH (M)	2.5	MAP REFERENCE	S13 019-033	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	613	% NATIVE VEGETATION COVER IN CATCHMENT		20	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Hudson N., Quinn J, Rowe D, Tanner C & M de Winton, 2008. Review of options for improving the condition of Lake Hakanoa. <i>NIWA Client Report HAM2008-067</i>, Hamilton. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. McConnell, M. F. Lake Hakanoa Draft Management Plan, Wildlife Service, Department of Internal Affairs. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	Historical record of banded dotterel (1986)
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Large surface area (52 ha) with several quite large wetlands including several lagoons. Wetland and emergent vegetation zones have a number of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Flapgate on the outflow to the Waikato River limits fish passage except under high flows.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Very close to Waikato River and several other lakes (e.g. Waahi, Weavers and Kimihia).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Part of the lake has large areas of fenced wetland.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Catchment highly modified and partly urbanised.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	TLI = 6.7 (EW Lakes Database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Native plants dominate the emergent vegetation zone and there is a reasonable abundance of native plants in the grey willow understorey.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Likely to have reasonably abundant populations of shortfin eels and possibly smelt. Mainly waterfowl use this lake, occurring in high numbers.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wetland vegetation is dominated by grey willow with the exotics, gypsywort and water primrose common amongst the emergent vegetation.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Contains large populations of exotic fish (koi, catfish and rudd).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Multiple-stressors contributing to its' poor ecological condition.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve with fenced buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Waikato District Council, Lake Hakanoa Care Group are all involved in determining a restoration strategy for the lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Large size of the lake and the multitude of issues limit improvements in value and integrity.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Size and shallowness of the lake and its connections to the Waikato River severely limit the likelihood of restoring this lake.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Restoration potential limited by urban development around much of the lake. However weed control and planting in wetlands to the east and south could have reasonable biodiversity gains.
TOTAL SCORE		49	

HAMAREHA LAKES

LAKE AREA (HA)	<1 ha	LAKE DEPTH (M)		MAP REFERENCE	T15 620-487	LAKE TYPE	unknown
DISTRICT	South Waikato	SIZE OF CATCHMENT (HA)	1055	% NATIVE VEGETATION COVER IN CATCHMENT		14.69%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Wildland Consultants 2009. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick (recorded at site in 1992).
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird (recorded at site in 1980s).
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Approx 5 ha of lake and wetland with substantial wetland vegetation and adjacent native forest.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Substantial areas of marginal wetland vegetation north of the Leslie Road Conservation Area and contiguous with unprotected indigenous forest that is part of the extension to Mamaku Forest.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)			Data deficient.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	Limited information. Vegetation is not described but wetland is known to contain rushes and sedges including <i>Baumea articulata</i> and has been reported as of being of excellent quality. Was identified as a SSWI and WERI site.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)			Data deficient.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)			Data deficient.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)			Data deficient.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)			Insufficient information to score.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)			Data deficient.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)			Data deficient.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3*	9	Best guess of 5-10 years based on historic reports of high quality wetland margins.
TOTAL SCORE		51	CURRENTLY DATA DEFICIENT

LAKE HARIHARI

LAKE AREA (HA)	18.39	LAKE DEPTH (M)	8-9 M MAX	MAP REFERENCE	R16 610-310	LAKE TYPE	Dune
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	134	% NATIVE VEGETATION COVER IN CATCHMENT		3.79%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> de Winton M., Wells R., and Matheson F. 2005: An assessment of the ecological condition of Lake Harihari. <i>NIWA Client Report HAM 2005-132</i>. 9p. Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using Lake SPI. <i>NIWA Client Report HAM 2008-2009</i>. Neilson K. and Hamer M. 2008: Sampling of lake health indicators 2007/08: Lakes Ngahewa and Tutaeinanga. <i>Environment Waikato Internal Series 2008/17</i>. Neilson K., Collier K., and Hamer M. 2007: Assessment of biological Indicators of lake health in Waikato shallow lakes - a pilot study 2006/07. <i>EW Technical Report 2008/18</i>. 9p. Beard C. 2009: Lake Harihari Terrestrial Vegetation and Birdlife. EW Internal report. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Freshwater mussel, longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	One of only two shallow lakes regionally with oligo-mesotrophic water quality.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	>10 ha, <50 ha, large wetlands, good submerged and emergent vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake outlet flows intermittently naturally. Installation of overhanging culvert in 2001 has restricted elver recruitment, however a trial fish passage structure was installed in 2009.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Landowner fenced part of lake margins January 2009.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3	9	Relatively clear water (visibility of up to 3 m). A layer of dirty water was recorded at 4 m depth, particularly in the shallow NW arm of the lake. TLI - 3.5 mesotrophic (Neilson <i>et al.</i> 2007). Chlorophyll a - oligotrophic levels.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	A rich assemblage of native plants recorded by NIWA on 1/11/05. Wetland vegetation is also reported to be fairly weed free with the exception of occasional infestations of grey willow and pampas.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Large freshwater mussel population. Freshwater sponges recorded as common, and native snails and the tiny pea mussel also recorded. Native fish include common bully and lacustrine smelt. Eel recruitment intermittent due to intermittent flow of outlet, and overhanging culvert. No evidence of migratory smelt, grey mullet, banded kokopu or inanga that have been recorded historically.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	<i>Elodea canadensis</i> present but not dominant. <i>Potamogeton crispus</i> and <i>Juncus bulbosus</i> uncommon.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	No exotic fish known/reported.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Vulnerable to erosion and stock access to lake, wetlands and inflowing streams (NIWA 2005).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Lakebed owned by Taharoa Lakes Trust.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	EW, DoC, Waitomo DC, Taharoa Lakes Trust.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	6	12	Fencing and pest control would make a substantial improvement.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Requires fencing (stock exclusion) and planting which is achievable in 5-10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control (willow and pampas) and replanting of margin which could be achieved in 5-10 yrs - note that kikuyu may limit restoration planting.
TOTAL SCORE		116	

HENDERSONS POND

LAKE AREA (HA)	1.6	LAKE DEPTH (M)		MAP REFERENCE	S15 103-645	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	31	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. Environment Waikato Technical Report 2006/54. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	Rare peat type-manuka-sphagnum-Carex.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Very small lake with a small wetland fringe.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system, now linked to the wider catchment via inlets and outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Partial buffer with some stock access.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Could be restored with a weir.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	At least eutrophic based on water chemistry parameters in the Thompson and Greenwood report (1997).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Only native vegetation is a small manuka stand in good condition.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Thompson and Greenwood (1997) describe wildlife values as being mainly limited to waterfowl (mallards and paradise shelducks).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Gorse present at SW end and likely to be other weeds present.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	No information - default value of '2' assigned.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Lake in reasonably poor condition however no controls in place to prevent further deterioration.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Waipa Lakes Accord.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Small lake that could regain much of its ecological values with commitment from landowner. Requires fencing, restoration of water levels, weed control and replanting.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Small lake where restoration achievable due to the small size of the lake and catchment but would first require commitment from landowner.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Requires fencing and weed control, but major issue is addressing drainage which would be likely to require policy change and more likely to occur over a longer time frame.
TOTAL SCORE		65	2 ESTIMATES

HINEMAIAIA LAKES

LAKE AREA (HA)	c.12	LAKE DEPTH (M)	c.15	MAP REFERENCE	U18:787-517	LAKE TYPE	Hydro
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	13,139	% NATIVE VEGETATION COVER IN CATCHMENT		71.57%	

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Department of Conservation, unpublished data.
- Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. *Environment Waikato Technical Report 2008/36*.
- NIWA Ecosystems 1993: Sediment dredging in Hinemaiaia (HA) reservoir: Prediction of environmental impacts. Prepared for Taupo Electricity Ltd. 37 pp.
- Donovan W.F. 2001: The Hinemaiaia Fishery. Prepared for Trustpower Limited. 42 pp.
- John Gibbs pers. comm., Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	Pied stilt.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crake.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag likely.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Wetland present at head of top dam.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Three dams in place.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Lakes Rotongaio and Taupo.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	4	12	70% of catchment covered in native forest but most of remaining area is in plantation forest. Plantation forest borders each of the lakes, and large quantities of silt derived from management operations within these areas has been deposited into the system (refer consent application from Taupo Electricity to dredge upper lake).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Natural barrier however, was originally present at site of Hinemaia 'A' Dam.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2	6	TP and TN levels measured in Hinemaia 'A' (uppermost lake) in April 1993 indicate at least eutrophic conditions.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Little information. Indigenous macrophytes quite abundant at Hinemaia 'B' (Gibbs pers. comm.).
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Observations made in April 1993 indicate a moderate diversity of wetland birds and predominantly native fauna. No native fish present, and aquatic macro invertebrates largely represented by chironomids and oligochaetes.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2*	2	Little information. Elodea may be the only species present.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Brook char only species recorded.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Cumulative effects of ongoing sedimentation.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Formerly a Closed Game Area owned by Trustpower and surrounded by plantation forest managed by Lake Taupo Forest Trust.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Little information.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for hydro electricity production.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0*	0	Managed for hydro electricity production.
TOTAL SCORE		64	DATA DEFICIENT (6 ESTIMATES)

LAKE HOTOANANGA

LAKE AREA (HA)	19	LAKE DEPTH (M)	3	MAP REFERENCE	S14 030-915	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	71	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.		0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.		0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.		0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >10 ha, with a moderate number of native vegetation types including large stands of native emergent vegetation providing good habitat for birds.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake would have been a closed system, now connected by drains to other waterways.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of the Horsham Downs complex of peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	70-100 m vegetated buffer. Stock have access in places.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Lake water level affected by deepening of drains. Could be partly remedied with a water level control structure.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic (EW lake database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Native plants dominate the emergent vegetation zone and there is a reasonable abundance of native plants in the understorey of grey willow that occurs in wetter parts of the lake margin.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Only shortfin eel were found at this lake during the 2003 survey by EW but several native bird species use the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wetland vegetation zone dominated by willow.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3	3	Only mosquito fish were found in this lake during the 2003 survey by EW.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Water quality could deteriorate rapidly if koi or other benthic feeding fish become dominant at this lake, or if stock continue to have access.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve with an unfenced buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Doc and EW working together on water level and fencing issues.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Hydrology could be improved relatively cheaply that may also increase the value of the wetland habitat.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Medium sized shallow lake in a highly modified catchment. Would probably need dredging to deepen lake and a catchment wide programme to reduce nutrient and sediment loadings to restore light environment in the water column - both significant barriers to restoration.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control and fencing required but drainage not as big an issue as some other peat lakes. Relatively wide margin owned by Crown and Maori owners.
TOTAL SCORE		78	

LAKE KAINUI

LAKE AREA (HA)	25	LAKE DEPTH (M)	6.7	MAP REFERENCE	S14 073-893	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	132	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Waikato County Council 1985: Management Plan for Lake Kainui Recreation Reserve, Hamilton. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.		0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.		0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.		0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.		0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel recently recorded by B Hicks, University of Waikato.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >10 ha, reasonably deep and with a sinuous shoreline with submerged macrophytes comprised of native charophytes. Wetland and emergent habitat limited but undergoing replanting.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake would have been a closed system, now connected by drains to other waterways.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within 1 km of two other small peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Moderately wide, fenced riparian buffer that is being restored but only lake only partially buffered.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Water level control structure maintains minimum water levels although catchment modified by extensive drainage.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lake database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Native charophytes dominate the submerged vegetation although cover is c.10%. Extensive plantings are slowly restoring native component of wetland zone although this is currently limited in extent.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Shortfin eels and common bullies were recorded at this lake in a 2003 survey by EW, and several native shag species. Likely to have a reasonable abundance of native waterfowl species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wetland zone has a moderate abundance of exotic species although this is being addressed by care group.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Catfish, goldfish and rudd all common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Water quality could be further degraded if koi or other benthic feeding fish become dominant at this lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with a fenced buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Kainui Lake Management Committee (Waikato District Council), Environment Waikato and Fish and Game involved in co-ordinated activities at this lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Continued planting and weed control will result in minor increases in the ecological value of this lake. Substantial funding needed to address shrinkage of peat substrate and reduce nutrient inputs from wider catchment.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Substantial reductions in sediment and nutrient loadings could be achieved with the adoption of best possible nutrient management practices in this medium sized catchment. Unlikely to happen within 10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Relatively narrow margin. Undergoing planting and weed control. Lake is fenced. Water levels and drainage are major issues and more likely to be resolved in 10-50 years.
TOTAL SCORE		63	1 ESTIMATE

LAKE KAITUNA

LAKE AREA (HA)	15	LAKE DEPTH (M)	<1.5	MAP REFERENCE	S14 085-890	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	580	% NATIVE VEGETATION COVER IN CATCHMENT			0.92
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Department of Conservation, Environment Waikato, Lake Kaituna Care Group, 2001. Lake Kaituna Management Plan. Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Lake catchment map, Environment Waikato 2008. New Zealand Freshwater Fish Database. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	Pied stilt.
Recovering species have been recorded at this site or are likely to be there based on available habitat.	1	2	Report of brown teal 2004.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, black mudfish.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >10 ha, with a moderate number of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake would have been a closed system, now connected by drains to other waterways.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of the Horsham Downs complex of peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Wide fenced riparian margin with silt trap on main drain.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Water control structure at Lake Komakorau maintains water levels, could be improved.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic (EW lake database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Extensive native plantings and weed control have resulted in the wetland zone being dominated by native species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	A moderate diversity (8 species) of native birds use the lake and several native fish species (short-finned eel and common bully).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	1	1	Most exotic plants have been removed from the wetland zone.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, catfish, goldfish, and rudd all common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Lake seriously degraded with multiple stressors contributing.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with significant fenced protective buffers.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Care group, Department of Conservation and Environment Waikato.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Substantial work needed to make any further significant improvement (e.g. lake dredging).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Moderate sized, very shallow lake that is slowly infilling. Likely to need dredging before any major improvements in water quality would occur.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Substantial planting and weed control has been done. Lake is fenced. Margin still quite narrow in places. Major additional gains would require land purchase. More likely to be resolved in 10-50 years.
TOTAL SCORE		68	

LAKE KARAPIRO

LAKE AREA (HA)	760	LAKE DEPTH (M)		MAP REFERENCE		LAKE TYPE	Hydro
DISTRICT	South Waikato, Waipa	SIZE OF CATCHMENT (HA)	82,788 (EXCL ARAPUNI)	% NATIVE VEGETATION COVER IN CATCHMENT		6.3%	

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- FBIS.
- Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices.
- Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. *NIWA Client Report HAM2002-021*. Prepared for Mighty River Power. 30 pp.
- Garrick A.S., Jones C., and Saunders A.J. 1986: Wildlife Values of Lake Arapuni. A Wildlife Service Environmental Projects Unit report prepared for the New Zealand Electricity Division of the Ministry of Energy. 67 pp.
- Taupo Waikato Resource Consents AEE Mar 2001.
- Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. *New Zealand Journal of Marine and Freshwater Research* 13(4): 561-572.
- Paula Reeves pers.comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			One record of Australasian bittern but likely to be an infrequent visitor only.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	2	8	NZ dabchick, Caspian tern.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	Pied stilt.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, koura. Freshwater mussels?
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Large lake but only a moderate diversity of native vegetation types. Regionally important for wetland birds but of lesser significance than Lake Arapuni as lacks the extensive swampy terraces located on Arapuni.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	0	0	Hydro dam. Elvers trapped and transferred over dam each year.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1*	3	Lake well buffered in parts but narrow or lacking in others, and stock may have access in some areas.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic in 1979.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Some diversity of indigenous species associated with wetland vegetation and emergent macrophytes.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Good diversity of wetland birds, and some species abundant (e.g. shags, scaup).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Exotic plants dominate submerged macrophytes.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, rudd, catfish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Wetland vegetation vulnerable to further encroachment of weeds such as willow?
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned (LINZ) and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	LINZ, Environment Waikato and Mighty River Power working together to manage the lake margins, LINZ and EW carrying out Wilding pine management.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control within areas supporting wetland vegetation.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3*	9	Weed control within areas supporting wetland vegetation.
TOTAL SCORE		62	4 ESTIMATES

LAKE KIMIHIA

LAKE AREA (HA)	58	LAKE DEPTH (M)	1	MAP REFERENCE	S13 040-060	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	1485	% NATIVE VEGETATION COVER IN CATCHMENT		41.06	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Busto R. and Russell G. 1988: Lake Kimihia lake level setting. Waikato Catchment Board. Staff report to the WCB Committee, June 1988. • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Waikato Catchment Board 1988: Lake Kimihia Lake Level Setting. Staff report to the Waikato Catchment Board Committee. • FBIS data. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >10 ha but very shallow, with a moderate number of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake formerly connected to the river, and still is although there is a flood gate on the outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within 5 km of Waikato River, several other riverine lakes (Hakanoa, Ohinewai, Okowhao) also adjacent to Kimihia wetland.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	41 % of lake catchment in native vegetation. Large riparian buffer on western edge of lake but minimal on parts of the eastern side. Fence not effective.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Mining activities next to the lake have dramatically reduced its size and led to substantial infilling. There is a flood gate on the outlet.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	1993 vegetation survey reported a moderate diversity of native plants in the wetland and emergent zones of the lake however cattle access in recent years has degraded the vegetation.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	A reasonably high number of native bird species were recorded at Lake Kimihia and adjacent wetlands during wildlife surveys in the 1980's but likely to have declined since then. Only native fish species recorded at the lake was shortfin eel.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Wetland zone and a large floating sudd are dominated by exotic plants.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Catfish, goldfish and mosquito fish all common in 1984. High densities of koi present and likely to contain rudd also.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Lake seriously degraded with multiple stressors contributing.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve with partially fenced margin.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Managed by DoC.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	4	Substantial work needed to make significant improvements to the lake.
18. IN-LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Highly modified hydrology, extreme shallowness of lake and high sediment inputs are significant barriers to restoring this lake.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Large crown owned margins. Weed control, fencing and planting could achieve substantial biodiversity gains in the wetlands.
TOTAL SCORE		39	

LAKE KOMAKORAU

LAKE AREA (HA)	2.6	LAKE DEPTH (M)	<1	MAP REFERENCE	S14 083-895	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	619	% NATIVE VEGETATION COVER IN CATCHMENT			1.59
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.		0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.		0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.	0	0	Historical record of spotless crake (1986).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.		0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Black mudfish. Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.		0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.		0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Very small shallow lake but with a reasonably large area of wetland relative to its size.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake would have been a closed system, now connected by drains to other waterways including Lake Kaituna.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Very close to several other lakes in the Horsham Downs lake complex (i.e. Kaituna, Kainui).
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Large fenced buffer of wetland vegetation surrounds the lake but a very large catchment generating very large nutrient inputs to lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Lake very shallow and even with a weir can dry out in summer.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lake database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity of native species in the wetland zone with a substantial emergent zone containing raupo.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Limited diversity of native birds (pukeko, paradise duck) and two native fish species recorded in recent surveys (shortfin eel, common bully).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Willows controlled.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, rudd, goldfish, catfish and mosquito fish all common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Small degraded lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with fenced buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Care group, DoC and Environment Waikato all involved in restoration of the lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Limited improvement of wetland habitat.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Wetland area could be restored to dominance of native vegetation due to its small size but wouldn't address key issues of peat shrinkage and nutrient inputs from a moderately large catchment.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Margin very wide in parts. Planting and weed control required to be ongoing. Biodiversity gains could be made in 5-10 years.
TOTAL SCORE		45	

KOPUATAI BURN POOLS

LAKE AREA (HA)	c.2	LAKE DEPTH (M)		MAP REFERENCE	T13 405-183	LAKE TYPE	Peat
DISTRICT	Hauraki	SIZE OF CATCHMENT (HA)	183.10	% NATIVE VEGETATION COVER IN CATCHMENT		100%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Insufficient information to score lake values 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Black mudfish (<i>Neochanna diversus</i>).
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake and associated wetlands are large (>10 ha) but low diversity of habitat and the lake itself is very small.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)			
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of a mostly continuous natural landscape. Other small lakes/ponds within close proximity.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)			
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)			
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)			
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)			
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)			
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)			
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)			Insufficient information.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4*	4	Possibly included as part of QEII application.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)			
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)			
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)			Data deficient.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	100% native vegetation in catchment.
TOTAL SCORE		21	CURRENTLY DATA DEFICIENT

LAKE KOPUERA

LAKE AREA (HA)	52	LAKE DEPTH (M)	1.5	MAP REFERENCE	S13 995-175	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	250	% NATIVE VEGETATION COVER IN CATCHMENT		24.5	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. FBIS data. Lake manager (Kevin Hutchinson, DoC). Lake catchment map, Environment Waikato 2008. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.		0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake c.52 ha, with several bays and a range of vegetation types in the relatively large wetland surrounding the lake.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been hydrologically linked to the Waikato River in the past but only occurs now during extreme flooding. Water from Lake Kopuera now diverted into Lake Waikare via the Rangiriri channel.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Very close to the Waikato River & Lake Waikare and within 5 km of the Whangamarino Wetland.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Large buffer of wetland vegetation surrounds the lake with large areas fenced.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Lake levels hydrologically linked to Lake Waikare which is controlled for flood management however a water control structure could potentially restore minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0*	0	No recent data however was classed as hypertrophic in 1982. Unlikely to have greatly improved since then.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Wetland and emergent zones are dominated by native plants with the most common vegetation type manuka scrub.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	NI fernbird, spotless crake, and Australasian bittern are present and the lake is likely to have moderate abundance of native waterfowl. Shortfin eel.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Moderate abundance of exotic plants in both the canopy and understorey within the wetland zone.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Data old (1983) but even then dominated by catfish, goldfish and mosquito fish. Koi and rudd also present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Lake water quality quite degraded, macrophytes gone, coarse fish dominate.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve with protected buffer with some fencing.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Managed by DoC.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Improvements could be made to the quality of the vegetation by undertaking weed control but substantial funding needed to improve hydrology and reduce catchment inputs.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Very shallow lake with a highly modified hydrology. Would possibly require dredging to substantially improve in-lake ecology.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Small lake with large willow dominated wetland margins. Willow/weed control and fencing could lead to substantial biodiversity gains.
TOTAL SCORE		54	1 ESTIMATE

LAKE KORAHA

LAKE AREA (HA)	0.784	LAKE DEPTH (M)	C.6-8	MAP REFERENCE	R16 786-359	LAKE TYPE	Karst
DISTRICT	Otorohanga	SIZE OF CATCHMENT (HA)	176.80	% NATIVE VEGETATION COVER IN CATCHMENT		67.56%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Dave Smith (DOC Maniapoto). Peter de Lange (DOC Auckland) - detailed description of lake and species lists from visits in 1980s. BIMS database 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			Nationally significant as an intact, lowland karst lake system with surrounding forest cover
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	<i>Ricciocarpus natans</i> (aquatic liverwort) has been collected from the lake margins. Brown teal have been recorded in the past (mid 1990s) but are no longer there.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			Historical, unconfirmed record of NI fernbird (1996).
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			Historical, unconfirmed record of spotless crake (1996).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Rare example of intact lowland kaarst system with surrounding forest cover.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Very small lake but catchment dominated by native vegetation and dominated by native submerged and emergent vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Completely landlocked and drains via a small cave system.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	0	0	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3*	9	Likely to be at least good, although low clarity (1.5 m) due to high organic inputs.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5	5	Lake bed covered in charophytes, <i>Myriophyllum propinquum</i> and <i>Potamogeton cheesemanii</i> .
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Little information. Assume moderate.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	No major naturalised aquatic macrophytes aside from scarce <i>Callitriche stagnalis</i> . Included in royal fern eradication programme (DOC).
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Little information. Assume moderate.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Royal fern (<i>Osmunda</i>) currently controlled but potential to impact on marginal wetland values if control not sustained or effective. Occasional cattle access.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	In DoC goat control area. In DoC-EW possum control area.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	6	12	Royal fern control.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5*	15	Best guess without detailed water quality information.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Based on eradication programme for royal fern (assume feasibility) and that <i>C.stagnalis</i> does not appear to be particularly invasive.
TOTAL SCORE		116	4 ESTIMATES

LAKE KOROMATUA

LAKE AREA (HA)	6.7	LAKE DEPTH (M)	1.3	MAP REFERENCE	S14 058-715	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	200	% NATIVE VEGETATION COVER IN CATCHMENT		3.35	

INFORMATION USED TO SCORE LAKE

- Caldwell K. 200?: Lake Koromatua the Peat Lake Experiment. Opus International Consultants.
- Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. *NIWA Ecosystems Publication No. 8*, Hamilton.
- Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. *Environment Waikato Technical Report 2006/54*.
- Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton.
- FBIS data.
- Expert panel.
- Lake manager (Kevin Hutchinson, DoC).
- Lake catchment map, Environment Waikato 2008.
- BIMS database.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.		0	
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	2	2	Spotless crane, marsh crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Black shag, banded rail, little black shag likely.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Black mudfish, and longfin eel likely to be present (especially given illegal eeling unlikely)
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake plus marginal wetlands >10 ha. Extensive emergent and wetland zone.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system, now linked to the wider catchment via inlets and outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other peat lakes including Posa and Pataka.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Despite a large planted buffer that has been fenced, lake cannot be considered well buffered.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Weir was installed in 2001 which successfully raised water levels and a diversion has increased the amount of water flowing into the lake compensating for drainage that has occurred.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Extensive planting and control of grey willow has resulted in a moderate diversity and abundance of native plants.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	A good abundance of shortfin eels and a moderate diversity of native bird species have been recorded at the lake since restoration began in 2001.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Removal of willow in recent years has resulted in exotics being only moderately abundant at this lake.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	A recent survey by the University of Waikato recorded no exotic fish species.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	This lake was one of the worst in the Waipa District in terms of ecological condition but restoration has seen steady improvements that are unlikely to be reversed given the commitment of groups involved.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with large fenced buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Waipa District Council, Fish and Game, DoC.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Costly restoration works have already been undertaken that are improving the viability of the lake. Catchment wide practices to reduce nutrient inputs are needed to significantly improve the condition of the lake water quality and possibly the removal of lake sediments.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	See above.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Ongoing weed control required. Much restoration work already been completed. Further gains would require an increase in the margin (e.g. south-eastern corner). This is more likely to require a longer term approach.
TOTAL SCORE		63	1 ESTIMATE

LAKE KURATAU

LAKE AREA (HA)	103	LAKE DEPTH (M)	3.9 (1985)	MAP REFERENCE	T18:455:559	LAKE TYPE	Hydro
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	18367	% NATIVE VEGETATION COVER IN CATCHMENT			18.87%

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Department of Conservation (n.d.): Identification of important habitat and species for WCEET by Department of Conservation (Tongariro, Taupo, BOP, and Waikato Conservancies).
- Taupo District Council SNA record sheet.
- DOC of Conservation, unpublished data.
- FBIS.
- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Dugdale T and Wells R. 2001: The distribution and potential impacts of *Egeria densa* and other oxygen weeds in Lake Taupo, Kuratau, Otamangakau and Rotoaira. *NIWA Client Report DOC01235*. Prepared for Department of Conservation. 24 pp.
- Robert Watson Landscape Architects Ltd 2003: Landscape management plan. Prepared for City Country Energy.
- Kusabs I.A. and Mitchell C.P. 1997: Proposed modifications to the Kuratau hydro-electric project: an inventory of present ecological values and possible impacts. Prepared for King Country Energy Limited. 42 pp.
- Email from Bob Anstis (KCE Generation Ltd).
- King Country Energy Generation Ltd: Kuratau vegetation plan map.
- Waikato Valley Authority 1981.
- John Gibbs pers. comm., Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	Pied stilt, NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Marsh crake.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Absence of exotic submerged macrophytes.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	4	8	Relatively large lake with moderate-high number of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Structural as well as natural barriers (dam and waterfall).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Lake Taupo, South Taupo Wetlands, Otamangakau-Rotoaira complex.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Pastoral margins in parts.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2	6	Eutrophic and has significant sediment inputs.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	All three zones have a good diversity of native vegetation. Submerged macrophytes entirely native.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Good diversity of wetland fauna.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Large area of grey willow at head of lake and willows also present in wetland associations elsewhere (but control programmes underway).
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout and goldfish. Significant trout fishery.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	Vulnerable to invasion of exotic macrophytes in particular, but also threatened by agricultural and forestry runoff, and encroachment by other weeds, e.g. wildling pines and willows.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Owned and managed by King Country Energy.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Opportunities for partnerships with King Country Energy who have been controlling willow as a consent requirement.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Eradication of willow.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Willow control.
TOTAL SCORE		105	1 ESTIMATE

LEESONS POND

LAKE AREA (HA)	3-4	LAKE DEPTH (M)		MAP REFERENCE	S14 275-930	LAKE TYPE	Peat
DISTRICT	Matamata-Piako	SIZE OF CATCHMENT (HA)	Small	% NATIVE VEGETATION COVER IN CATCHMENT		7.97	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Kevin Hutchinson (DoC). Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Marginal and wetland zone dominated by a wide band of grey willow.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system but now has a drain through the catchment into the lake and into the drain network that runs along Matuku Road.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	0	0	Very isolated lake with no natural areas within 10 km of the pond.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Lake is fenced and has a wide grey willow buffer around the lake. Only one inlet draining a very small catchment.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	There is a minor amount of drainage in the catchment, however water levels are managed to provide good open water habitat and unlikely to be much lower than historic water levels.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	There is no water quality information for this lake, however given the nature of the surrounding agricultural catchment and high numbers of waterfowl using the small lake it is likely to be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	0	0	Vegetation is dominated by the exotic grey willow.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Lake is managed for waterfowl so will have a reasonable diversity and abundance of native waterfowl but unlikely to contain many other native bird species. No information on native fish.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Vegetation is dominated by the exotic grey willow.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Insufficient information. Default values of '2' assigned.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Small isolated peat lake managed for waterfowl. Under current ownership it is unlikely to be vulnerable but with change in ownership could be subject to much greater drainage and nutrient inputs.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	No agencies involved in the management.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Habitat could possibly be improved for a wider range of species.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Unlikely that there are significant barriers to restoring the lake, however would require a willingness by the landowner to modify lake management to restore habitat so it is more suitable for a wider range of native species.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control and replanting could address major problems. Relatively large fenced margin.
TOTAL SCORE		53	3 ESTIMATES

LAKE MANGAHIA

LAKE AREA (HA)	8.4	LAKE DEPTH (M)	1.5	MAP REFERENCE	S15 062-668	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	354	% NATIVE VEGETATION COVER IN CATCHMENT		3.87	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Bodmin K., Champion P., and Matheson F. 2008: Lake Mangahia Management Recommendations for Lake Level, Marginal Vegetation and Nutrient Removal. <i>Environment Waikato Technical Report 2008/35</i>. Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Thompson K. and Champion P. 1993: Esplanade Reserve Recommendations for Lakes Serpentine, Mangahia, Rotomanuka, Ruatuna and Cameron (Waipa District). Water Research Unit, University of Waikato, Hamilton. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird (1993).
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane (1985).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel (recently recorded by B Hicks, University of Waikato)
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	While lake is not particularly large or deep it has quite extensive vegetation habitat, including extensive areas of emergent vegetation and a high diversity of native species in the wetland zone including a regenerating kahikatea stand.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have originally been a closed system, now linked by drains to the wider catchment allowing exotic fish to access the lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within 5 km of several peat lakes including Posa, Pataka and Mangakaware.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Lake partially buffered by fenced wetland area however most inlets delivering silt and nutrients to the lake from the largely agricultural catchment.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	A weir was installed in 2001 at the outlet to partially restore water levels. Weir height may need to be increased to improve hydrology.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (TLI 6.7).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	There hasn't been submerged vegetation in the lake since at least 1992, but there are extensive areas of emergent vegetation and a high diversity of native species in the wetland zone including a regenerating kahikatea stand.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	While there is insufficient information about fauna, anecdotal comments suggest good populations of waterfowl and threatened species recorded in the 1990's are still likely to be present based on the current habitat. Likely to be shortfin eel present.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wetland zone dominated by grey willow.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Recent surveys found goldfish, gambusia, rudd and catfish but not koi.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Vulnerable to further drainage and lowering of water levels.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Lake bed recently acquired by Crown.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	MOU between EW and DOC re collection of water level data. Waipa Lakes Accord. NZ Landcare Trust and a Lake Care Group also involved.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Invasive plant control, removal of pest fish, block point source inputs. Small size of lake makes these restoration actions possible within the funding limits.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	With support from landowners may be possible to restore lake within 10-50years. While many of the habitat improvement actions could be done relatively quickly it is likely to take time to improve water quality.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Existing wide margin. Weed control and planting underway but substantial work to be done. This can be achieved in 5-10 years.
TOTAL SCORE		84	1 ESTIMATE

LAKE MANGAKAWARE

LAKE AREA (HA)	12.9	LAKE DEPTH (M)	4.8	MAP REFERENCE	S15 054-605	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	238	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Edwards T., Clayton J. and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>Environment Waikato Technical Report 2008/36</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >10 ha with several bays and reaching reasonable depths. Has submerged, emergent and wetland habitat although none of these are particularly abundant.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have originally been a closed system now has multiple inlets and an outlet connecting it to other waterways.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within 4 km of the Waipa River and just over 5 km to Lake Ruatuna.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Lake has recently been fenced and many of the inlets are spring fed. The low relief in the catchment suggests that much of the water in the catchment infiltrates into the soil before being discharged into inlets and the lake.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Weir upgraded in 2007 increasing minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Recorded as hypertrophic (EW Lakes Database) but native macrophytes still present.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Native vegetation dominated the emergent zone of the wetland and occurs in both the submerged and wetland plant zones but not at great abundances although significant enhancement plantings and weed control in the wetland zone may see this change quickly.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	The lake is closed to hunting and therefore harbours a good abundance of native waterfowl species particularly during the hunting season. 17 native bird species have been recorded at the lake. 4 species of native fish have been recorded at the lake including shortfin and longfin eels, common bully and smelt.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Grey willow and egeria have dominated the wetland and submerged plant zones. There is a weed control programme in place that will reduce wetland and emergent weeds over time, however egeria is likely to dominate the submerged zone.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3	3	Only catfish and goldfish have been recorded at this lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Ongoing threat/impacts of invasive plants, e.g. willow, waterlilies, yellow flag iris and reed sweetgrass, and vulnerable to introduction of koi.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	A very wide reserve surrounds this lake.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Waipa District Council, Environment Waikato have worked together to address hydrological issues.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Many key restoration issues have recently been addressed. Further funding directed at weed and pest control and the closing of inlets is likely to have moderate increases in the ecological value of this lake improving water quality and habitat values.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Restoration actions (weed and pest control and closing of inlets) are partially underway and are likely to happen within 10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Very large margin owned by Waipa District Council. Planting and willow control underway. High potential for restoring (fencing/planting) much of the margin within 5-10 years.
TOTAL SCORE		90	1 ESTIMATE

LAKE MARAETAI

LAKE AREA (HA)	410	LAKE DEPTH (M)		MAP REFERENCE		LAKE TYPE	hydro
DISTRICT	Taupo, South Waikato	SIZE OF CATCHMENT (HA)	66104 (EXCL WHAKAMARU)	% NATIVE VEGETATION COVER IN CATCHMENT		24.5%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Lake catchment map, Environment Waikato 2009. FBIS. Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices. Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. <i>NIWA Client Report HAM2002-021</i>. Prepared for Mighty River Power. 30 pp. Taupo Waikato Resource Consents AEE Mar 2001. Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. <i>New Zealand Journal of Marine and Freshwater Research</i> 13(4): 561-572. Wells R. (Ed.), Reeves P., Smith J., Wilding T., Sagar P., Champion P., Boubee J., Kelly G., Taumoepeau A. (Eds) 2005: The effects of 4 years of increased water level fluctuations and a drop in average water levels on the ecology of Lake Waipapa. <i>NIWA Client Report HAM2005-105</i>. Prepared for Mighty River Power. 101 pp. Paula Reeves pers. comm. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	Pied stilt. NI fernbird possible.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			Spotless crake possible.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag. Little black shag possible.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, koura. Freshwater mussels?
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Large lake with a moderate diversity of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Hydro dam.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1*	3	Lake well buffered in parts but narrow or lacking in others, and stock may have access in some areas.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2	6	Eutrophic in 1979.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	Highly representative marginal herbaceous vegetation but only a moderate diversity of indigenous species associated with plant communities now?
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Likely to have a moderate diversity of indigenous birds, and some species may be abundant (e.g. shags, scaup). Four native fish species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Submerged macrophytes dominated by exotic plant species.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, rudd, catfish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Wetland vegetation vulnerable to further encroachment of weeds such as willow?
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned? and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Multiple agencies and groups with interests and various agreements/partnerships in place but extent of co-ordination uncertain.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control within areas supporting wetland vegetation?
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control within areas supporting wetland vegetation?
TOTAL SCORE		62	5 ESTIMATES

LAKE MARATOTO

LAKE AREA (HA)	18	LAKE DEPTH (M)	7.1	MAP REFERENCE	S15 129-660	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	168	% NATIVE VEGETATION COVER IN CATCHMENT			25.07
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Cromarty P. and Scott D. 1995: A Directory of Wetlands in New Zealand, Department of Conservation. Hodges M. 2008: Lake Maratoto Wetland Restoration Plan. Environment Waikato Internal Report, <i>Document # 1327243</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Kessels & Associates Ltd 2007: Assessment of Peat Lake and Wetland Remnant, Lake Maratoto, Douch Rd, Ohaupo, Waipa District. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	2	6	Listed in Cromarty and Scott (1995) as a wetland of national importance.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	1	6	White heron.
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Black mudfish, longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	Most intact peat bog vegetation of all Waipa lakes.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Moderately sized (18 ha), deep (7.1 m) peat lake with substantial areas of wetland surrounding the lake.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Despite the large area of wetland surrounding the lake, the Integrity of the fencing is questionable and stock may have occasional access.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Weir has been installed in an attempt to raise minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3	9	Rotifer inferred TLI 3.43 (Duggan 2008).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Kessels & Associates Ltd (2007) reported a relatively diverse and abundant native flora.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity and abundance of native bird species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Weed control has been undertaken but weeds remain an issue and may be inhibiting natural regeneration (cf Kessels & Associates Ltd 2007).
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	No information, a default value of '2' assigned.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Low water levels, invasive weeds, fire (as occurred in 1993) and possible subdivision within the catchment.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	QEII covenant over c.80% of area.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Co-ordination between Waipa District, EW and NZ Landcare Trust.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Partnership with landowners, exclude stock entirely, control weeds, enhancement planting.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Improvements in fencing, weed control and replanting have all been initiated and likely to be complete within the next 10 years providing landowners remain committed.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Ongoing weed control and planting required. Very large margin in parts with potential to increase on the eastern margin. Water level investigations required to ensure water levels are protected. Could be achieved in 5-10 years.
TOTAL SCORE		119	1 ESTIMATE

LAKE MILICICH

LAKE AREA (HA)	2.2	LAKE DEPTH (M)		MAP REFERENCE	S15 080-662	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	54	% NATIVE VEGETATION COVER IN CATCHMENT			4.66
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend et al. 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Very small lake with limited but variable vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within 5km of several other peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Partly fenced with inadequate buffering.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Investigations have been underway for several years to restore minimum water levels. Minimum level protected by a natural clay sill.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Little information but estimated N, P and sediment loads are quite high (Jenkins and Vant 2007) so likely to be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Not known whether there are submerged plants. Good diversity of native plants under willow, emergent vegetation dominated by natives.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Insufficient information but unlikely to score higher.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Grey willow dominates majority of the wetland zone.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Mosquito fish but no other information. Likely to also contain catfish and goldfish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	Vulnerable to increased drainage and nutrient loadings, and introduction of koi carp.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	EW, Waipa District Council.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Install weir, control invasive plants, complete fencing and establish nutrient and sediment controls on all inlets. Small size of lake and catchment would enable most of these actions to be achieved within the funding limit.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Reduction of nutrient loads to the lake needs to be addressed, not known whether further action would be required to significantly improve water quality.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Fencing, weed control (willow) and planting required. Potential to acquire more marginal land and re-establish corridor to adjacent kahikatea. Good gains could be made in 10 years.
TOTAL SCORE		79	3 ESTIMATES

LAKE MOANANUI

LAKE AREA (HA)	8	LAKE DEPTH (M)	3 (MAX)	MAP REFERENCE	T16 599-256	LAKE TYPE	Artificial
DISTRICT	South Waikato	SIZE OF CATCHMENT (HA)	2706	% NATIVE VEGETATION COVER IN CATCHMENT		0%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Miller D.C. and Hicks B.J. 2006: Physical environment, nutrient budget, and ecology of Lake Moana-nui, Tokoroa. Client report prepared for the South Waikato District Council and Environment Waikato. <i>CBER Contract 42</i>. University of Waikato. 50p. Opus Consultants 1998: Lake Moana-Nui: Draft Management Plan prepared for the South Waikato District Council. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Submerged vegetation, sinuous margins, some marginal planting.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	0		
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	0		
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0		
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Could restore hydrological processes but lake is artificial.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2	6	Water quality described as eutrophic by Miller & Hicks (2006) although nutrient concentrations are typical of hypertrophic water bodies (due to nutrient enrichment from pastoral farmland and stormwater inputs). The lake has high water clarity as a result of high flushing rate, dense submerged vegetation (sediment stabilisation) and abundance of zooplankton (particularly cladocerans for algal control). Extremely high zooplankton density likely to be responsible for low populations of algae.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Extensive beds of <i>Potamogeton ochreatus</i> (dominant native macrophyte). Draft management plan also refers to <i>Nitella hookeri</i> growing in lake, and <i>Elatine gratioloides</i> scattered around the lake margins.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Best guess based on available information.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	<i>Egeria densa</i> dominant in littoral zone - in high density beds. Draft management plan also refers to hornwort.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3	3	Stocked annually with 200 rainbow trout and has a resident population of brown trout. Also goldfish reported by Miller and Hicks. Fish present reported to be present in very low densities.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	Aquatic plants vulnerable to collapse as a result of nutrient enrichment and lake level manipulation.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Recreation Reserve managed by SWDC.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	SWDC, Fish & Game.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Based on urban inputs and intensive land uses within catchment- could only improve a small portion of the lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Reasonable quality lake but threatened by catchment inputs - likely to be a 10-50 year timeframe for resolution.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Estimate.
TOTAL SCORE		65	1 ESTIMATE, 1 DATA DEFICIENT

LAKE NGAHEWA

LAKE AREA (HA)	8.4	LAKE DEPTH (M)	5.5	MAP REFERENCE	U16 050 154	LAKE TYPE	Volcanic
DISTRICT	Rotorua	SIZE OF CATCHMENT (HA)	746	% NATIVE VEGETATION COVER IN CATCHMENT		5.22%	

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Innes J., Whaley K. and Owen K. 1999: Abundance and distribution of waterbirds of the Rotorua lakes, 1985-1986. *Conservation Advisory Science Notes No. 236*. Department of Conservation, Wellington.
- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Paul Cashmore pers. comm., Johlene Kelly pers. comm., Keith Owen pers. comm.
- Neilson K. and Hamer M. 2008: Sampling of lake health indicators 2007/08: Lakes Ngahewa and Tutaeinanga. *Environment Waikato Internal Series 2008/17*.
- Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. *Environment Waikato Technical Report 2008/36*.
- Shaw W.B. and Beadel S.M. 1998: Natural heritage of the Rotorua District. *Wildland Consultants Ltd Contract Report No. 176*. 657 pp.
- Jenkins B. and Vant B. 2007: Potential for reducing the nutrient loads from the catchments of shallow lakes in the Waikato Region. *Environment Waikato Technical Report 2006/54*. Prepared for Environment Waikato. 29 pp.
- Rasch G. 1989: Wildlife and wildlife habitat in the Bay of Plenty Region. *Regional Report Series Number 11*. Department of Conservation, Rotorua. 136 pp plus maps.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag.
Data deficient species have been recorded at this site or are likely to be there based on available habitat.	1	1	<i>Ranunculus macropus</i> .
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake itself less than 10 ha but coupled with its associated wetlands is of moderate size (39.65 ha). Four predominantly native wetland vegetation types recorded by Shaw and Beadel (1998).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE Excellent (5), Good (4), Poor (2), Very Poor (0)	4*	4	Natural barriers are likely to have prevented fish ever having access to lake but there may also have been artificial barriers installed.
6. CONNECTIVITY Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Lakes Okaro, Rotomahana, Ngapouri and Tutaeinanga plus other open water wetlands within 5 km.
7. CATCHMENT/SURROUNDING LANDSCAPE >60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Lake well buffered with no stock access but only 5% of catchment covered in native vegetation cover.
8. HYDROLOGY Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	Upper catchment has largely been cleared, but natural hydrological processes largely in place and no water control structures present.
9. WATER QUALITY Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Water clarity (c.1.2 m in 2007/08) and other measures indicate lake is supertrophic. TLI approximately 5.5 between 2007-2009. Very high sediment inputs indicated by Jenkins and Vant (2007). Some other factor may be present also as trout appear stunted and lake supports relatively low numbers of waterfowl.
10. NATIVE CONDITION - PLANTS High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Submerged macrophytes dominated by <i>Lagarosiphon major</i> , but emergent macrophytes and wetland vegetation largely native and reasonably diverse.
11. NATIVE CONDITION - FAUNA High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Relatively low diversity and abundance of both indigenous aquatic fauna, and wetland fauna. A low diversity also, of exotic fauna.
12. EXOTIC CONDITION - PLANTS Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Emergent macrophyte and wetland vegetation zones currently have a relatively low abundance of exotic plants.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Rainbow trout present (500 liberated annually).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Water quality has deteriorated since 1973. Vegetation has collapsed by the mid 2000s but shown some recovery by 2008. Grey willow and wildling conifers are invading wetland vegetation and wetland margins respectively.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Lake bed vested with Te Arawa Lakes Trust, margins administered by Department of Conservation.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Department of Conservation and Fish and Game NZ have an agreement in place but no active co-ordination.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Eradication of grey willow and other exotic trees would significantly enhance its ecological values and viability.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Best land management practices in the catchment could significantly reduce nutrient and sediment loads to the lake but this unlikely to happen within the next 10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Eradication of grey willow, wilding conifers and other exotics is feasible and could be cost effectively implemented if undertaken within the near future.
TOTAL SCORE		90	2 ESTIMATES

LAKE NGAKORO

LAKE AREA (HA)	12	LAKE DEPTH (M)	>20	MAP REFERENCE	U17: 043 098	LAKE TYPE	Geothermal
DISTRICT	Rotorua	SIZE OF CATCHMENT (HA)	235	% NATIVE VEGETATION COVER IN CATCHMENT		35.98%	

INFORMATION USED TO SCORE LAKE

- Wildland Consultants 2004: Geothermal vegetation of the Waikato Region - Revised 2004. *Wildland Consultants Ltd Contract Report No. 896*. Prepared for Environment Waikato. 238 pp.
- Paul Cashmore pers. comm., Katherine Luketina pers. comm.
- Duggan I. and Boothroyd I. 2002: The distribution of biota from some geothermally influenced standing waters in the Taupo volcanic zone. *NIWA Client Report EVW02226*, NIWA, Hamilton.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.	2	6	Margins support shrubland and scrub on heated or hydrologically altered ground.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	2	6	Part of an internationally significant geothermal wetland complex.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	<i>Cyclosorus interruptus</i> , NI fernbird possible.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Prostrate kanuka.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake and associated wetlands >10 ha but low diversity of native vegetation types in keeping with this lake type (primarily prostrate kanuka shrubland).
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Geothermal and natural barriers only.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Part of a semi-continuous natural landscape.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	4	12	Significant proportion of catchment covered in plantation forest but wetland well buffered.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	Pines in upper catchment.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	4*	6	Likely to be poor water quality, but close to natural state.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Wetland vegetation has good diversity and abundance of native species. Being geothermal, lake is unlikely to have ever supported submerged macrophytes.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Due to its geothermal nature, the lake naturally has a low diversity of aquatic native fish and bird fauna. It may however support significant macro invertebrates or microbial communities (Katherine Luketina pers. comm.).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Wilding conifers have invaded marginal vegetation communities.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	No information but believed unlikely to have exotic fish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2*	10	Potential threats to the lake and its marginal vegetation from wilding conifers and pine harvesting in upper catchment.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Eradication of wilding conifers would enhance ecological values and viability of prostrate kanuka shrublands.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5*	15	No known issues.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Wilding conifer control.
TOTAL SCORE		119	4 ESTIMATES

LAKE NGAROTO

LAKE AREA (HA)	108	LAKE DEPTH (M)	4	MAP REFERENCE	S15 111-582	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	1846	% NATIVE VEGETATION COVER IN CATCHMENT		0.51	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Beaton R., Hamilton D., Brokbartold M., Brakel C., and Ozkundakci D. 2007: Nutrient budget and water balance for Lake Ngaroto. <i>University of Waikato CBER Report No. 54</i>. Prepared for Waipa District Council. • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Ministry for the Environment 2001: Lake Ngaroto restoration: a case study. • Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. • Waipa County Council 1979: Lake Ngaroto Recreation Reserve: A Management Plan pursuant to the Reserves Act 1977. • Wildland Consultants Ltd 2008: A Preliminary Assessment of the Effects of Two Management Proposals on Marginal Plant Communities and Wetlands Birds at Lake Ngaroto. <i>Wildland Consultants Ltd Contract Report No. 1892</i>. Prepared for Waipa District Council. • FBIS data. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	1	6	White heron.
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	Caspian tern. Historical records of NZ dabchick and red-billed gull (1979).
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	2	2	Spotless crane, marsh crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Black shag, little black shag and banded rail. Historical record of little shag (1979).
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.		0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel recently recorded by B Hicks, University of Waikato.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	4	8	Large lake with a sinuous margin with large and variable wetland and emergent plant zones surrounding almost 85% of lake margin.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Lake Ngaroto would have been one of the few peat lakes that was connected to the wider catchment and still remains this way.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Large fenced buffer but most of the nutrient and sediment load from the considerably large catchment is being channelled directly into the lake.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Seasonally inverted levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database)
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Both wetland and emergent plant zones have a moderate diversity and abundance of native plants.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Good diversity of native or migrant birds have been recorded at Lake Ngaroto including 8 threatened species. Short fin eel and common bully are also likely to be present in the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Moderate abundance of exotic species, including crack and grey willow, and gypsywort.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Catfish, goldfish, koi, gambusia, rudd
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Most threats already exist at this lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with large fenced buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Waipa District Council, EW, care group.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed control and planting.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Catchment wide problems that would be difficult to address even within a 50-year time frame. Multiple stressors.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control and replanting under manuka required. Wide margins and potential to acquire more over the long term. Substantial gains could be made in 5-10 years.
TOTAL SCORE		76	

LAKE NGAROTOITI

LAKE AREA (HA)	3.4	LAKE DEPTH (M)	1	MAP REFERENCE	S15 120-597	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	504	% NATIVE VEGETATION COVER IN CATCHMENT		0.45	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag and little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel l may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small shallow lake with no submerged vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system, now artificially connected to Ngaroto through a substantial drain.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other peat lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Fenced, but ineffective buffer. Lake fed by a large (c.500 ha) primarily dairy farmed catchment directly feeding into lake via 5 drains, and winter levels extend well into grazed paddocks.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Deep outlet drain has had substantial effects on hydrology. Would possibly require bunding to restore water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Small lake with small zones of wetland and emergent vegetation. These have a reasonable diversity of native species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Lake is used intensively by waterfowl as there is little disturbance of the habitat. However due to small size of lake species diversity and abundance is likely to be low.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Grey willow and exotic sprawling vegetation dominate the wetland and emergent zones.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0*	0	Data deficient but assigned a '0' as connected to Ngaroto.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Depth <1 m and threat of ongoing peat shrinkage and deepening of drains, but lake already highly degraded and koi very likely to be present.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Unfenced reserve.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	EW and DOC.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Small shallow lake with deep inlet and outlet drains that may already have compromised the hydrological functioning of the lake. Funding could be used to improve the quality of the wetland and emergent vegetation.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Shallowness of the lake and the compromised hydrology pose significant barriers to restoration.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Weed control and fencing required but margin is very small and land acquisition would be required for major gains. Likely to require 10-50 years.
TOTAL SCORE		34	1 ESTIMATE

LAKE NUMITI

LAKE AREA (HA)	15.776	LAKE DEPTH (M)		MAP REFERENCE	R16 617-347	LAKE TYPE	Dune
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	732	% NATIVE VEGETATION COVER IN CATCHMENT		49.01%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Chisnall B. and Ruru I. 2008: Taharoa Lakes Customary Eel Fisheries. <i>MFish Report EEL 2006-06</i>. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crake.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Banded rail.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Only significant coastal freshwater wetlands on the West Coast of the North Island between Kaipara and South Taranaki. Regionally significant native freshwater fishery.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Dam at outlet of Lake Taharoa. Fish pass has been problematic and prevents grey mullet passage. May also limit recruitment of other fish species (e.g. eels).
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3*	9	Stock likely to have access in parts.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3*	9	Assume that lake is buffered from fluctuations in Lake Taharoa.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Based on anecdotal reports (Ruru & Chisnall report) that water quality is poorer than Taharoa (which is eutrophic) and of algal blooms occurring.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	Data deficient - assume that similar condition to other Taharoa lakes.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5	5	Australasian bittern, banded rail and spotless crane are found in lake margins. Scaup, fernbird, black swan, grey and mallard duck, shags and white-faced heron have been seen using the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2*	2	No information - assume comparable to the other Taharoa lakes as interconnected.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	No reports of exotic fish from Taharoa lakes (best guess based on surveys of other lakes).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Deterioration in water quality since 1980's associated with land use. Further risk of aquatic pest introduction associated with use (e.g. eel fishing).
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	MFish and Lakes Trust working on lake but appears to be no active co-ordination.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4*	8	Best guess based on size of catchment and existing marginal vegetation.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Would rely on changes to catchment land use (probably 10-50 years realistically).
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Estimate based on land ownership issues.
TOTAL SCORE		106	DATA DEFICIENT (8 ESTIMATES)

LAKE OHAKURI

LAKE AREA (HA)	1370	LAKE DEPTH (M)		MAP REFERENCE		LAKE TYPE	Hydro
DISTRICT	Taupo, Rotorua	SIZE OF CATCHMENT (HA)	147880 (EXCL ARATIATIA)	% NATIVE VEGETATION COVER IN CATCHMENT		7.3%	

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- FBIS.
- Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices.
- Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. *NIWA Client Report HAM2002-021*. Prepared for Mighty River Power. 30 pp.
- Sagar P. and Kelly G. 2005: Numbers and distribution of wetland birds on the Upper Waikato River and Lakes Ohakuri and Arapuni, September 2004 and January 2005. *NIWA Client Report CHC2005-054*. Prepared for Mighty River Power Ltd. 16 pp.
- Taupo Waikato Resource Consents AEE Mar 2001.
- Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. *New Zealand Journal of Marine and Freshwater Research* 13(4): 561-572.
- Department of Conservation, unpublished data.
- Rasch G. 1989: Wildlife and wildlife habitat in the Bay of Plenty Region. *Regional Report Series Number 11*. Department of Conservation, Rotorua. 136 pp plus maps.
- Paula Reeves pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.	2	6	Geothermal margins present in parts which support shrubland and scrub on heated or hydrologically altered ground.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern possible.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	2	8	NZ dabchick. Caspian tern possible?
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	Pied stilt.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane reported.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag and little shag confirmed. Little black shag?
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, koura, freshwater mussels? None of these listed in FBIS.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Significantly larger than any of the other hydro lakes but only a moderate diversity of native vegetation types. Regionally important for wetland birds (Whirinaki Arm) but of lesser significance than Lake Arapuni.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers existed prior to hydro dam.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River and Whirinaki Arm provides linkage back to Rotorua wetlands.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1*	3	Lake well buffered in parts but narrow or lacking in others, and stock may have access in some areas.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2	6	Eutrophic. Ohakuri also acts as a trap for arsenic and mercury discharged from Wairakei and other geothermal vents upriver, and its sediments contain higher levels of these elements than elsewhere. Trout in Ohakuri have higher mercury concentrations than trout in any of the other hydro lakes in the system. Botulism a regular occurrence in the Whirinaki Arm.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity of indigenous species associated with wetland vegetation.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Good diversity of wetland birds, and some species abundant (i.e. shags, scaup, black swan). Eels absent?
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Exotic plants dominate submerged macrophytes.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, catfish.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Wetland vegetation vulnerable to further encroachment of weeds such as willow?
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned? and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Multiple agencies and groups with interests and various agreements/partnerships in place but extent of co-ordination uncertain.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control in areas of wetland vegetation?
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control within areas supporting wetland vegetation?
TOTAL SCORE		78	3 ESTIMATES

LAKE OHINEWAI

LAKE AREA (HA)	16	LAKE DEPTH (M)	4.5	MAP REFERENCE	S13 025-098	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	347	% NATIVE VEGETATION COVER IN CATCHMENT		2.67	

INFORMATION USED TO SCORE LAKE

- Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. *NIWA Ecosystems Publication No. 8*, Hamilton.
- Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. *Environment Waikato Technical Report 2006/54*.
- McLea M. 1986: Ohinewai Regional Resources Study Biology and Water Quality. *Waikato Valley Authority Technical Publication No. 37*, Hamilton.
- Thompson K. 1983: Ohinewai an ecological survey. University of Waikato Report. Prepared for the Mines Division of the Ministry of Energy, Hamilton.
- Waikato Valley Authority 1985: Waikato Small Lakes: resource statement. *Waikato Valley Authority Technical Publication 1985/7*. Hamilton.
- FBIS data.
- Lake Manager (Kevin Hutchinson, DoC)
- Expert panel.
- Lake catchment map, Environment Waikato 2008.
- BIMS database.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend et al. 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	Caspian tern.
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag. Unconfirmed report of royal spoonbill (2006)
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Freshwater mussel, longfin eel recorded recently by B Hicks, University of Waikato..
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Despite lake being >10 ha it isn't particularly large and is steep sided with a very narrow band of wetland and emergent vegetation. Lake has been de-vegetated since the 1980s.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	No longer connected to the Waikato River.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Waikato River, Lake Rotokawau and Lake Waikare.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Fully fenced with plantings.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Considerable drainage occurred in the surrounding catchment and lake level lowered in the 1970's. Could potentially be restored to some degree by a water level control structure.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database)
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Some native plants but years of grazing have resulted in both the wetland and emergent zones being dominated by willow and gypsywort.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Eels, inanga, and banded kōkopu all recorded from the Ohinewai Stream in 1998. Of these species, shortfin eels still likely to regularly use lake. Common bully also likely (recorded in 1985). Narrow margin limits habitat for birds but shags, ducks, black swans, pukekos and white-faced heron all likely to use lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Willow and gypsywort dominate vegetation.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, catfish, goldfish and mosquito fish have been recorded from this lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Degraded lake with multiple stressors.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	DoC has recently fenced the reserve surrounding the lake.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	DoC and EW have recently co-ordinated the fencing of the lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Enhancement and increasing the width of marginal vegetation will improve habitat value. Fencing of inflows particularly those that pass through dairy farms could help reduce high nitrogen and phosphorus loads entering lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Fish removal, water control structure and addressing nutrient loads into the lake all needed to help restore ecological value and function.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Margin size restricted on southern boundary. Potential to increase margin on northern boundary but likely to take >10 years.
TOTAL SCORE		49	

LAKE OKOROIRE

LAKE AREA (HA)	3.5	LAKE DEPTH (M)	?	MAP REFERENCE	T15 555-612	LAKE TYPE	Peat
DISTRICT	South Waikato	SIZE OF CATCHMENT (HA)	147	% NATIVE VEGETATION COVER IN CATCHMENT		0.02%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Wildland Consultants 2009: Significant Natural Areas of South Waikato District Vol 2 Appendices. <i>Wildland Consultants Ltd Contract Report No. 2109.</i> Insufficient information to score lake values 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern are occasional visitors.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Some adjacent wetland vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	2	2	Only lake in area with limited linkages.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Wetland vegetation around margins but grazed by stock.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Lake in intensively farmed catchment. Has been substantially lowered.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)			Data deficient.
10 NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)			Data deficient. Wetland vegetation likely to be dominated by rushes and sedges.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Best guess based on SSWI reports that it is moderate to high value waterfowl site. Only natural lake in area (although it has been modified). Up to 800 shelducks and 1000 mallard and grey duck seen during duck shooting season.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Exotic trees planted on the margins.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)			Data deficient.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)			Data deficient.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0		
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)			Data deficient.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)			Data deficient.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)			Data deficient.
TOTAL SCORE		26	CURRENTLY DATA DEFICIENT

LAKE OKOWHAO

LAKE AREA (HA)	12	LAKE DEPTH (M)	2.2	MAP REFERENCE	S13 995-063	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)		% NATIVE VEGETATION COVER IN CATCHMENT			4.5
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Garrick A. and Saunders A. (Compilers) 1986: A preliminary assessment of the flora and fauna in the vicinity of the Huntly West No. 1 Coal Mine. A Wildlife Service Environmental Investigations Unit Report with the Fisheries Research Division and Aquatic Plants Centre of MAF and the University of Waikato. Waikato Valley Authority 1985: Waikato Small Lakes: resource statement. <i>Waikato Valley Authority Technical Publication 1985/7</i>. Hamilton. FBIS data. Lake Manager (Kevin Hutchinson, DoC) Lake catchment map, Environment Waikato 2008. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.			Historical, unconfirmed record of spotless crake (1996).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >10 ha with a range of vegetation types that have been fenced for long period of time. Lake margin is reasonably sinuous but there is little variation in lake depth.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Still connected to the Waikato River during wetter parts of the year, but flood gate and pumping station restrict periods during which passage is available.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to the Waikato River, Lake Waahi, Rotongaro, Kimihia and Hakanoa.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Large margin of native vegetation surrounds the lake and has been fenced for >20 years.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Pumping station on outlet of lake may be affecting lake levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Lake SPI score = 0. Likely to be at least eutrophic based on catchment inputs.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Emergent vegetation dominated by native species. Wetland zone mostly willow with some small areas of manuka scrub.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Eels, common bully recorded from this lake as are several native bird species which are likely to occur in moderate abundance.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Willow dominates wetland zone but has a predominantly native understorey. Exotic plants are also common in the emergent zone. No submerged macrophytes.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Catfish, goldfish, and mosquito fish dominate the lake fishery. Koi also present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Close to the Huntly mine and could be affected by its activities. Further development in the catchment could affect hydrology.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with fenced buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Solid Energy, Tainui, EW and AWFGC.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Significant gains could be to the values of marginal areas and possibly in lake features.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Improvement in water quality and restoration of macrophyte beds may be possible in the medium term at this lake if coarse fish can be removed.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Good native understorey and wide Crown-owned margins. Weed control/planting could be completed in 5-10 years.
TOTAL SCORE		80	1 ESTIMATE

LAKE OPOURI (NGAPOURI)

LAKE AREA (HA)	23.5	LAKE DEPTH (M)	c.30 (MAX)	MAP REFERENCE	U16015129	LAKE TYPE	Volcanic
DISTRICT	Rotorua	SIZE OF CATCHMENT (HA)	636	% NATIVE VEGETATION COVER IN CATCHMENT		1.66%	

INFORMATION USED TO SCORE LAKE

- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. *Environment Waikato Technical Report 2008/36*.
- FBIS.
- Paul Cashmore pers. comm., Keith Owen pers. comm.
- Innes J., Whalley K., and Owen K. 1999: Abundance and distribution of waterbirds of the Rotorua lakes, 1985-1996. *Conservation Advisory Science Notes No. 236*.
- Department of Conservation, Wellington. Clayton *et al.* 2005.
- Rasch G. 1989: Wildlife and wildlife habitat in the Bay of Plenty Region. *Regional Report Series Number 11*. Department of Conservation, Rotorua. 136 pp plus maps.
- Department of Conservation (n.d.): Lake Ngapouri Fish Kill File Note No. 3. Unpublished File Note RWL 025. 5 pp.
- Spring-Rice B.N. 1996: Atiamuri Ecological District. Survey Report for the Protected Natural Areas Programme. *Unpublished report*. 170 pp.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane (Spring Rice).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, koura.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Medium sized lake with some sinuosity, variable depths but low-moderate indigenous vegetation diversity.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5*	5	Lake occupies a hydrothermal explosion crater and is unlikely to have had fish passage to it historically.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of a semi-continuous natural landscape.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Less than 2% of catchment covered in indigenous vegetation but stock don't have access to lake and lake partially buffered by riparian vegetation.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3*	9	Upper catchment cleared but no water structures present to impact on drainage patterns?
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Lake SPI 58 (2004) but Boswell (1985) recorded it as highly eutrophic. Fish kill and aquatic macrophyte collapse in 2002 attributed to deoxygenation. Relatively high sediment inputs.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Indigenous species moderately abundant in submerged macrophyte zone but low diversity in other two zones which are also limited in extent. <i>Check Clayton et al.2005.</i>
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Reasonable diversity but limited abundance of indigenous birds. Smelt present. Paradise shelduck moulting site.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	<i>Elodea canadensis</i> currently present in relatively low abundance but exotic plants moderately abundant in marginal vegetation.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0*	0	Rainbow trout liberated into lake annually (500).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Lake with a relatively low-moderate native condition that could deteriorate as a consequence of further shallow water anoxia events.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Lake bed vested with Te Arawa Lakes Trust, margins administered by Fish and Game NZ under an appointment to control and manage. Government Purpose (Wildlife Management Reserve). Fenced margin, but buffer narrow around much of lake.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Te Arawa Lakes Trust, Fish and Game NZ, Department of Conservation.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed control around margins.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control coupled with infill planting where required.
TOTAL SCORE		82	5 ESTIMATES

LAKE OROTU

LAKE AREA (HA)		LAKE DEPTH (M)		MAP REFERENCE	U17: 040 092	LAKE TYPE	Volcanic
DISTRICT	ROTORUA	SIZE OF CATCHMENT (HA)	582	% NATIVE VEGETATION COVER IN CATCHMENT		29.41%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Paul Cashmore pers comm., Keith Owen pers. comm. Miller N. 1983: Proposed addition to Waitapu Scenic Reserve. Unpublished survey report for the Scenic and Allied Reserves of Rotorua Lakes and White Island Ecological Districts survey programme. 6pp. Department of Conservation, unpublished information. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.	2	6	Margins support shrubland and scrub on heated or hydrologically altered ground.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	Extensive populations of <i>Cyclosorus interruptus</i> , North Island fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Little shag, black shag probable. Prostrate kanuka.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Largest known population of <i>Cyclosorus interruptus</i> in Rotorua-Taupo region.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	2	4	Lake and associated wetlands >10 ha with moderate diversity of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers only.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of a semi-continuous natural landscape.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Only 29% of catchment covered in indigenous vegetation but wetland well buffered.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	Pines in catchment to north and farmland to south.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Miller (1983) suggested lake "fairly eutrophic" but no other information available.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	No submerged aquatic plants appear to present but moderate to good diversity in other zones.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Limited data.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Minimal weed issues, grey willow and wildling conifers have mostly been removed.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3*	3	No information. Gambusia could be present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2*	10	Unlikely to deteriorate further under present management regime. <i>But possible concerns with dairy farm to south?</i>
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Fenced Wildlife Management Reserve/Scenic Reserve with good buffering.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Department of Conservation and Fish and Game NZ.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Ongoing willow and conifer control? Water quality from farmland inputs?
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Water quality could be improved by reducing nutrient inputs from farmland to south?
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	Periodic removal of willow and/or wilding conifers may be required.
TOTAL SCORE		108	4 ESTIMATES

LAKE OTAMATEAROA

LAKE AREA (HA)	4.96	LAKE DEPTH (M)	5	MAP REFERENCE	R12 598-328	LAKE TYPE	Dune
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	68.30	% NATIVE VEGETATION COVER IN CATCHMENT		0%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Neilson K., Collier K., and Hamer M. 2007: Assessment of biological Indicators of lake health in Waikato shallow lakes - a pilot study 2006/07. <i>EW Technical Report 2008/18</i>. 9p. Benham S. 2008: DOC internal memo - Site Visit Report: Awhitu Peninsula threatened plant and kauri PTA survey. Dated 29 January 2008. 4p. Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>NIWA Client Report HAM 2008-2009</i>. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	<i>Utricularia australis.</i>
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	<i>Myriophyllum robustum.</i>
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Data deficient species have been recorded at this site or are likely to be there based on available habitat.	1	1	<i>Ranunculus macropus</i> .
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	One of only two (recorded) regional shallow lakes with oligo-mesotrophic water quality.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small lake in a pastoral catchment.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	No apparent linkage - natural condition.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of several dune lakes that are located close to one another (but are not linked by vegetation).
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Margins vulnerable to cattle trampling - Lake needs to be fenced, with controlled grazing of margins for weed control.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3	9	Lake assessed as mesotrophic in 2007 (Neilson <i>et al.</i> 2007).TLI 3.4. Good clarity.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	<i>Potamogeton ochreatus</i> & <i>Glossostigma elantinoides</i> translocated to the lake by DOC in Jan 2008. <i>Myriophyllum robustum</i> occurs at lake margins. Also <i>R.macropus</i> and <i>Utricularia australis</i> amongst emergent vegetation around lake margin. Remnant charophytes.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Recent survey by UOW - Large shortfin eels (artificially stocked?), bullies sparse but recorded by NIWA in 2009.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	No oxygen weeds but extensive beds of stunted hornwort (<i>Ceratophyllum demersum</i>) are present in lake. <i>Elodea canadensis</i> has existed in lake since 1950s. Some grey willow is being removed from lake margins by lake owners.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Previously stocked with rainbow trout and brown trout by AWF&GNZ but may not be stocked again in future. UOW reported two catfish, odd rainbow trout and moderate goldfish density. AWF&GNZ observation that mosquitofish may exist here (as they are in the lakes to the north of this one).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Real chance of alligator weed introduction and possibility of hornwort expansion. Change in land use could result in further degradation.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	EW and NIWA working on hornwort operation.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	6	12	Hornwort eradication would be relatively low cost and could allow native charophytes to regenerate.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Landowner is reluctant to fence which is impediment to restoration.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Landowner is reluctant to fence which is an impediment to restoration though light grazing of margins is probably beneficial at this stage. Grey willow is being removed from lake margins.
TOTAL SCORE		105	

LAKE PARANGI

LAKE AREA (HA)	12.18	LAKE DEPTH (M)	16	MAP REFERENCE	R15 693-502	LAKE TYPE	Dune
DISTRICT	Otorohanga	SIZE OF CATCHMENT (HA)	122	% NATIVE VEGETATION COVER IN CATCHMENT		1.78%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>NIWA Client Report HAM 2008-2009</i>. Neilson K. and Hamer M. 2008: Sampling of lake health indicators 2007/08: Lakes Ngahewa and Tutaeinanga. <i>Environment Waikato Internal Series 2008/17</i>. Neilson K. 2009: Letter to Otorohanga District Council Re: Subdivision application (080131) located at Lake Road, Kawhia. Dated 29 January 2009. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Freshwater mussels recorded by NIWA. Longfin eels may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	>10 ha with good submerged and emergent vegetation and sinuous margins.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	2*	2	One of several dune lakes in the district that is likely to be used collectively by waterfowl. Close to harbour.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	2007/08 - lake unfenced and accessible to stock. Over past 12 months 1760 m of fencing has been completed with an average riparian margin of c.25 m. More fencing to be completed in 2009/10 but no plans to fence entire margin.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Supertrophic (TLI 5.8). Visual water quality has deteriorated in recent years with algal blooms now occurring over the summer months.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	<i>Potamogeton ochreatus</i> and <i>Myriophyllum triphyllum</i> present in lake.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Estimate based on recent visits. Eels known to be present.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	<i>Elodea canadensis</i> forms invasive weed bed around lake to max depth of 3.6 m.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3*	3	Catfish present - thought to be in low density.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	Lake water quality deteriorating. Lake likely to deteriorate further threatening submerged vegetation.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Could realistically target specific areas around the lake margin for weed control and restoration planting.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Due to current land management practices and low likelihood of improvement within 10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Would require weed and animal pest management and changes in land management, the latter more likely to be achieved over the longer term.
TOTAL SCORE		84	3 ESTIMATES

PARKINSON'S LAKE (KOHAHUAKE LAKE)

LAKE AREA (HA)	1.92	LAKE DEPTH (M)	6 (MAX)	MAP REFERENCE	R12 596-306	LAKE TYPE	Dune
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	107.72	% NATIVE VEGETATION COVER IN CATCHMENT			1.09
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Benham S. 2008: DOC internal memo - Site Visit Report: Awhitu Peninsula threatened plant and kauri PTA survey. Dated 29 January 2008. 4p. Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using Lake SPI. <i>NIWA Client Report HAM 2008-2009</i>. Tanner C.C. and Wells R.D.S. 1990: Re-establishment of native macrophytes in Lake Parkinson following weed control by grasscarp. <i>NZJMF</i> 24:181-186. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	0		Very small lake in a pastoral catchment. AWF&GNZ observed high level of abstraction for irrigation, and reasonable swamp area on one arm of lake (now more extensive due to abstraction).
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	No apparent linkages - natural.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of several dune lakes that are located close to one another (but are not linked by vegetation).
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Margins vulnerable to cattle trampling.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2*	6	Reported by Benham as eutrophic - assume moderate since plants present.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Narrow fringe of charophytes sometimes present beyond the depth extent of weed beds. Small remnant <i>Potamogeton ochreatus</i> recorded from north side of lake.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Bullies were re-introduced to lake after rotenone operation, and are now reproducing (no other observations from NIWA).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Submerged vegetation dominated by <i>Egeria</i> (after eradicated in 1996). Swamp lily (<i>Ottelia ovalifolia</i>).
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	One koi seen in late 1990s (NIWA) not known if reproducing (may be gone now according to F&G). Carp observed in 2004 (NIWA). Rainbow and brown trout stocked by AWF&GNZ. Grass carp reintroduced by AWF&GNZ in 2008 for egeria control.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Lake has low native condition but could degrade further as a result of a low intensity threat (e.g. increased cattle grazing or change in land use intensity could result in loss of native plants).
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Could eradicate weeds (grass carp?) and remove pest fish using rotenone.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Egeria could be eradicated again using grass carp and rotenone to restore fish communities (NIWA advice). 2-15+yrs.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Fencing and planting likely to provide some enhancement.
TOTAL SCORE		69	2 ESTIMATES

LAKE PATAKA

LAKE AREA (HA)	4.6	LAKE DEPTH (M)	5	MAP REFERENCE	S15 055-704	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	55	% NATIVE VEGETATION COVER IN CATCHMENT			13.44
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Edwards T., Clayton J. and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>Environment Waikato Technical Report 2008/36</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Neilson K. and Desmond T. 2007: River and Catchment Farm Plan, Waipa Zone, New Works Proposal for Posa Ranch Ltd. <i>Environment Waikato Internal Report Doc # 1155251</i>. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	0	0	Small lake with very limited wetland and emergent vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have originally been a closed system, now linked by drains to the wider catchment allowing exotic fish to access the lake.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several peat lakes.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Minimal marginal vegetation to buffer overland flow but lake fenced.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Possibly restorable with a weir but may be compromised by the high rate of peat decomposition.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	High N & P loads but low sediment loadings and small amount of <i>Nitella</i> recorded in recent Lake SPI survey. Water quality likely to be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	0	0	Very low diversity and abundance of native vegetation. Stand of raupo at the outlet and very small areas of spike sedge.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Little information but likely to contain low diversity and abundance given lack of habitat.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Willow control in 2007 would have reduced dominance of exotic plants but as most of the margin is in rough pasture would still have a moderate abundance of exotic species.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	No information. Default value of '2' assigned.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Surrounding land being converted to dairying operation and lake not protected by drainage rules. Also at risk of koi introduction.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Waipa Lakes Accord.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Exclusion of stock, weed control, weir installation and planting would all increase habitat values to a moderate extent given the small size of the lake and catchment.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Considerable list of restoration activities would be required to restore lake. Dependent on willingness of landowner hence a timeframe of >10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Fencing, weed control and planting required but margin is very small and now restricted by a farm race that is close to the lake margin and surrounds it entirely. Drainage is also a major issue and likely to require 10-50 years to resolve given land tenure.
TOTAL SCORE		64	2 ESTIMATES

LAKE PATETONGA/PATETONGA LAGOON

LAKE AREA (HA)	4.87 3.3 (DOC)	LAKE DEPTH (M)		MAP REFERENCE	T13 321-230	LAKE TYPE	Riverine
DISTRICT		SIZE OF CATCHMENT (HA)	120997	% NATIVE VEGETATION COVER IN CATCHMENT			7.32%
INFORMATION USED TO SCORE LAKE							
Insufficient information to score lake values							
<ul style="list-style-type: none"> Anecdotal information from DOC (Mike Lake and Amy McDonald). 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	2*	4	Very small lake but wetlands may be quite large.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Floodgate on the outlet of the lake (into the Piako River) so fish population restricted to those that can enter through the floodgate on the incoming tide.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Adjacent to Piako River and large wetlands.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Lake fully fenced in 2004.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0		Man-made lake with floodgates on outlet. Lake dries up in summer.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Water enters from the Piako River, and the lake has a thick sludge bottom (Amy McDonald pers. comm.).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Insufficient info, but probably low (Amy McDonald pers. comm.).
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Good waterfowl biodiversity - mallards, Canada geese, black swan, dabchick. Ephemeral and upstream of floodgate so unlikely to support native fish populations.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Lots of glyceria (was blanket sprayed in 1998) but needs ongoing control. Large areas of primrose willow.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3	3	Only has exotic fish after large floods and is ephemeral (Mike Lake pers. comm.).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0*	5	Insufficient info but probably low vulnerability as artificial and weedy.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Fenced Wildlife Management Reserve.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	2	2	DoC and conservation/hunting groups have collaborated with planting.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Actions would only address a specific biodiversity aspect of a lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Insufficient information - however, glyceria will be an ongoing problem due to islands that float up and down the Piako River.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Best guess based on weed issues and management for hunting (cf. biodiversity).
TOTAL SCORE		42	DATA DEFICIENT (6 ESTIMATES)

LAKE PENEWAKA

LAKE AREA (HA)	c.4	LAKE DEPTH (M)	c.2-3	MAP REFERENCE	S13 015-164	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	Small	% NATIVE VEGETATION COVER IN CATCHMENT			
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Lake Manager (Kevin Hutchinson, DoC) • Aerial photo (MapToaster, Topo NZ, Copyright MetaMedia Ltd) • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	1	6	White heron.
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Black shag, little black shag, royal spoonbill.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Koura.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small lake with willow fringe that has been heavily grazed in the past.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been connected to the Waikato River. Still flooded during large storm events by Lake Waikare.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Part of the Lake Waikare wetland and lake complex.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Some grazing but large areas fenced. Limited run-off.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Would have been substantially altered as a result of the Lower Waikato Flood Control Scheme.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0*	0	No water quality information but likely to be hypertrophic based on catchment inputs.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Several native vegetation types surrounding lake within the wetland and emergent plan zones.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Despite small size a recent trip by the OSNZ found a wide range of native birds using this site.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2*	2	Insufficient information but anecdotal information suggests there are several native vegetation types surrounding the lake with few willows.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	For a limited period after being flooded by Lake Waikare and before drying out, a common occurrence for this ephemeral lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Alligator weed in Te Onetea, flood control, mining a possibility.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve with partially fenced buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	MOU between DoC & AWF&GNZ.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Complete fencing, enhancement planting and weed control, surveillance for alligator weed, stabilise lakeshore at Lake Waikare so lake water doesn't contaminate water in Penewaka. Much of biodiversity enhancement work already done.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	While most restoration activities are straightforward, stabilisation of Lake Waikare lake shore may take longer than 10 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Crown ownership and work been done to improve hydrology. Still requires weed control.
TOTAL SCORE		76	2 ESTIMATES

LAKE PIKOPIKO

LAKE AREA (HA)	6.35	LAKE DEPTH (M)	2.5	MAP REFERENCE	S14 037-910	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	94	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • FBIS data • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Lake surface <10 ha, shallow with little sinuosity, narrow margin of wetland and emergent vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system now connected to the Waikato River via the Waikeri Stream.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Lake Areare and part of the Horsham Downs Wildlife Management Reserve.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Lake margin is very narrow in places. Inlets to the lake deliver nutrients and sediment directly into the lake, and stock can access the lake in parts.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Catchment fully developed for farming which will have affected water levels. Water level control structure needed to restore minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Very narrow margin of wetland and emergent vegetation although emergent vegetation dominated by raupo.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	A moderate diversity of native fish (shortfin eel, common bully) and birds (pukeko, little black shag, NZ dabchick, welcome swallow) have been recorded at this lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Willow dominates the narrow band of wetland vegetation and other species such as gypsywort and blackberry quite common.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Catfish, goldfish and mosquito fish all common at this lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	At risk from koi carp introductions which would impact on lake water quality.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve but buffer needs to be fenced.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	DoC and EW co-ordinating water level monitoring.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Hydrology could be improved but unlikely to result in significant gains in ecological value, nutrient and sediment loads need to be reduced. Habitat value of wetland vegetation could be improved with weed control, enhancement planting and fencing at the outer edge of the reserve to widen buffer area.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Shallow degraded lake in a highly modified catchment with a narrow margin. Restoration activities (see 17.) more likely to be achieved over long timeframe.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Fencing, weed control and planting required but margin is very small. Drainage is also a major issue and likely to require a policy change. 10-50 years to resolve given land tenure.
TOTAL SCORE		52	

LAKE PIOPIO

LAKE AREA (HA)	0.205	LAKE DEPTH (M)		MAP REFERENCE	R16 606-329	LAKE TYPE	Dune
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	28	% NATIVE VEGETATION COVER IN CATCHMENT		16.47%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">• Insufficient information to score lake values• Lake bed owned by Taharoa Lakes Trust							

LAKE POSA

LAKE AREA (HA)	2.05	LAKE DEPTH (M)	4	MAP REFERENCE	S15 054-700	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	95	% NATIVE VEGETATION COVER IN CATCHMENT			9.84
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Edwards T., Clayton J. and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>Environment Waikato Technical Report 2008/36</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Neilson K. and Desmond T. 2007: River and Catchment Farm Plan, Waipa Zone, New Works Proposal for Posa Ranch Ltd. <i>Environment Waikato Internal Report Doc # 1155251</i>. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	2	2	Spotless crane, marsh crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small (c.2 ha), shallow (max depth 4 m) peat lake with 20-30 m band of marginal vegetation surrounding lake.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system in its natural state, now linked to Lake Pataka and outlet connects into stream catchment that discharges into Waipa River.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Very close to several other peat lakes including Lake Pataka and Koromatua.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Approximate 15-20 m buffer around the lake, but five 'drains' deliver sediment and nutrients from the catchment into the lake with stock accessing lake margin.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Potential for restoration of minimum lake water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	N & P loads quite high although sediment load reasonably low (Jenks and Vant 2007), lake water quality likely to be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	In 1993 the wetland plant zone comprised several different native plant communities that had a good diversity of native plant species. Emergent zone dominated by extensive beds of raupo.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Emergent zone supports populations of spotless crake and marsh crake otherwise value unknown. Small size of lake is likely to only support a limited diversity and abundance of native birds and fish.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Emergent zone dominated by Mercer grass. Grey willow is being removed from wetland plant zone.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Goldfish, catfish and mosquito fish all common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Small lake with multiple stressors but with some good habitat values. Recent change in ownership and conversion to dairying has resulted in further drainage in this small catchment (which is not protected by drainage rules).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Waipa Accord.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Small catchment so resources put into altering hydrology and reducing nutrient loads could result in substantial improvements to the lake now that fencing, weed control and enhancement planting have been carried out (2007).
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	If hydrology could be addressed then lake could possibly be restored within the next 50 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Fencing, weed control and planting required but margin is very small. Drainage is also a major issue and likely to require 10-50 years to resolve given land tenure.
TOTAL SCORE		65	2 ESTIMATES

LAKE PUKETI

LAKE AREA (HA)	6.42	LAKE DEPTH (M)	7	MAP REFERENCE	R12 589-345	LAKE TYPE	Dune
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	114.10	% NATIVE VEGETATION COVER IN CATCHMENT			1.09%
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Benham S. 2008: DOC internal memo - Site Visit Report: Awhitu Peninsula threatened plant and kauri PTA survey. Dated 29 January 2008. 4p. Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>NIWA Client Report HAM 2008-2009</i>. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small lake in a pastoral catchment but relatively deep and vegetated.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4*	4	Appears to have no fish passage although short drain appears to link to lake.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of several dune lakes that are located close to one another (but are not linked by vegetation). Very close to lake Rotoiti.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3*	9	Mostly intact although appears to have a short drain connected.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2*	6	Assume moderate since plants present.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Charophyte <i>Chara fibrosa</i> var. <i>acanthopitys</i> recorded. NIWA reports 3 charophyte species (sparse), 5 native turf plants and also native emergents.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Shortfin eel and bullies recorded in 1980.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Grey willow recorded from lake margins. Submerged vegetation dominated by <i>Egeria densa</i> (high invasive condition index).
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Rainbow trout and rudd historically present (1974) but not stocked by AWF&GNZ. Assumed to be moderate.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3*	15	Assumed that vulnerable to water quality deterioration since submerged vegetation still exists in this lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	DoC land.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Weed and pest fish eradication may be option.
18. IN-LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	NIWA advice that <i>Egeria</i> could be eradicated using grass carp. May also need to eradicate rudd (rotenone) to ensure plant recovery. 2-15+ years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Data deficient. Light grazing probably assists habitat diversity.
TOTAL SCORE		68	DATA DEFICIENT (6 ESTIMATES)

LAKE PUKETIRINI

LAKE AREA (HA)	54	LAKE DEPTH (M)	64	MAP REFERENCE	S13 995-010	LAKE TYPE	Artificial
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	Small	% NATIVE VEGETATION COVER IN CATCHMENT			
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Balvert S. 2006: Limnological Characteristics and Zooplankton Dynamics of a Newly Filled Mine Lake. <i>Unpublished MSc thesis</i>, University of Waikato, Hamilton. Alan Turner (Waikato District Council). Lake catchment map for Lake Waahi, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel l may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Moderate sized, deep lake with a few small wetlands. Enhancement planting has occurred but not immediately adjacent to the lake.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Fish can access the lake via inlet to Lake Waahi. Has no 'natural' state being an artificial lake.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Very close to Waikato River and Lake Waahi.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	One main inlet which is fenced with plantings for the last 800 m. No stock access to the lake.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Lake has been created from an open mine pit.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3	9	Mesotrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	No submerged vegetation and emergent vegetation quite limited. Extensive native planting occurring at the lake but this is set back from the waters edge.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Insufficient data. Proximity to Lake Waahi and the moderate size of the lake suggests that this lake would have a moderate diversity and abundance of native waterfowl. Native fish diversity and abundance likely to be low.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Willows on edge of lake but major revegetation underway.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Large deep lake. Koi are known to be in the lake but abundances likely to be limited due to lake bathymetry.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Water quality could deteriorate in the medium term if lake is managed purely for recreational purposes.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Currently being made into a reserve to be managed by Waikato District Council.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Solid Energy and Waikato District Council.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Establishment of wetland vegetation, particularly emergent species could have moderate increases in the wildlife values of the lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Artificial lake. Enhancement opportunities that should increase biodiversity values of the lake within 10 years, however primary value of the lake will be for recreational purposes.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Potential for wetland restoration but this will be limited due to Management Plan focus on recreational development as opposed to biodiversity.
TOTAL SCORE		62	1 ESTIMATE

LAKE ROTOAIRA

LAKE AREA (HA)	1532	LAKE DEPTH (M)	14.6	MAP REFERENCE	T19 448-356	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	14190	% NATIVE VEGETATION COVER IN CATCHMENT			65.87%

INFORMATION USED TO SCORE LAKE

- Wetland inventory spreadsheet, Department of Conservation, unpublished data.
- Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. *Environment Waikato Technical Report 2008/36*.
- Email from Jessica Wallace (Department of Conservation).
- Rowe D., Waugh B., Konui, G., Safi, K. and Thompson, K. 2008: Lake Rotoaira - results from water quality and trout fishery monitoring in 2007/2008. *NIWA Client Report Ham2008-???*. Prepared for Lake Rotoaira Management Group. 27 pp.
- Dugdale
- John Gibbs pers. comm.; Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	NI fernbird, pied stilt.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.	2	2	Spotless crane, marsh crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag and little shag probable, banded rail possible.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	One of very few lakes regionally that is close to pristine. Tongariro-Taupo FW Strategy classifies as regionally important.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	5	10	Large and diverse system.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	0	0	Fish passage dramatically altered by Tongariro Power Development Scheme.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Proximal to Otamangakau wetland complex and Rotopounamu.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	4	12	Significant proportion of catchment covered in indigenous vegetation and stock excluded from all but a very small part of the lake and its wetlands.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Originally a much smaller lake that was converted into a reservoir as part of the Tongariro Power Development Scheme. Artificial structures associated with both inlets and outlet. Water residence time reduced from 247 to 28 days.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	3	9	Mesotrophic (Dugdale and Wells 2001). Water clarity as measured by secchi disc >6 m in March 2008 (Rowe <i>et al.</i> 2008).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Extensive areas associated with all three zones though submerged macrophytes dominated by exotic species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Moderate to high diversity and abundance of indigenous wetland birds.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Emergent macrophytes and wetland vegetation have relatively few exotic plants, but submerged macrophytes dominated by exotic species (lake invasive condition index has increased over last decade and now 90%).
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Significant rainbow trout fishery, also brown trout and goldfish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Vulnerable to variable water level associated with electricity generation.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Managed by Lake Rotoaira Trust Board on behalf of owners.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Lake Rotoaira Trust Board, Lake Taupo Forest Trust, Genesis Energy, Department of Conservation, Hikairo hapu.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	6	12	Willow control and koaro habitat restoration.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0*	0	Lake water quality good but highly unnatural hydrology and submerged aquatics dominated by exotic species.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Willow control.
TOTAL SCORE		113	1 ESTIMATE

LAKE ROTOITI (LITTLE LAKE)

LAKE AREA (HA)	1.23	LAKE DEPTH (M)	7	MAP REFERENCE	R12 588-347	LAKE TYPE	Dune
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	41.93	% NATIVE VEGETATION COVER IN CATCHMENT		0%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Benham S. 2008: DOC internal memo - Site Visit Report: Awhitu Peninsula threatened plant and kauri PTA survey. Dated 29 January 2008. 4p 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Data deficient species have been recorded at this site or are likely to be there based on available habitat.	1	1	<i>Ranunculus macropus</i> .
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Very small lake in pastoral catchment but deep, vegetated and sinuous margins.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5*	5	Appears to have no inlet/outlet - natural.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Needs fencing to exclude stock (and controlled grazing of lake margin).
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2*	6	Assume moderate water quality due to presence of submerged aquatic plants.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Data deficient. Lake SPI scores suggest low native condition. DOC noted <i>Epilobium palladiflorum</i> , <i>Lachnagrostis filiformis</i> , <i>Sparganium subglobosum</i> , and <i>Eleocharis gracilis</i> around the lake. <i>Gratiola sexdentata</i> occurred very sparsely on the southern side.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Common bully recorded in 1978. Assumed to be moderate.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Dominated by <i>Egeria densa</i> for last 17 years. <i>Azolla pinnata</i> recorded in 1987.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Rudd recorded in 1978 - likely to exist still.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3*	15	Assumed that vulnerable to water quality deterioration since submerged vegetation still exists in this lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Weed and pest fish eradication likely to be an option.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	NIWA advice that Egeria could be eradicated using grass carp. May also need to eradicate rudd (rotenone) to ensure plant recovery. 2-15+ years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Light grazing of margins likely to enhance habitat diversity.
TOTAL SCORE		75	DATA DEFICIENT (7 ESTIMATES)

LAKE ROTOKAEO

LAKE AREA (HA)	<5	LAKE DEPTH (M)		MAP REFERENCE	S14 085-786	LAKE TYPE	Peat
DISTRICT	Hamilton	SIZE OF CATCHMENT (HA)	Small	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Dugdale T. and Reeves P. 2004: Options for the management of Lake Rotokaeo. <i>NIWA Client Report HCC02228</i>. Prepared for Hamilton City Council. FBIS data. Lake Manager (Kemble Pudney, HCC). Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small shallow lake but with good emergent and wetland zones.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Would have been a closed system and still is with the outlet being piped and preventing fish passage.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other lakes and the Waikato River.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Small wetland areas at inlet that provide some filtering of urban stormwater contaminants.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Catchment urbanised.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	No water quality data but based on catchment activities is likely to be eutrophic. Receives stormwater from urban catchment.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Has a good diversity of native plants in high abundances including a kahikatea forest (planted).
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Ten native bird species have been recorded at this lake. There are no records for native fish.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Several small plant communities dominated by native species. Lake was dominated by Mexican lily but this has been eradicated by HCC.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Mosquito fish dominate this lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Introduction of coarse fish is a possibility at an urban lake like this one.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with large planted buffer around 75% of the lake.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	HCC manages the lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Due to the small size of the lake and its reasonably good condition, funding could make a significant difference in continuing to improve the ecological value of this lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Most of the actions required are achievable within a 5-10 year timeframe and are not too costly. As lake is in an urban environment constant surveillance for invasive species will be an ongoing concern.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Most of the work that can be done has been and potential for restoring remaining margin is small because of very close residential properties and sports grounds. Proposed drainage for sports fields in the western margin.
TOTAL SCORE		60	1 ESTIMATE

LAKE ROTOKARAKA

LAKE AREA (HA)	c.6-7	LAKE DEPTH (M)		MAP REFERENCE	S14 165-964	LAKE TYPE	
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)		% NATIVE VEGETATION COVER IN CATCHMENT			
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">NZMS 260 S12Aerial photo (MapToaster, Topo NZ, Copyright MetaMedia Ltd)							

Insufficient data to score lake. Lake appears to have no open water in either the aerial photo or topomap, and may be more appropriately defined as a wetland.

LAKE ROTOKAURI

LAKE AREA (HA)	41.7	LAKE DEPTH (M)	4	MAP REFERENCE	S14 037-800	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	933	% NATIVE VEGETATION COVER IN CATCHMENT		0.24	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Edwards T., Clayton J. and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>Environment Waikato Technical Report 2008/36</i>. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Waikato District Council 2000: Rotokauri Lake Management Plan. • Waikato Valley Authority 1980: Lake Rotokauri: A Management Guideline. <i>WVA Technical Publication No. 15</i>. Hamilton. • Warr S. 1998: Review of the current status of Lake Rotokauri: Summary Report. Prepared for Waikato District Council & Hamilton City Council. • FBIS data. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. • New Zealand Freshwater Fish database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend et al. 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.			Historical, unconfirmed record of NI fernbird (1985).
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane. Historical, unconfirmed record of marsh crane (1985).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Giant kōkōpu. Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Moderately large lake (c.41 ha), up to 4 m deep with several bays. Large beds of emergent vegetation providing good habitat for a range of wetland bird species buffered by a relatively wide margin of willow and manuka scrub.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system and is now linked to adjacent catchments.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several lakes including Waiwhakareke.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Silt traps on the main drain entering the lake, stock fenced out of wide riparian margin.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Water levels have been lowered over time as catchment drained but weir at outlet prevents lake levels getting too low.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hyper-eutrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Extensive emergent plant zone dominated by raupo. Reasonable diversity of native plants in wetland zone.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	A moderate number of native fish and bird species have been recorded at the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Willow and other problematic weeds dominate parts of the wetland zone and occur amongst the emergent vegetation.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Catfish, goldfish and mosquito fish all common at this lake. Probably also koi more recently.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Wildlife values may be diminished by increasing urban development in the catchment.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with fenced buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Lake management committee co-ordinating management between community, Waikato District Council, HCC, AWF&GNZ, and DoC.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Potential to improve wetland plant communities through targeted weed control.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	There are a number of barriers to restoration (significant nutrient and sediment inputs from large catchment, coarse fish, urban encroachment).
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control and infill planting could result in large biodiversity gains and be achieved in 5-10 years.
TOTAL SCORE		68	

LAKE ROTOKAWA

LAKE AREA (HA)	62	LAKE DEPTH (M)	27 M MAX	MAP REFERENCE	U17 875 809	LAKE TYPE	Geothermal
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	1090	% NATIVE VEGETATION COVER IN CATCHMENT		7.18%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Huser B. 1988: The impact of sulphur mining on Lake Rotokawa. Waikato Valley Authority <i>Technical Report 1988/4</i>. Parkyn S. 2007: Literate review of the aquatic biota of Lake Rotokawa and Parariki Stream. <i>NIWA Client Report HAM2007-057. NIWA Project MRP07210</i>. Prepared for Rotokawa Joint Venture. 10 pp. Wildland Consultants 2004: Geothermal vegetation of the Waikato Region - Revised 2004. <i>Wildland Consultants Ltd Contract Report No. 896</i>. Prepared for Environment Waikato. 238 pp. Forsyth D.J. 1977: Limnology of Lake Rotokawa and its outlet stream. <i>NZ Journal of Marine and Freshwater Research 11(3)</i>: 525-539. Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report. Innes J., Whaley K. and Owen K. 1999: Abundance and distribution of waterbirds of the Rotorua lakes, 1985-1986. <i>Conservation Advisory Science Notes No. 236</i>. Department of Conservation, Wellington. Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation. Nick Singers pers. comm. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			Northern margin supports an area of shrubland and scrub on heated or hydrologically altered ground.
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			A black-billed gull colony was observed in 1984 but no records since.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	Banded dotterel.
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	NI fernbird, pied stilt.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Prostrate kanuka, little shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			Only known NZ record for a <i>Helobdella</i> leech but this could be an introduced species?
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No unless <i>Helobdella</i> is shown to be an indigenous species.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake large but relatively low diversity of native vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5*		Natural barriers would probably have prevented fish ever having access to lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Waikato River and associated wetlands within the near vicinity.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Most of catchment is farmed, both dairy and drystock, remainder comprises plantation forestry. No stock access.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3*	9	Impacted by geothermal power station?
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	4*	3	Lake spring fed by acid sulphate chloride springs and even more acidic (pH 2.2) than Rotowhero. Howard-Williams and Vincent (1984) listed it as being turbid. Poor water quality, but close to natural state.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	No submerged macrophytes, two emergent macrophyte species (raupo and <i>Eleocharis sphacelata</i>). Indigenous geothermal vegetation adjoining northern end of lake.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Limited diversity of birds.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wildling pines (radiata, maritime, black and lodgepole) comprise a substantial component (6-25%) of the geothermal vegetation at the northern end of the lake. Broom and blackberry margins elsewhere.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	Geothermal lake and no fish likely to be present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Unlikely to deteriorate further under present management regime.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Part Maori owned, part Conservation Area administered by DOC.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Maori landowners and Department of Conservation.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Removal of wildling pines and weeds in geothermal area.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5*	6	No known issues.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Removal of wildling pines and other weeds, and enhancement of riparian margin.
TOTAL SCORE		84	4 ESTIMATES

LAKE ROTOKAWAU

LAKE AREA (HA)	22	LAKE DEPTH (M)	1.2	MAP REFERENCE	S13 040-112	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	1804	% NATIVE VEGETATION COVER IN CATCHMENT		33.73	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • McLea M. 1986: Ohinewai Regional Resources Study Biology and Water Quality. <i>Waikato Valley Authority Technical Publication No. 37</i>, Hamilton. • Thompson K. 1983: Ohinewai an ecological survey. University of Waikato Report. Prepared for the Mines Division of the Ministry of Energy, Hamilton. • Waikato Valley Authority 1985: Waikato Small Lakes: resource statement. <i>Waikato Valley Authority Technical Publication 1985/7</i>. Hamilton. • Waikato Valley Authority 1986: Waikato Valley Authority, 1986. Ohinewai regional resource study: biology and water quality. <i>Waikato Valley Authority Technical Publication No. 37</i>. Hamilton. • FBIS data. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	2	10	<i>Amphibromus fluitans</i> and Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, black mudfish.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	Largest wetland surrounding a lake in the Lower Waikato. Largest known population of black mudfish in the Lower Waikato.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	4	8	While the lake is only moderately large and shallow it has one of the most extensive and diverse areas of wetland vegetation surrounding a lake in the Lower Waikato Basin.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Historical connection to Lake Waikare still in existence.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Lake situated within c.230 ha of wetland and within a short distance to Lake Waikare and Lake Ohinewai.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	No fence at North Western end but rest of lake fenced. All drains currently go through the lake into Lake Waikare however there is a project to divert 80% of the catchment runoff (during low to medium flows) into a drain that will be diverted around the side of the lake which will substantially improve the buffering of the lake from catchment run-off.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Lake level linked to Lake Waikare which has tightly controlled water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hyper-eutrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity and abundance of native plant communities and best of any of the small lakes in the Lower Waikato basin.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Likely to still contain a good diversity of native fish and birds. Large population of black mudfish.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	While the wetland and emergent zones of the lake are dominated by native species there is still a moderate abundance of exotic plants including gorse, willow and swamp primrose.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, catfish.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Peat is subsiding in this area and plant diversity declining as a result of a reduction in the fluctuation of water levels associated with the Lake Waikare flood control scheme. Additional threats include the prospect of mining in this area and the invasive alligator weed has been found in the Te Onetea Stream.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with a fenced buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	DoC, AWF&GNZ, Waikato District Council.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed control.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Major changes need to occur to improve the health of the lake. A diversion of nutrient-laden catchment water is planned within the next 10 years however it is unlikely that any changes to the hydrology will be addressed even in the long-term due to the importance of the flood control scheme at Lake Waikare.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control issues, but very substantial wetland that could be restored in 5-10 years.
TOTAL SCORE		86	

LAKE ROTOKOTUKU

LAKE AREA (HA)	1.14	LAKE DEPTH (M)		MAP REFERENCE	S16 036-128	LAKE TYPE	Waikato lowland
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	77	% NATIVE VEGETATION COVER IN CATCHMENT		11.35%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">• Insufficient information to score lake values• Anecdotal reports that lake is very deep• Appears to have an excellent native wetland margin (100-200 m+ wide)							

LAKE ROTOMANUKA

LAKE AREA (HA)	12.3 (N), 5.4 (S)	LAKE DEPTH (M)	8.7 (N), 4.8 (S)	MAP REFERENCE	S15 140-614	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	479	% NATIVE VEGETATION COVER IN CATCHMENT		5.23	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Barnes G. 2002: Water Quality Trends in Lake Rotomanuka North: Implications for Restoration and Management. <i>Environment Waikato Technical Report 2002/03</i>. Boubee J. 1978: Lake Rotomanuka Inventory and Management Plan. Prepared for the Waipa County Council. Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Greenwood J. 1996: Environment Waikato Lake Rotomanuka Restoration Plan. Prepared for Environment Waikato. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Speirs D. and Barnes G. 2002: Fish Populations of Lake Rotomanuka 2000 & 2001. <i>Environment Waikato Technical Report 2001/07</i>. Thompson K. and Champion P. 1993: Esplanade Reserve Recommendations for Lakes Serpentine, Mangahia, Rotomanuka, Ruatuna and Cameron (Waipa District). <i>Conservation Advisory Science Notes No. 47</i>, Department of Conservation, Wellington. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	2	10	Australasian bittern, <i>Utricularia australis</i> .
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag. Historical record of little shag (1978).
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	Deepest remaining peat lake in the Waikato. Manuka swamp community.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Two small lakes (12 ha and 5 ha, max depth 8.7 m) with a variety of native plant communities although macrophytes have collapsed.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system but now linked to Mystery Creek and the Waikato River - however waterfalls on Mystery Creek would limit access for some fish species.
6. CONNECTIVITY Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Serpentine lakes.
7. CATCHMENT/SURROUNDING LANDSCAPE >60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Rotomanuka North is well buffered by a wetland between the two lakes. Both lakes are fenced.
8. HYDROLOGY Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Hydrology modified by inlets and outlets to lake however is in better condition than all the other Waipa lakes due to a drain diversion that keeps water levels high.
9. WATER QUALITY Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Large beds of raupo and spike sedge in the emergent plant zone, reasonably good diversity of native species.
11. NATIVE CONDITION - FAUNA High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity of native fish (shortfin eel, longfin eel, smelt, common bully) and bird species.
12. EXOTIC CONDITION - PLANTS Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Grey willow dominates the wetland plant zones, water primrose common in the emergent plant zone and macrophytes have collapsed.
13. EXOTIC CONDITION - FISH Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Rudd common but density of catfish quite low.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Vulnerable to introduction of koi. Egeria present in the outlet.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with fencing.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	DoC, Waipa District Council, EW have been working on aspects of biodiversity management.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Removal of rudd and control of willows could substantially improve ecological viability of lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Restoration requires a reasonable amount of financial commitment and resources that is more likely to be achieved over a longer time period.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control, planting and land acquisition required but substantial gains could be made in 5-10 years.
TOTAL SCORE		94	

LAKE ROTONGAIO

LAKE AREA (HA)	34	LAKE DEPTH (M)	22 MAX	MAP REFERENCE	U18:755:617	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	506	% NATIVE VEGETATION COVER IN CATCHMENT		44.07%	

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Taupo District Council SNA record sheet.
- Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation.
- Department of Conservation, Unpublished data.
- Forsyth *et al.* 1983.
- John Gibbs pers. comm., Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			No but contains a Geopreservation Site.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird probable.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Freshwater mussels and koura likely to be present (Gibbs pers. comm.).
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Relatively large lake with a moderate diversity of native vegetation types.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	No structures or modifications to the outlet draining to Lake Taupo.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	Immediately adjacent to Lake Taupo.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	4	12	44% of catchment covered in indigenous vegetation.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	No artificial drainage but groundwater sources could possibly be affected by plantation forestry effects.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2*	6	Classified as eutrophic by Howard-Williams and Vincent (1984). Supports dense algal blooms.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Relatively large area of terrestrial vegetation adjoins lake to south, and moderate diversity and abundance of indigenous wetland plant communities.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	Little information available. Fernbirds likely and dabchicks abundant. Smelt, common bully and probably koaro present (Gibbs pers. comm.).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3*	3	Large crack willow present on western margin and wildling pines present.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Little information but, trout, and catfish likely to be present (Gibbs pers. comm.).
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2*	10	May be vulnerable to further encroachment of willow.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Maori Land managed by Lake Taupo Forest Trust and hapu.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Unknown. Lake Taupo Forest Trust and hapu.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4*	8	Unclear.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Uncertain.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Removal of willows.
TOTAL SCORE		105	DATA DEFICIENT (8 ESTIMATES)

LAKE ROTONGARO

LAKE AREA (HA)	336	LAKE DEPTH (M)	3.3	MAP REFERENCE	S13 975-110	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	1950	% NATIVE VEGETATION COVER IN CATCHMENT		2.33	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Garrick A. and Saunders A. (Compilers) 1986: A preliminary of assessment of the flora and fauna in the vicinity of the Huntly West No. 1 Coal Mine. A Wildlife Service Environmental Investigations Unit Report with the Fisheries Research Division and Aquatic Plants Centre of MAF and the University of Waikato. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Waikato Valley Authority 1985: Waikato Small Lakes: resource statement. <i>Waikato Valley Authority Technical Publication 1985/7</i>. Hamilton. • FBIS data. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Black shag, little black shag, <i>Fimbristylis velata</i> , little shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	3	6	Freshwater mussel, black mudfish, longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	The best stand of manuka scrub next to a lake in the Lower Waikato Catchment.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Large (334 ha) sinuous lake but maximum depth only 3.3 m. Several wetlands on lake margin with emergent and turf communities common. Macrophytes have collapsed.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Canal with water control structure reduces fish passage.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Waikato River and lakes Waahi and Rotongaroiti.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Lake partially fenced. Few controls on streams entering the lake.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Lake levels lowered with canal development. Possibly can restore minimum water levels with water level control structure.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0*	0	Lake SPI score 0. Likely to be hyper-trophic due to the large catchment containing c.1,200 ha of dairy pasture.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Good diversity of native plants in the wetland, emergent and lake turf plant communities.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Did have a good diversity and abundance of native fauna in the 1980's when wildlife surveys were carried out, however degradation of habitat since then is likely to have reduced the diversity and abundance to moderate.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Moderate abundance of exotic plants including willow, water purslane, parrots feather, Mercer grass and blackberry.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, goldfish, and mosquito fish common in the lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Large degraded lake, possibly at risk of being drained further.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve but unfenced.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Doc and EW.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Level of funding is unlikely to make more than a minor difference at this large lake. Fencing and weed control would be recommended.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Large shallow lake with significant inputs of nutrients and sediment from a very large catchment. Hydrological issues could be difficult to address and lake dominated by coarse fish.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Large Crown owned margins but currently being farmed. Would require retiring, fencing, planting and substantial weed control. Water level management also likely to be required. More likely to be achieved over >10 years.
TOTAL SCORE		73	1 ESTIMATE

LAKE ROTONGAROITI

LAKE AREA (HA)	53	LAKE DEPTH (M)	0.5	MAP REFERENCE	S13 968-116	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	2105	% NATIVE VEGETATION COVER IN CATCHMENT		2.27	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Garrick A. and Saunders A. (Compilers) 1986: A preliminary of assessment of the flora and fauna in the vicinity of the Huntly West No. 1 Coal Mine. A Wildlife Service Environmental Investigations Unit Report with the Fisheries Research Division and Aquatic Plants Centre of MAF and the University of Waikato. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Waikato Valley Authority 1985: Waikato Small Lakes: resource statement. <i>Waikato Valley Authority Technical Publication 1985/7</i>. Hamilton. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag, <i>Fimbristylis velata</i> .
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Freshwater mussel, longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	National stronghold for the sedge <i>Fimbristylis velata</i> .
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Moderately large lake (53 ha) but very shallow (<0.5 m). Turf communities and small areas of wetland that have been heavily grazed. Emergent vegetation minimal.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Canal with water control structure which allows for fish passage.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Waikato River and lakes Waahi and Rotongaro.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Lake unfenced and very little buffering of lake margin. Receives nutrient and sediment load from Lake Rotongaro via a short canal between them.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Lake levels lowered with canal development and recently dropped a further 1 m. Probably too modified to be restored.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0*	0	Lake SPI score 0. Likely to be hypertrophic given the size of the catchment and intensity of dairy farming.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Low diversity of native plants in all of the plant zones.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3*	3	While there is no good recent information it is likely to still retain a moderate diversity of native birds and fish given its proximity to Lake Rotongaro.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Willow, pasture species and gorse dominate the wetland plant zone of the lake.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, goldfish, and mosquito fish common in the lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Highly degraded lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve but unfenced.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	DoC manages the lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed control and fencing to improve wetland, emergent and lake turf communities.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Very shallow degraded lake where water levels have dropped over 1 m in last 15 years. Significant barriers to restoration.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Requires fencing, weed control and water level management. Likely to require >10 years to address issues.
TOTAL SCORE		35	2 ESTIMATES

LAKE ROTONGATA

LAKE AREA (HA)	5.3	LAKE DEPTH (M)		MAP REFERENCE	T16 375-381	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	144	% NATIVE VEGETATION COVER IN CATCHMENT		0	

INFORMATION USED TO SCORE LAKE

- Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. *Environment Waikato Technical Report 2006/54*.
- Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton.
- FBIS data.
- Expert panel.
- Hamish Dean (QE Trust).
- Lake catchment map, Environment Waikato 2008.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag and little shag likely.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may have been introduced via elver transfer programme.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	0	0	Small (5.26 ha), shallow (maximum depth not known) lake with very narrow band of willow.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system in natural state, now connected to surrounding catchment via inlets and outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within a few km of Lake Arapuni on the Waikato River.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	While lake partially fenced, inlet drains not buffered.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Lake has been lowered by up to 4 m, and is now considerably smaller than it originally was. Lake levels could be at least partially restored with a weir.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	High SS & TP (Thompson and Greenwood 1997) likely to be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Some native sedges, flax and manuka but at low abundances.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Low abundance of native fauna, mainly waterfowl. Shortfin eels recorded.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Willow dominates the narrow margin surrounding the lake with no emergent or submerged plant zones. Gorse also common at southern end.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Insufficient information, assigned default value of '2'.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Highly degraded.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Covenanted.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	No co-ordination.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed control, silt traps and hydrological investigation all needed to make some changes to the lake. Most of these activities could be done within the funding limit.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Significant restoration issues that are unlikely to be addressed by current private landowners (lake occurs on three individually owned properties.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Narrow margins and drainage issues. Weed control and planting could achieve minor gains in short term but land acquisition/protection required for large gains and likely to take >10 years.
TOTAL SCORE		41	2 ESTIMATES

LAKE ROTOPATAKA

LAKE AREA (HA)	2.8	LAKE DEPTH (M)		MAP REFERENCE	S15 146-571	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	76	% NATIVE VEGETATION COVER IN CATCHMENT		1.01	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small (2.8 ha), shallow (maximum depth not known) lake with stands of emergent vegetation. Open water is c.1.5 ha.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system in natural state, now connected to surrounding catchment via inlets and outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within a few km of Serpentine Lakes and Lake Ngaroto.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	No indication that inlets have been buffered. Fencing of lake inadequate.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Highly drained catchment but water levels could be partially restored with a weir.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0*	0	Likely to be very poor as nutrient concentrations high (Thompson and Greenwood, 1997) and entire catchment in dairy farming.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Large stands of native emergent vegetation, but few macrophytes and wetland dominated by grey willow.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Likely to be used by low diversity and abundance of native waterfowl, spotless crane, Australasian bittern and shortfin eel.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Grey willow dominates wetland but emergent zone mainly native.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Likely to contain catfish, goldfish and mosquito fish at moderate densities.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Could be further degraded if koi introduced into the lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve but unfenced.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	DoC, EW working on fencing.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed control and fencing could be achieved with this level of funding, but more resources are likely to be needed to address hydrological and water quality issues.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Additional land needed for buffering lake and investigations into hydrology.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Very narrow margins, drainage issues. Weed control and replanting required as a minimum. Land acquisition required over the long term.
TOTAL SCORE		54	2 ESTIMATES

LAKE ROTOPIKO (SERPENTINE LAKES)

LAKE AREA (HA)	15.2	LAKE DEPTH (M)	4.4	MAP REFERENCE	S15 141-587	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	163	% NATIVE VEGETATION COVER IN CATCHMENT		8.12	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Barnes G. 2001: Aquatic and Marginal Vegetation of Lake Serpentine North. <i>Environment Waikato Technical Report 2001/03</i>. Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Edwards T., Clayton J. and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using Lake SPI. <i>Environment Waikato Technical Report 2008/36</i>. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Thompson K. and Champion P. 1993: Esplanade reserve recommendations for Lakes Serpentine, Mangahia, Rotomanuka and Cameron (Waipa District). <i>Conservation Advisory Science Notes No. 47</i>, Department of Conservation, Wellington. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. FBIS data. Lake catchment map, Environment Waikato 2008. BIMS database 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Black shag, little black shag, little shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	Unfished population of shortfin eels. Solely native macrophyte populations in East and North lakes.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Three small lakes with open water, native macrophyte communities and extensive beds of emergent vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system in natural state, now connected to surrounding catchment via inlets and outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Within a few kms of other peat lakes.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Lakes partially buffered by marginal vegetation however there are still point source discharges into the lake from intensively farmed land.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	There has been considerable drainage in the catchment but water levels could be restored with a weir at the outlet.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2*	6	TLI scores vary between the lakes but on average would be considered to have moderate water quality.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Submerged macrophytes are entirely composed of native species as is most of the emergent vegetation.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	There is a good diversity of native fish present and contains a variety of native bird species, many of which are threatened.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Grey willow is the main exotic species at the wetland which was sprayed by DoC in 2007.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3	3	Ongoing programme to keep densities of rudd low.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	High quality lakes with exceptional submerged vegetation that is vulnerable to introduction of koi and increased intensity of farming in the catchment that could increase nutrient and sediment loads to the lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	DoC has been negotiating with adjacent landowners to fence off a more appropriate buffer margin.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	DoC, EW and Waipa District Council working together to improve ecological value of lakes.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Funding to prevent degradation of the lakes (i.e. controlling nutrient and sediment inflows) and enhancing and expanding wetland habitat would lead to moderate gains in ecological value.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Catchment activities need to be addressed which are likely to occur over the longer term.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Recently acquired additional margin to be planted and weed control required through existing wetland. Water level changes may be required along with further land acquisition. Likely to be >10 years.
TOTAL SCORE		107	1 ESTIMATES

LAKEROTOPOUNAMU

LAKE AREA (HA)	5.54	LAKE DEPTH (M)	7.9	MAP REFERENCE	T19 471-383	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	525	% NATIVE VEGETATION COVER IN CATCHMENT		84%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Jenkins B. and Vant B. 2007: Potential for reducing the nutrient loads from the catchments of shallow lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Prepared for Environment Waikato. 29 pp. Lake catchment map, Environment Waikato 2009. FBIS. Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report. Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>Environment Waikato Technical Report 2008/36</i>. Michaelis F. 1983: Aquatic macrophytes of Lake Rotopounamu, a montane volcanic lake in New Zealand. <i>New Zealand Journal of Botany Vol 21</i>: 33-38. Jessica Wallace pers. comm., John Gibbs pers. comm., Nick Singers pers. comm. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			Tongariro-Taupo FW Strategy classifies as nationally significant and #1 conservancy priority for management
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Koura.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	No invasive species present. One of very few lakes regionally that is close to pristine. Tongariro-Taupo FW Strategy recognises lake as #1 conservancy priority for management.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Proximal to Rotoaira and Otamangakau wetland complexes.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	Entire catchment covered in indigenous forest.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	4*	12	Lake SPI 71 in 2004. Was higher prior to 1990s but a natural event lead to the disappearance of the extensive charaphyte meadows that had been present until then. Catchment fully forested.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5	5	Very few exotic plant species present.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	Little documentation available. Koaro and common smelt were present (latter introduced in 1970s), but their present status is uncertain (Gibbs pers. comm.).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Only adventives recorded in wetland communities (two species identified in lake margins by Edwards <i>et al.</i> (2008) but at least one other present Singers pers. comm.). Heather an issue on dryland margins.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	No exotic species have been identified as present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Vulnerable to the invasion of exotic submerged macrophytes.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Located within Tongariro National Park.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	Department of Conservation and Tongariro Natural History Society.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed surveillance.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	
TOTAL SCORE		124	2 ESTIMATES

LAKE ROTOROA

LAKE AREA (HA)	55	LAKE DEPTH (M)	6	MAP REFERENCE	S14 105-760	LAKE TYPE	Peat
DISTRICT	Hamilton	SIZE OF CATCHMENT (HA)	258	% NATIVE VEGETATION COVER IN CATCHMENT		2.56	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Clayton J. and de Winton M. 1994: A candidate for restoration or restraint? Pages 39-52 in Collier, K.J. (Ed), 1994. <i>Restoration of Aquatic Habitats</i>. Department of Conservation. Hamilton City Council 2006: Draft Reviewed Hamilton Lake Management Plan. FBIS data. Lake Manager (Kemble Pudney, HCC). Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Freshwater mussel, longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Lake >50 ha with depths up to 6 m. A moderate diversity of submerged and emergent native plant communities although neither are particularly abundant.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have naturally been a closed system but is now connected via an outlet to an adjacent catchment.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to the Waikato River and several other small lakes in Hamilton City.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Some stormwater treatment devices at inlets. Marginal wetlands around lake are likely to partially filter contaminants from a small amount of overland flow but full treatment of stormwater unlikely in this catchment.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Catchment urbanised so hydrology will be highly modified.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Submerged vegetation zones are dominated by native species and there are large stands of native emergent vegetation around the lake.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity of native bird species (c.10 species) and three native fish species recorded in the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Moderate abundance of exotic species in both the submerged and emergent plant zones.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Catfish, rudd, perch, goldfish and tench all common in the lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3	15	Lake currently stabilised however possible risk that egeria will increase and/or rudd will limit expansion of charophytes.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Lake contained within a large reserve.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	HCC manages the lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Pest and weed control are needed to maintain current ecological value of lake in such an intensively used area.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Highly modified catchment and lake which is unlikely to change over a medium term period. Significant barriers (cost, lake of space) to significantly improve water quality from surrounding catchment.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Restoration of wetland limited by urban restrictions.
TOTAL SCORE		51	

LAKE ROTOROA (KAWHIA)

LAKE AREA (HA)	22.39	LAKE DEPTH (M)		MAP REFERENCE	R16 612-340	LAKE TYPE	Dune
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	355	% NATIVE VEGETATION COVER IN CATCHMENT		31.64%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • FBIS • Chisnall and Ruru 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Banded rail.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Only significant coastal freshwater wetlands on the West Coast of the North Island between Kaipara and South Taranaki. Regionally significant native freshwater fishery.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Dam at outlet of Lake Taharoa. Fish pass has been problematic & does not pass grey mullet. May also limit recruitment of other fish species (e.g. eels).
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3*	9	Stock likely to have access in parts.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3*	9	Assume that lake buffered from fluctuations in L. Taharoa.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Likely to be similar to other Taharoa lakes (best guess).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
AK NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	No information - assume comparable to other Taharoa lakes.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5	5	Australasian bittern, banded rail and spotless crane are found in lake margins. Scaup, fernbird, black swan, grey and mallard duck, shags and white-faced heron have been seen using the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2*	2	No information - assume comparable to the other Taharoa lakes as interconnected.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	No reports of exotic fish from Taharoa lakes.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	3*	15	Potential to deteriorate in the long term as a result of low intensity threat (land use).
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	MFish and Lakes Trust working on lake but appears to be no active co-ordination.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4*	8	Best guess based on size of catchment and existing marginal vegetation.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Would rely on changes to catchment land use (probably 10-50 years realistically).
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2*	6	Estimate based on land ownership issues.
TOTAL SCORE		106	DATA DEFICIENT (8 ESTIMATES)

LAKE ROTOTAPU

LAKE AREA (HA)	1.97	LAKE DEPTH (M)		MAP REFERENCE	R16 606-328	LAKE TYPE	Dune
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	28	% NATIVE VEGETATION COVER IN CATCHMENT		16.47%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Insufficient information to score lake values • Appears to have a reasonable wetland margin. • Habitat Diversity - Low - small but relatively large wetlands and native vegetation in catchment. • Lake bed owned by Taharoa Lake Trust. 							

LAKE ROTOWHERO

LAKE AREA (HA)	2.6	LAKE DEPTH (M)		MAP REFERENCE	U16 051147	LAKE TYPE	Geothermal
DISTRICT	Rotorua	SIZE OF CATCHMENT (HA)	1101	% NATIVE VEGETATION COVER IN CATCHMENT			7.35%

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- FBIS.
- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Forsyth D.J. and McColl R.H.S. 1974: The limnology of a thermal lake: Lake Rotowhero, New Zealand: II. General biology with emphasis on the benthic fauna of Chironomids. *Hydrobiologia* 44(1): 91-104.
- Stevens *et al.* 2003: Habitat characteristics of geothermally influenced waters in the Waikato. *University of Waikato CBER Report No. 25.*
- Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation.
- Wildland Consultants 2004: Geothermal vegetation of the Waikato Region - Revised 2004. *Wildland Consultants Ltd Contract Report No. 896.* Prepared for Environment Waikato. 238 pp.
- Rasch G. 1989: Wildlife and wildlife habitat in the Bay of Plenty Region. *Regional Report Series Number 11.* Department of Conservation, Rotorua. 136 pp plus maps.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.	2	6	Margins support shrubland and scrub on heated or hydrologically altered ground.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			<i>Cyclosorus interruptus</i> could be present.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Prostrate kanuka.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Lake small but surrounded by predominantly native vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers would have prevented fish ever having access to lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Other lakes and similar wetland complexes within vicinity.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Lake well buffered despite wider catchment supporting relatively little indigenous vegetation.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	Natural processes largely intact.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	4*	3	Lake spring fed by acid sulphate chloride springs. Howard-Williams and Vincent (1984) listed it as being in a eutrophic state, but this is likely to be natural state.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Relatively small lake margin and no submerged macrophytes (algae only recorded).
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Small, geothermal lake surrounded by geothermal vegetation and diversity likely to be naturally low.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Minimal weed issues, grey willow has mostly been removed from margins.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5	5	Geothermal lake and no fish likely to be present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Unlikely to deteriorate under present management regime.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Scenic Reserve.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Department of Conservation only.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Margins likely to be invaded from time to time by grey willow and wildling pines but few other apparent threats.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5*	15	Lake naturally eutrophic.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	Margins likely to be invaded from time to time by grey willow and wildling pines.
TOTAL SCORE		88	2 ESTIMATES

LAKE RUATUNA

LAKE AREA (HA)	13	LAKE DEPTH (M)	3.2	MAP REFERENCE	S15 115-614	LAKE TYPE	Peat
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	190	% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. Thompson K. and Champion P. 1993: Esplanade reserve recommendations for Lakes Serpentine, Mangahia, Rotomanuka and Cameron (Waipa District). <i>Conservation Advisory Science Notes No. 47</i>, Department of Conservation, Wellington. Thompson K. and Greenwood J. 1997: Status of the Waipa peat lakes in 1997 with recommendations for restoration and sustainable management. Water Research Unit, Waikato University, Hamilton. Waipa District Council 2007: (Draft) A Plan for the Management of Peat Lakes and Associated Reserves Administered by the Waipa District Council. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. BIMS database 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			Unconfirmed record of spotless crane (1996).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Little black shag, black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Moderate sized lake with several different vegetation types dominated by native species.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system in natural state, now connected to surrounding catchment via inlets and outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to several other small peat lakes.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Wetland buffer is filtering out some of the catchment inputs.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Hydrological investigation needed to identify minimum water levels. Weir is present, but water levels need to be elevated.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	Lake SPI = 0. Lake would be at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Large stands of native emergent vegetation, wetland dominated by grey willow but understorey mainly native species. There is a large stand of flax at southern end.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	While there is no specific mention of bird species within the lake (except pukeko being abundant) in the literature, general comments regarding wildlife indicate the lake would have a moderate diversity and abundance of native waterfowl. Likely to contain shortfin eels.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Grey willow dominates wetland canopy species but understorey predominantly native.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Access to the Waipa, Rudd.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Koi potential threat to this lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with fenced buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	DoC, Waipa District Council, EW working together.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Weed and pest control would improve marginal habitat and installation of weir likely to lead to moderate increases in ecological value.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Restoration requires a reasonable amount of financial commitment and resources that are more likely to be achieved over a longer time period.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Recently acquired additional margin to be planted and weed control required through existing wetland. Water level changes may be required along with further land acquisition. Likely to be >10 years.
TOTAL SCORE		81	1 ESTIMATE

SULPHUR LAGOON

LAKE AREA (HA)	<2	LAKE DEPTH (M)	?	MAP REFERENCE	2741150E 6230010N	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	197	% NATIVE VEGETATION COVER IN CATCHMENT		69.14%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Lake catchment map, Environment Waikato 2009. Jessica Wallace pers comm. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1*	2	Likely to be species poor with no aquatic macrophytes and flora comprising mosses, liverworts and algae only.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers preclude fish passage.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of a complex of high altitude lakes in the Tongariro National Park.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	Vegetation cover of catchment 69% and composition of vegetation predominantly indigenous (remainder bare substrate).
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	5*	15	Likely to be low in nutrients.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5*	5	Little information, may only be non-vascular plant species present.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Little information and may be largely represented by a few species of aquatic invertebrates present only. Microbial communities have been partly described.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3*	3	No information.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	Unlikely to be fish present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2*	10	Could be invaded by the exotic rush <i>Juncus bulbosus</i> .
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Situated within Tongariro National Park.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1	1	Department of Conservation and Tongariro Natural History Society.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	2	Surveillance for weeds.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	But ongoing surveillance required to ensure lake is not invaded by <i>Juncus bulbosus</i> .
TOTAL SCORE		115	DATA DEFICIENT (7 ESTIMATES)

LAKE TAHAROA

LAKE AREA (HA)	216.24	LAKE DEPTH (M)	9.2	MAP REFERENCE	R16 625-360	LAKE TYPE	Dune
DISTRICT	Waitomo	SIZE OF CATCHMENT (HA)	4226	% NATIVE VEGETATION COVER IN CATCHMENT		31.56%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Neilson K. and Hamer M. 2008: Sampling of lake health indicators 2007/08: Lakes Ngahewa and Tutaeinanga. <i>Environment Waikato Internal Series 2008/17</i>. Cromarty P., Scott D.A. (eds) 1995: A directory of wetlands in New Zealand. DOC Wellington, New Zealand. Neilson K., Collier K., and Hamer M. 2007: Assessment of biological Indicators of lake health in Waikato shallow lakes - a pilot study 2006/07. <i>EW Technical Report 2008/18</i>. 9p. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Banded rail.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Freshwater mussel, longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Only significant coastal freshwater wetlands on the West Coast of the North Island between Kaipara and South Taranaki. Regionally significant native freshwater fishery.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	5	10	>200 ha, adjacent native vegetation and with good submerged vegetation. Extensive wetland fringe (flax-raupo-sedge wetland), raupo beds.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Dam at outlet. Fish pass has been problematic & does not pass grey mullet. May also limit recruitment of other fish species (e.g. eels, native galaxiids).
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3*	9	Stock likely to have access in parts.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Lake level can fluctuate dramatically due to sand mining operation and abstraction to fill boats (up to 9 times annually).
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Water clarity has declined significantly since 2001 Increasing concentrations of nutrients and algae. TLI 5.1 - supertrophic (Neilson <i>et al.</i> 2007).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Extensive native plants and their seed banks. Depth extent of plants had decreased by 1.5-2.5 m since 2001.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5	5	Mullet no longer present in lake due to construction of barrier at lake outlet. Large resident populations of black swan and grey duck. Also scaup, dabchick, spotless crake, Australasian bittern, banded rail and fernbird (Cromarty and Scott).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	<i>Lagarosiphon major</i> and <i>Elodea canadensis</i> present in moderate abundance.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	No exotic fish reported from Taharoa lakes.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	Currently deteriorating as a result of catchment land use (resultant decline in depth extent and health of lake).
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Lake bed owned by Taharoa Lakes Trust.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	EW, Lake Trustees, BHP.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Could only address a small portion of the catchment.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Restoration achievable in 10-50 years given the current condition of the lake and opportunities to reverse decline.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Able to improve condition with weed control and restoration planting.
TOTAL SCORE		115	2 ESTIMATES

TAMA LAKE (LOWER)

LAKE AREA (HA)	25	LAKE DEPTH (M)	?	MAP REFERENCE	T20 351 194	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	679	% NATIVE VEGETATION COVER IN CATCHMENT		72.89%	

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Department of Conservation, unpublished data.
- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation.
- Significant Site Summary for Alpine Lakes within Tongariro National Park. Department of Conservation, unpublished data.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	One of very few lakes regionally that is close to pristine. Tongariro-Taupo FW Strategy classifies as regionally important.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Species poor, no aquatic macrophytes, flora comprises mosses, liverworts and algae only, but lake is larger than 10 ha.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers preclude fish passage.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of a complex of high altitude lakes in the Tongariro National Park.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	Vegetation cover of catchment 73% and composition of vegetation predominantly indigenous (remainder bare substrate).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	5*	15	Low nutrients, neutral pH.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5*	5	Non vascular plant species present only. Naturally low diversity of plants dominated by native species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	No information but likely to be represented by a few species of aquatic invertebrates present only.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3*	3	Little information but no identified issues.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	Unlikely to be fish present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Could be invaded by the exotic rush <i>Juncus bulbosus</i> .
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Situated within Tongariro National Park.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Half of lake within Waikato region, half within Manawatu-Wanganui Region.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Surveillance for weeds.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	Ongoing surveillance required to ensure lake is not invaded by <i>Juncus bulbosus</i> .
TOTAL SCORE		124	5XDD

TAMA LAKE (UPPER)

LAKE AREA (HA)	32	LAKE DEPTH (M)		MAP REFERENCE	T19 365 211	LAKE TYPE	Volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	271	% NATIVE VEGETATION COVER IN CATCHMENT			54.61%

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Department of Conservation, unpublished data.
- Boswell J., Russ M. and Simons M. 1985: Waikato small lakes: resource statement. Waikato NIWA Report.
- Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation.
- Significant Site Summary for Alpine Lakes within Tongariro National Park. Department of Conservation, unpublished data.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			Tongariro-Taupo FW Strategy classifies as regionally important.
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	3	6	Has only North Island record of the liverwort <i>Eoisotachis stephanii</i> and one of very few lakes regionally that is close to pristine. Tongariro-Taupo FW Strategy classifies as regionally important.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Species poor, no aquatic macrophytes, flora comprises mosses, liverworts and algae only, but greater than 10 ha in size.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers preclude fish passage.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	One of a complex of high altitude lakes in the Tongariro National Park.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	5	15	Vegetation cover of catchment 55% and composition of vegetation predominantly indigenous (remainder bare substrate).
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	5	15	
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	5*	15	Low nutrients, neutral pH.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	5*	5	Non vascular plant species present only. Naturally low diversity of plants dominated by native species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	No information but likely to be represented by a few species of aquatic invertebrates present only.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3*	3	Little information but no identified issues.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	Unlikely to be fish present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Could be invaded by the exotic rush <i>Juncus bulbosus</i> .
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Situated within Tongariro National Park.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Surveillance for weeds.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5	15	Ongoing surveillance required to ensure lake is not invaded by <i>Juncus bulbosus</i> .
TOTAL SCORE		124	5 ESTIMATES

LAKE TAUPO

LAKE AREA (HA)	61,500	LAKE DEPTH (M)	184	MAP REFERENCE		LAKE TYPE	volcanic
DISTRICT	Taupo	SIZE OF CATCHMENT (HA)	343,355	% NATIVE VEGETATION COVER IN CATCHMENT		42%	

INFORMATION USED TO SCORE LAKE

- FBIS.
- Department of Conservation, unpublished data.
- Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. *Environment Waikato Technical Report 2008/36*.
- Dugdale T and Wells R. 2001: The distribution and potential impacts of *Egeria densa* and other oxygen weeds in Lake Taupo, Kuratau, Otamangakau and Rotoaira. *NIWA Client Report DOC01235*. Prepared for Department of Conservation. 24 pp.
- Wells R. and Champion P. 2001: Issues and options for the Management of *Egeria densa* in Lake Taupo. *NIWA Client Report EVW01230*. Prepared for Environment Waikato. 18 pp.
- Cromarty P. and Scott D.A. (Eds) 1995: A Directory of Wetlands in New Zealand. Department of Conservation, Wellington, New Zealand. 395 pp.
- Rae, R., Hawes, I., Chague-Goff, C. and Gibbs, M. 2000: Nuisance plant growths in the shallow littoral zone of Lake Taupo. *NIWA Client Report CHC00/75. NIWA Project EVW00503*. Prepared for Environment Waikato.
- DOC Conservation Strategy 1990.
- Gibbs M. 2008: Lake Taupo long-term monitoring programme 2006-2007. *NIWA Client Report No. EVW07210*. Prepared for Waikato Regional Council (Environment Waikato).
- Schwarz A., Sorrell B. and James M. 1997: Lake Taupo near shore water quality monitoring programme: Information review and suggested monitoring programme. *NIWA Consultancy Report No. EVW70501*. Prepared for Waikato Regional Council.
- Forsyth *et al.* 1983.
- John Gibbs pers. comm., Nick Singers pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			South Taupo Wetland listed as a site of international importance (RAMSAR site).
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	3	15	Australian bittern, black-billed gull, <i>Utricularia australis</i> .
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	3	12	Caspian tern, NZ dabchick, red-billed gull. Banded dotterel may be present.
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	NI fernbird, NZ pied oystercatcher. Pied stilt may be present.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	2	2	Spotless crake, marsh crake. <i>Utricularia delicatula</i> may be present (Motuopa 1980s).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	3	3	Banded rail, black shag, little shag, little black shag. <i>Stuckenia pectinata</i> may be present.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Koura, freshwater mussels.
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			.
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	5	10	South Taupo Wetland listed as a site of international importance (RAMSAR site).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers prior to hydro dams and outlet structure
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	>30% but not fully buffered from land use.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Some inflows, and outflow managed in association with hydro-electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	4	12	Oligotrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Submerged macrophytes in 2-10 m zone dominated by oxygen weeds, and willows abundant in associated wetlands, e.g. in South Taupo wetlands.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Internationally significant rainbow trout fishery, brown trout, brown bullhead catfish, goldfish, sail-fin molly.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	4	20	Eutrophication from agricultural runoff, pollution from urban development, impacts from forestry operations, increasing recreational usage, expansion of oxygen weeds (hornwort and egeria).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Lakebed owned by Ngati Tuwharetoa and managed by Tuwharetoa Maori Trust Board.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Multiple agencies: Tuwharetoa Maori Trust Board, Environment Waikato, Taupo District Council, Department of Conservation, Ministry for the Environment, Fish and Game NZ, MRP, genesis, Lakes and Waterways Action Group, and numerous other groups.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	\$100k of closely targeted funding could enhance ecological values locally, but would be insignificant in terms of addressing wider issues.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Through implementation of Taupo-nui-a-Tia Action Plan.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Through statutory planning processes and on the ground projects, e.g. control of invasive plant species such as willow.
TOTAL SCORE		136	

LAKE TE KAPA

LAKE AREA (HA)	c.2-3	LAKE DEPTH (M)		MAP REFERENCE	S13 960-138	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	Small	% NATIVE VEGETATION COVER IN CATCHMENT		29.9	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Lake catchment map, Environment Waikato 2008. 							

Insufficient data to score lake.

LAKE TE KOUTU

LAKE AREA (HA)	6	LAKE DEPTH (M)	1.5	MAP REFERENCE	S15 275-653	LAKE TYPE	Urban (old river meander)
DISTRICT	Waipa	SIZE OF CATCHMENT (HA)	416	% NATIVE VEGETATION COVER IN CATCHMENT		4.07	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Chizmar J. 2005: Options for the management of Lake Te Ko Utu and surrounding park. Tonkin and Taylor. Report prepared for Waipa District Council. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. FBIS data. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small (c.6 ha), shallow (1.5 m) lake with some emergent vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	0	0	Piped outlet to Karapiro Stream.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	2	2	Close to the Waikato River but isolated from other lakes and wetlands.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Urban catchment - stormwater treatment options were compiled in 2005. Base flow too low.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Extensive piping in catchment.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hyper-eutrophic.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Low diversity of native emergent plants in lake.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Insufficient information. Likely to attract some native waterfowl and may contain some short-finned eel.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Park surrounds are dominated by exotics.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2*	2	Insufficient information. Default value of '2' assigned.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Small degraded lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Reserve with protected buffer.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Managed by Waipa District Council.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Substantial costs involved in improving water quality but ecological value could be improved with appropriate planting, particularly of emergent vegetation.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Significant barriers to restoration due to the extent of urbanisation in the catchment and the highly modified hydrology. While difficult to restore has a high popularity with local residents.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Restoration limited by urban catchment and recreational use.
TOTAL SCORE		16	2 ESTIMATES

TE OTAMANUI LAGOON

LAKE AREA (HA)		LAKE DEPTH (M)		MAP REFERENCE	S14 981-848	LAKE TYPE	Riverine?
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)		% NATIVE VEGETATION COVER IN CATCHMENT			7.36
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Grant Barnes (ex lake manager for DoC & EW). Barnes G. 2001: Ecological issues and restoration options for Te Otamanui Lagoon. Internal Memo, <i>Environment Waikato Doc # 719847</i>. Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.			
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel l may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small shallow lagoon with an emergent and wetland zone dominated by exotics.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Stream culverted but easily passable by fish.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	2	2	Close to Waikato River and wetlands but no other open water.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2*	6	Insufficient data, but discussions with Grant Barnes suggest that lagoon is only partially buffered.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Much of the catchments water had been diverted leading to the lagoon drying out. Restrictions at the culvert. Flooding frequency is close to 1 in 10 years where would normally be closer to 1 in 2 years.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0*	0	A survey in 1988 recorded the lake as being hypereutrophic - unlikely to have changed since then.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Willow domination and grazing have left only a few natives in the wetland zone.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2*	2	Limited information - Barnes (2001) notes there are native fish and that they have been declining in abundance.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Willow and parrots feather dominate the wetland and emergent plant zones.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Koi and catfish common in the lagoon.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Heavily modified and degraded lagoon.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	Unallocated Crown land.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	No co-ordination of management.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Weed and pest control could improve ecological value of wetland and emergent zone but returning the water to the lagoon most important priority but could be costly and difficult to achieve.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Restoration would involve restoring water levels in the lagoon, probably by diverting water back into it. This is more likely to happen over a medium-long timeframe.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Issues around land ownership, hydrology, weeds, and fencing. Likely to take >10 years before substantial gains can be made.
TOTAL SCORE		39	3 ESTIMATES

LAKE TE ROTOPUPU

LAKE AREA (HA)	0.95	LAKE DEPTH (M)		MAP REFERENCE	R15:746:426	LAKE TYPE	?
DISTRICT	Otorohanga	SIZE OF CATCHMENT (HA)	240.25	% NATIVE VEGETATION COVER IN CATCHMENT		4.94%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">• Insufficient information to score lake values• Private land							

LAKE TUNAWHAKAHEKE

LAKE AREA (HA)	6.7	LAKE DEPTH (M)	1	MAP REFERENCE	S14 015-865	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	100	% NATIVE VEGETATION COVER IN CATCHMENT			0
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. <i>Environment Waikato Internal Series IS03/04</i>. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.		0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.		0	
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	Unlikely.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	0	0	Small, very shallow lake with very narrow margin of vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Lake would have been a closed system, now connected by drains to other waterways.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to four other small lakes which are all part of the Horsham Downs Lakes complex.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Several small inlets with no riparian buffering, lake itself only partially fenced but has very limited buffer around the edges.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Catchment been drained, and drains continue to be deepened. Water level control structure needed to restore minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Small patch of raupo in one corner and pockets of flax, manuka and cabbage tree where willow is open.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Moderate diversity of native bird species but only shortfin eel recorded in the lake.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Willow and pasture grasses dominate the lake margins.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3	3	Lake dried out during the 2007/08 summer, dramatically reducing abundance of exotic fish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Koi have access to this shallow lake which dried up altogether during the 2007/08 summer. Intensively farmed catchment and no effective buffer to lake.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve on one side of the lake that is unfenced.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	DoC and EW working together on water level and fencing issues.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	While a number of actions could improve the ecological value of the lake none of these is likely to significantly increase the ecological viability of such a small degraded lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Catchment-wide practices would need to be improved and lake dredging may be necessary, but as both catchment and lake are small could be feasible within a 50 year time-frame.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Very narrow margins, drainage issues. Weed control and replanting required as a minimum. Land acquisition required over the long term.
TOTAL SCORE		38	

LAKE TUTAEINANGA

LAKE AREA (HA)	c.3.1	LAKE DEPTH (M)	11 (MAX)	MAP REFERENCE		LAKE TYPE	Volcanic
DISTRICT	Rotorua	SIZE OF CATCHMENT (HA)	501	% NATIVE VEGETATION COVER IN CATCHMENT		0.80%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Neilson K. and Hamer M. 2008: Sampling of lake health indicators 2007/08: Lakes Ngahewa and Tutaeinanga. <i>Environment Waikato Internal Series 2008/17</i>. Edwards T., Clayton J., and de Winton M. 2008: The condition of 43 lakes in the Waikato Region using LakeSPI. <i>Environment Waikato Technical Report 2008/36</i>. Innes J., Whaley K. and Owen K. 1999: Abundance and distribution of waterbirds of the Rotorua lakes, 1985-1986. <i>Conservation Advisory Science Notes No. 236</i>. Department of Conservation, Wellington. Paul Cashmore pers. comm., Keith Owen pers.comm. Lake catchment map, Environment Waikato 2009. Rasch G. 1989: Wildlife and wildlife habitat in the Bay of Plenty Region. <i>Regional Report Series Number 11</i>. Department of Conservation, Rotorua. 136 pp plus maps. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Little shag, black shag highly probable.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	0	0	Little or no submerged vegetation and minimal riparian margin dominated with exotics.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4*	4	Natural barriers are likely to have prevented fish ever having access to lake but there may be some artificial barriers also.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Other lakes and wetland complexes within 5 km.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	Stock excluded. But no effective buffer.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	Virtually entire catchment has been cleared, but natural hydrological processes largely in place and no water control structures present.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	TLI = 6.1. Lake SPI = 0.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	0	0	Little or no submerged vegetation and very little minimal marginal native vegetation.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Smelt previously present and limited diversity of native birds. Used by paradise shelduck for moulting.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Little or no submerged vegetation and riparian margin dominated with exotics.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	3*	3	Data deficient. Rainbow trout may be present.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Already a low quality lake, although submerged macrophytes were present up until at least 2004.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Lake bed vested with Te Arawa Lakes Trust, marginal strip administered by Fish and Game NZ. Government Purpose (Wildlife Management) Reserve.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	Te Arawa Lakes Trust, Department of Conservation and Fish and Game NZ.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	If riparian margin was significantly increased and restored, and hydrological inputs treated for nutrient removal, values could be significantly enhanced.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Extension and enhancement of riparian margins and decrease in external nutrient load could be achieved within 10-50 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Extension and enhancement of riparian margins.
TOTAL SCORE		48	2 ESTIMATES

UNNAMED 3

LAKE AREA (HA)	c.2.13	LAKE DEPTH (M)		MAP REFERENCE	R13 654-078	LAKE TYPE	Dune
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	39.69	% NATIVE VEGETATION COVER IN CATCHMENT		0%	
INFORMATION USED TO SCORE LAKE							
Insufficient information to score lake values Private land Lake appears to have no natural inlet or outlet - fish passage (5x1)							

UNNAMED 9 (LAKE OPUATIA)

LAKE AREA (HA)	c.6-7	LAKE DEPTH (M)		MAP REFERENCE	S13:928-165	LAKE TYPE	Riverine?
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	Medium	% NATIVE VEGETATION COVER IN CATCHMENT			7.36
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">NZMS 260 S12.Aerial photo (MapToaster, Topo NZ, Copyright MetaMedia Ltd).							

Insufficient information to score the lake. Probably has high ecological values and good water quality given it's location within the ecologically significant Opuatia Wetland.

LAKE WAAHI

LAKE AREA (HA)	522	LAKE DEPTH (M)	5	MAP REFERENCE	S13 980-030	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	9221	% NATIVE VEGETATION COVER IN CATCHMENT			5.6
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Garrick A. and Saunders A. (Compilers) 1986: A preliminary of assessment of the flora and fauna in the vicinity of the Huntly West No. 1 Coal Mine. A Wildlife Service Environmental Investigations Unit Report with the Fisheries Research Division and Aquatic Plants Centre of MAF and the University of Waikato. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • Kingett P. 1984: An environmental history of Lake Waahi. Kingett and Associates, unpublished report for Mines Division, Ministry of Energy. • Kingett & Associates Ltd 1988: Aquatic resources in the Rotowara Area and Lake Waahi: existing and predicted conditions. Prepared for State Coal Mines, Ministry of Energy, Huntly. • FBIS data. • Expert panel. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	1	6	White heron.
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	3	12	Caspian tern, NZ dabchick, banded dotterel.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, giant kōkopu
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	When surveyed in 1993 it had the most diverse lake turf communities in the lower Waikato and is likely to have retained this feature.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Unlikely.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	4	8	Lake and associated wetlands are large in size (c.522 ha), with a range of wetland, emergent and lake turf plant communities. Lake is up to 5 m deep with a sinuous shoreline.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Floodgate on Waahi stream is passable to fish.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Very close to Waikato River, Weavers Lake and within 5 km of Lake Rotongaro and Hakanoa.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Parts of the lake edge are fenced. All tributaries flow through wetlands into the lake but are not buffered from land use activities within the catchment.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Lake levels controlled.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database), has received drainage from coal mines within the catchment.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4	4	Good diversity of native plants in the wetland, emergent and lake turf communities.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	High diversity of bird and fish species recorded in the lake during the 1980s, while unlikely to retain the same values due to macrophyte collapse, the size of the lake and extent of wetland vegetation should still support good diversity and abundance of native fauna. Potentially supports lake recruiting populations of diadromous native fish species including giant kokopu.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wetland zone is dominated by exotics particularly grey willow and pasture grasses.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, goldfish, catfish, rudd and mosquito fish abundant in the lake.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Degraded lake which has been significantly impacted by catchment activities including mining, agriculture and urban activities.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Only parts of the lake are reserved. Fencing planned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	EW, SENZ, and a local Maori Trust have a project to fence the lake.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Fencing, weed and pest control would all help improve lake habitat but a lot of resources needed for such a large lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Restoration of the hydrology very unlikely and would be difficult to reduce catchment inputs significantly in such a large catchment posing significant barriers to restoration of the lake.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Relatively large margins recently fenced including large areas of wetland. Large biodiversity gains could be made with planting and weed control.
TOTAL SCORE		85	1 ESTIMATE

LAKE WAIKARE

LAKE AREA (HA)	3442	LAKE DEPTH (M)	1.8	MAP REFERENCE	S13 050-160	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	21055	% NATIVE VEGETATION COVER IN CATCHMENT			7.58
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. • Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. • McLea M. 1986: Ohinewai Regional Resources Study Biology and Water Quality. <i>Waikato Valley Authority Technical Publication No. 37</i>, Hamilton. • Reeves P., Craggs R., Stephens S., de Winton M., and Davies-Colley R. 2002: Environmental Changes at Lake Waikare North Waikato: wave climate, water quality and biology. NIWA Client Report EVW02235, Prepared for Environment Waikato, Hamilton. • Thompson K. 1983: Ohinewai an ecological survey. University of Waikato Report. Prepared for the Mines Division of the Ministry of Energy, Hamilton. • Waikato Valley Authority, 1986. Ohinewai regional resource study: biology and water quality. Waikato Valley Authority technical publication, No. 37, Hamilton. • FBIS data. • Lake catchment map, Environment Waikato 2008. • BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	2	6	Connected to the internationally significant Whangamarino Wetland.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	1	6	White heron.
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel. Black mudfish likely to occur in marginal wetlands.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	A key staging site for shoveler in the Lower Waikato River catchment.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	Not known.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Very large shallow lake with remnant wetlands dominated by willow. Some large beds of emergent native vegetation. Macrophytes collapsed in the 1970s.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	No longer connected to the Waikato River via the Te Onetea Stream or during flood conditions. Fish passage has been built to allow access between the lake and Whangamarino Wetland.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Very close to the Waikato River, Whangamarino wetland and several other small lakes in the vicinity (i.e. Rotokawau, Kopuera and Ohinewai).
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Has been co-ordinated effort to fence riparian margins in parts of the Matahuru Catchment. Some of the lake margin fenced.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Controlled for flood management purposes.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Emergent plant zone has several native species in moderate and low abundances (e.g. raupo, lake club rush, spike sedge and marsh clubrush) but wetland vegetation dominated by grey willow and heavily grazed.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	A moderate diversity of native fish (four species) and bird species were found in the lake during surveys in the 1980s and 1990s. Potentially supports lake-recruiting populations of diadromous native fish (e.g. banded kokopu).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Wetland vegetation dominated by grey willow and heavily grazed with an understorey also dominated by exotic species. Macrophyte beds collapsed in the 1970s.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, catfish, goldfish, and mosquito fish abundant.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Degraded lake which has been significantly impacted by flood management and agricultural activities.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Partial reserve, unfenced.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	Environment Waikato, AWF&GNZ, DoC, and local community working together to improve the lake and its catchment.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Fencing, weed and pest control would all help improve lake habitat but a lot of resources needed for such a large lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Restoration of the hydrology very unlikely, posing a significant barrier to restoration of the lake.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Large areas of crown owned large currently being privately grazed. Major issues around fencing setbacks and land owners. Likely to take >10 years to resolve.
TOTAL SCORE		70	

LAKE WAIPAPA

LAKE AREA (HA)	150	LAKE DEPTH (M)		MAP REFERENCE		LAKE TYPE	Hydro
DISTRICT	Taupo, South Waikato, Otorohanga	SIZE OF CATCHMENT (HA)	25409 (EXCL. MARAETAI)	% NATIVE VEGETATION COVER IN CATCHMENT			48.6%

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- FBIS.
- Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices.
- Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. *NIWA Client Report HAM2002-021*. Prepared for Mighty River Power. 30 pp.
- Sagar P. and Kelly G. 2005: Numbers and distribution of wetland birds on the Upper Waikato River and Lakes Ohakuri and Arapuni, September 2004 and January 2005. *NIWA Client Report CHC2005-054*. Prepared for Mighty River Power Ltd. 16 pp.
- Garrick A.S., Jones C., and Saunders A.J. 1986: Wildlife Values of Lake Arapuni. A Wildlife Service Environmental Projects Unit report prepared for the New Zealand Electricity Division of the Ministry of Energy. 67 pp.
- Taupo Waikato Resource Consents AEE Mar 2001.
- Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. *New Zealand Journal of Marine and Freshwater Research* 13(4): 561-572.
- Wells R. (Ed.), Reeves P., Smith J., Wilding T., Sagar P., Champion P., Boubee J., Kelly G., Taumoepeau A. (Eds) 2005: The effects of 4 years of increased water level fluctuations and a drop in average water levels on the ecology of Lake Waipapa. *NIWA Client Report HAM2005-105*. Prepared for Mighty River Power. 101 pp.
- Paula Reeves pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crake (one recent record).
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag. Little black shag possible?
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, koura. Freshwater mussels?
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
4. HABITAT DIVERSITY Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Second smallest of the eight Waikato River hydro lakes with moderate to high diversity of indigenous aquatic vegetation types. Club rush stands and other indigenous emergent species which were lost from the lake during 2001 when the range over which water levels fluctuate was dramatically increased have since re-established.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Natural barriers prior to hydro dams.
6. CONNECTIVITY Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River.
7. CATCHMENT/SURROUNDING LANDSCAPE >60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	4*	12	Close to 50% of catchment covered in indigenous vegetation.
8. HYDROLOGY Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1	3	Eutrophic in 1979, worse now?
10. NATIVE CONDITION - PLANTS High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	4	Moderate to high diversity and abundance in wetland and emergent macrophyte zones.
11. NATIVE CONDITION - FAUNA High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Moderate diversity of indigenous birds, and some species may be abundant (i.e. shags, scaup and black swan). Four native fish species present.
12. EXOTIC CONDITION - PLANTS Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Submerged macrophytes dominated by exotic plant species.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, rudd, catfish.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Wetland vegetation vulnerable to further encroachment of weeds such as willow?
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned? and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Multiple agencies and groups with interests and various agreements/partnerships in place but extent of co-ordination uncertain.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control within areas supporting wetland vegetation?
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control within areas supporting wetland vegetation?
TOTAL SCORE		63	4 ESTIMATES

LAKE WAITAMOUMOU

LAKE AREA (HA)	2.38	LAKE DEPTH (M)		MAP REFERENCE	R14 725-776	LAKE TYPE	Dune
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)		% NATIVE VEGETATION COVER IN CATCHMENT		0?	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">• FBIS data.• Expert panel (David Klee, AWFGC).• Lake catchment map, Environment Waikato 2008.							

Insufficient data to score this lake.

LAKE WAIWHAKAREKE

LAKE AREA (HA)	3	LAKE DEPTH (M)		MAP REFERENCE	S14 064-790	LAKE TYPE	Peat
DISTRICT	Hamilton	SIZE OF CATCHMENT (HA)		% NATIVE VEGETATION COVER IN CATCHMENT		0	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> McQueen 2005: Waiwhakareke (Horseshoe Lake) Natural Heritage Park, Draft Management Plan. <i>Centre for Biodiversity and Ecology Research Report No. 37</i>. University of Waikato, Hamilton. FBIS data. Lake Manager (Kemble Pudney, HCC). Lake catchment map, Environment Waikato 2008. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.	0	0	No.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little black shag.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	1	2	Longfin eel.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Small lake with small remnants of native vegetation however undergoing major restoration work so would expect habitat diversity to increase over time.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Would have been a closed system but now connected to Rotokauri catchment via a drain at the outlet of the lake.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to the Waikato River and several other small lakes in Hamilton City.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	3	9	Tributaries and lakes have recently been fenced with extensive planting occurring.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Minimum water levels need to be restored.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Supertrophic but with a management goal to return the lake to dystrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Currently low diversity of native plants but will rapidly improve as all plant zones revegetated.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Low diversity of both native bird and fish species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Willows have been removed from the lake margin and substantial replanting is occurring as funds permit.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Catfish, rudd, brown trout, and mosquito fish common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Lake in poor condition but undergoing major restoration.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	0	0	Large reserve surrounding lake which is fenced, eventually with predator proof fencing.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	4	4	HCC, Wintec, Nga Mana Toopu O Kirikiriroa, Tui 2000.
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Already major funding from other parties, however return on investment is high due to the cumulative effect of combined restoration activities and the high likelihood of management goals being achieved due to the small size of the lake and the commitment to restoration beyond the immediate surrounds of the lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Re-vegetation of large area of the catchment, predator control and fencing, restoration of hydrology all planned to occur over the next 20 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Wide crown owned margins. Substantial wetland restoration could be carried out within 5-10 years.
TOTAL SCORE		58	

LAKE WAIWHATA

LAKE AREA (HA)	3-4	LAKE DEPTH (M)		MAP REFERENCE	S13 955-133	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	Small	% NATIVE VEGETATION COVER IN CATCHMENT			15
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none">Lake catchment map, Environment Waikato 2008.							

Insufficient data to score this lake.

LAKE WHAKAMARU

LAKE AREA (HA)	780	LAKE DEPTH (M)		MAP REFERENCE		LAKE TYPE	Hydro
DISTRICT	Taupo, South Waikato	SIZE OF CATCHMENT (HA)	81,148 (EXCL. OHAKURI)	% NATIVE VEGETATION COVER IN CATCHMENT		8%	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> • Lake catchment map, Environment Waikato 2009. • FBIS. • Mighty River Power 2000: Description of the ecology of the shallow zone of Lake Taupo and the Waikato River. (Working Draft). 129 pp plus appendices. • Schwarz A. and Hawes I. 2001: Assessment of significance of wetland habitats in the Waikato River. <i>NIWA Client Report HAM2002-021</i>. Prepared for Mighty River Power. 30 pp. • Sagar P. and Kelly G. 2005: Numbers and distribution of wetland birds on the Upper Waikato River and Lakes Ohakuri and Arapuni, September 2004 and January 2005. <i>NIWA Client Report CHC2005-054</i>. Prepared for Mighty River Power Ltd. 16 pp. • Taupo Waikato Resource Consents AEE Mar 2001. • Magadza C.H.D. 1979: Physical and chemical limnology of six hydroelectric lakes on the Waikato River, 1970-72. <i>New Zealand Journal of Marine and Freshwater Research</i> 13(4): 561-572. • Department of Conservation, unpublished data. • Paula Reeves pers. comm. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.			
2. THREATENED SPECIES			
As per Townsend et al. 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Declining species have been recorded at this site or are likely to be there based on available habitat.	2	6	Pied stilt, NI fernbird possible.
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane possible.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	2	2	Black shag, little shag. Little black shag possible.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Koura. Freshwater mussels? Longfin eel? (unidentified eel FBIS).
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	3	6	Relatively large lake but only a moderate diversity of native vegetation types and these are largely confined to a few areas of relatively limited extent (e.g. in the vicinity of the Youth Camp and the Christian Camp at Hikurangi Island).
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	0	0	Hydro dam.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	5	5	One of a network of hydro lakes on the Waikato River.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Plantation forestry is immediately adjacent to the lake along parts its northern side, and grazed pastoral land adjoins the lake along parts of its southern side.
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Managed for hydro electric power generation.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	2	6	Eutrophic.
AK NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Highly representative and diverse marginal herbaceous vegetation but of limited extent.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	4*	3	Good diversity of indigenous birds, and some species may be abundant (e.g. shags, scaup). At least three native fish species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Submerged macrophytes dominated by exotic plant species.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Rainbow trout, brown trout, goldfish, rudd, catfish. Gambusia also?
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Wetland vegetation vulnerable to further encroachment of weeds such as willow?
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	2	2	Mostly Crown owned and managed by Mighty River Power in accordance with resource consents issued by Environment Waikato.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	1*	1	Multiple agencies and groups with interests and various agreements/partnerships in place but extent of co-ordination uncertain.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2*	4	Weed control within areas supporting wetland vegetation?
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Managed for its primary role which is to generate electricity.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Weed control within areas supporting wetland vegetation?
TOTAL SCORE		62	3 ESTIMATES

LAKE WHAKATANGI

LAKE AREA (HA)	3	LAKE DEPTH (M)		MAP REFERENCE	S14 093-877	LAKE TYPE	Peat
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	170	% NATIVE VEGETATION COVER IN CATCHMENT			0

INFORMATION USED TO SCORE LAKE

- Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. *NIWA Ecosystems Publication No. 8*, Hamilton.
- Fergie S. 2003: Horsham Downs Peat Lakes Resource Inventory. *Environment Waikato Internal Series IS03/04*.
- Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. *Environment Waikato Technical Report 2006/54*.
- Expert panel.
- Lake catchment map, Environment Waikato 2008.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.		0	
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.		0	
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	1	4	NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			
Relict species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Little black shag.
As per Molloy <i>et al.</i> 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	Longfin eel may be present.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	0	0	No.
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	0	0	Very small lake (c.3 ha) surrounded by grey willow without emergent or submerged vegetation.
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	2	2	Natural state would have been a closed system - now connected to other waterways via several drain inlets and an outlet.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to other small lakes in Horsham Downs.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	0	0	While lake is fenced, several drains with no apparent buffering drain the entire catchment through the lake.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	1	3	Extensive drainage has modified the hydrology considerably however a water level control structure could restore minimum water levels.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	1*	3	There is no water quality information for this lake. It has no submerged vegetation and there is a race around the lake sloping towards it. Nutrient input is therefore likely to be high and water quality at least eutrophic.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	There are a few native species present in low abundances underneath the willow canopy of the wetland plant zone.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Low diversity and abundance of native birds and fish species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	0	0	Wetland plant zone dominated by grey willow, Japanese honeysuckle, privet.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	2	2	Rudd and mosquito fish common.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	At risk of koi introduction.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	4	4	Privately owned.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	No co-ordination.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Water level control structure could improve quality of wetland zone and may have some beneficial effect on water quality.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Catchment wide changes needed but small catchment so may be possible to achieve significant gains in ecological value over 50 years.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	2	6	Very narrow margins, drainage issues. Weed control and replanting required as a minimum. Farm race runs very close to perimeter of lake and would need moving to extend wetland. Land acquisition required over the long term.
TOTAL SCORE		52	1 ESTIMATE

LAKE WHANGAPE

LAKE AREA (HA)	1450	LAKE DEPTH (M)	3.5	MAP REFERENCE	S13 915-125	LAKE TYPE	Riverine
DISTRICT	Waikato	SIZE OF CATCHMENT (HA)	31767	% NATIVE VEGETATION COVER IN CATCHMENT		8.2	
INFORMATION USED TO SCORE LAKE							
<ul style="list-style-type: none"> Champion P., de Winton M. and de Lange P. 1993: The vegetation of the Lower Waikato Lakes: Volume 2. <i>NIWA Ecosystems Publication No. 8</i>, Hamilton. Champion P., Beadel S., and Dugdale T. 2001: Turf communities of Lake Whangape and some potential management techniques. <i>Science for Conservation No. 186</i>, Department of Conservation, Wellington. Jenkins B. and Vant B. 2007: Potential for Reducing the Nutrient Loads from the Catchments of Shallow Lakes in the Waikato Region. <i>Environment Waikato Technical Report 2006/54</i>. FBIS data. Expert panel. Lake catchment map, Environment Waikato 2008. BIMS database. 							

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.		0	
Ranked within the top five of Classes 1-5 of the Level 1 lake types.		0	
Contains an 'Originally rare' terrestrial ecosystem type*.			
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	0	0	No.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.	0	0	Historical record of white heron (1985).
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.	1	5	Australasian bittern.
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.	2	8	Caspian tern, NZ dabchick.
Declining species have been recorded at this site or are likely to be there based on available habitat.	1	3	NI fernbird. Historical record of pied stilt (1985).
Recovering species have been recorded at this site or are likely to be there based on available habitat.	0	0	Historical record of brown teal (1985).

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.	1	1	Spotless crane.
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	2	Black shag, little black shag, <i>Fimbristylis velata</i> .
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.	2	4	Longfin eel, giant kōkopu.
Sparse species have been recorded at this site or are likely to be there based on available habitat.	0	0	
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.	0	0	
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.		0	
Ranked within the top three lakes of a Level 2 lake type for the region.		0	
Contains a special/rare biological feature in a regional context.	3	6	National stronghold for <i>Fimbristylis velata</i> .
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.	0	0	No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	4	8	Large lake (c.1,453 ha) with 910 ha of associated wetlands although lake is shallow (max depth 3.5 m).
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	4	4	Numerous culverts throughout the catchment but weir to Waikato River is passable to fish.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	3	3	Close to Waikato River and Lakes Rotongaro and Rotongaroiti.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	1	3	Some buffering of tributaries and some fencing of the lake margins has been occurring in recent times.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	0	0	Natural hydrological fluctuations would have been over several metres - now partly controlled by a weir and no longer inundated by Waikato River.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	0	0	Hypertrophic (EW lakes database).
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Good diversity of native plant communities in the wetland plant zone and while the emergent plant zone is no longer extensive it is mainly comprised of native species.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Good diversity of native fish and bird species up until macrophyte collapse - now only moderate in diversity and abundance. Potentially supports lake-recruiting populations of diadromous native fish species.
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	2	2	Large areas of willow forest and a lot of lake margin dominated by pasture.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	0	0	Koi, catfish, goldfish, mosquito fish abundant.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	0	0	Catchment and lake heavily modified, focus is on rehabilitation.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	1	1	Reserve around parts of the lake. Not all fenced.
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	3	3	DoC and EW co-ordinating management.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	2	4	Fencing, weed and pest control would all help improve lake habitat, weir also requires major work but a lot of resources needed for such a large lake.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	0	0	Catchment wide problems in a very large catchment with highly modified hydrological processes posing significant barriers to restoration.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Large existing wetlands and large areas of Crown owned land. Issues around fencing, weed control and private grazing, but substantial gains could be made in 10 years.
TOTAL SCORE		72	

LAKE WHANGIOTERANGI (ECHO LAKE)

LAKE AREA (HA)	5	LAKE DEPTH (M)	25	MAP REFERENCE	U16:049 103	LAKE TYPE	Geothermal
DISTRICT	Rotorua	SIZE OF CATCHMENT (HA)	70	% NATIVE VEGETATION COVER IN CATCHMENT			5.87%

INFORMATION USED TO SCORE LAKE

- Lake catchment map, Environment Waikato 2009.
- Wildland Consultants 2004: Geothermal vegetation of the Waikato Region - Revised 2004. *Wildland Consultants Ltd Contract Report No. 896*. Prepared for Environment Waikato. 238 pp.
- Howard-Williams C. and Vincent W.F. 1985: Optical properties of New Zealand lakes: II. Underwater spectral characteristics and effects on PAR attenuation.
- Luketina K.: Waiotapu South Lakes. Internal memo, EW.
- Stevens *et al.* 2003: Habitat characteristics of geothermally influenced waters in the Waikato. *University of Waikato CBER Report No. 25*.
- Paul Cashmore pers. comm., Keith Owen pers. comm.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
1. NATIONAL PRIORITY			
Best national example of a Level 1 lake type.			
Ranked within the top five of Classes 1-5 of the Level 1 lake types.			
Contains an 'Originally rare' terrestrial ecosystem type*.	2	6	Margins support shrubland and scrub on heated or hydrologically altered ground.
Provides a critical ecological buffer or connection to a nationally important lake, wetland or estuary.	2	6	Part of an internationally significant geothermal wetland complex.
2. THREATENED SPECIES			
As per Townsend <i>et al.</i> 2008			
Nationally critical species have been recorded at this site or are likely to be there based on available habitat.			
Nationally endangered species have been recorded at this site or are likely to be there based on available habitat.			
Nationally vulnerable species have been recorded at this site or are likely to be there based on available habitat.			
Declining species have been recorded at this site or are likely to be there based on available habitat.			
Recovering species have been recorded at this site or are likely to be there based on available habitat.			

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
Relict species have been recorded at this site or are likely to be there based on available habitat.			
Naturally uncommon species have been recorded at this site or are likely to be there based on available habitat.	1	1	Prostrate kanuka.
As per Molloy et al. 2002			
Serious decline species have been recorded at this site or are likely to be there based on available habitat.			
Gradual decline species have been recorded at this site or are likely to be there based on available habitat.			
Sparse species have been recorded at this site or are likely to be there based on available habitat.			
Range restricted species have been recorded at this lake or are likely to be there based on available habitat.			
3. REGIONAL PRIORITY			
Best regional example of a Level 2 lake type.			
Ranked within the top three lakes of a Level 2 lake type for the region.			
Contains a special/rare biological feature in a regional context.			
Critical to the self sustainability of an indigenous species within a catchment of the Waikato Region and which contains healthy, representative populations of that species.			No.
4. HABITAT DIVERSITY			
Very high (5), High (4), Medium (3), Low (1), Very Low (0)	1	2	Lake and associated wetlands <10 ha with a relatively low diversity of native vegetation types (primarily prostrate kanuka shrubland).
5. IMPAIRMENT TO THE NATURAL STATE OF FISH PASSAGE			
Excellent (5), Good (4), Poor (2), Very Poor (0)	5	5	Geothermal and natural barriers only.
6. CONNECTIVITY			
Excellent (5), Very good (4), Good (3), Poor (2), Very Poor (0)	4	4	Part of a semi-continuous natural landscape.
7. CATCHMENT/SURROUNDING LANDSCAPE			
>60% (5), >30% & stock excluded (4), >30% but stock access (3), <30% but well buffered (3), Partial buffer with no stock access (2), Partial buffer with stock access (1), No buffering with or without stock access (0)	2	6	Catchment mostly covered in plantation forest and relatively narrow riparian buffer.

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
8. HYDROLOGY			
Natural (5), Mostly intact (3), Modified but restorable (1), Highly modified (0)	3	9	Pines in upper catchment.
9. WATER QUALITY			
Very high (5), High (4), Good (3), Moderate (2), Poor (1), Very poor (0)	4*	12	Described as turbid and cloudy by Howard-Williams and Vincent (1984), and Stevens <i>et al.</i> (2003). Likely to be close to natural state.
10. NATIVE CONDITION - PLANTS			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	3	3	Lake is unlikely to have ever supported submerged macrophytes due to its heated, and acidic nature.
11. NATIVE CONDITION - FAUNA			
High diversity and abundance (5), Good diversity (4), Moderate diversity and/or abundance (3), Low diversity (2), Very low diversity and abundance (0)	2	2	Due to its geothermal nature, the lake naturally has a low diversity of aquatic native fish and bird fauna. It may however support significant macro invertebrates or microbial communities (Katherine Luketina pers. comm.).
12. EXOTIC CONDITION - PLANTS			
Dominated by exotic plants (0), Moderate abundance (2), Low abundance (3), No exotic plants (5)	3	3	Wilding conifers present in marginal vegetation communities and on bluffs.
13. EXOTIC CONDITION - FISH			
Dominated by exotic fish (0), Moderate density (2), Low density (3), No exotic fish (5)	5*	5	Unlikely to support any fish species.
14. VULNERABILITY			
Highly vulnerable (4), Moderately vulnerable (3), Moderate-low vulnerability (2) Low vulnerability (0)	2	10	Potential threats to the lake and its marginal vegetation from wilding conifers, and pine harvesting in upper catchment.
15. DEGREE OF LEGAL PROTECTION			
Reserve with protected buffer (0), Reserve with limited protected buffer (1), Covenant in place (2), Owned by a statutory body or trust (3), Privately owned with no protection (4)	3	3	
16. DEGREE OF CO-ORDINATION			
3 or more agencies (4), 2 or more agencies (3), Agreement in place (1), No co-ordination (0)	0	0	

CRITERIA	SCORE	SCORE X WEIGHTING	COMMENT
17. FUNDING AND MANAGEMENT INPUT			
Substantial (6), Moderate (4), Minor (2), None (0)	4	8	Eradication of wilding conifers would enhance ecological values and viability of prostrate kanuka shrublands.
18. IN- LAKE RESTORATION POTENTIAL			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	5*	15	No known issues.
19. RESTORATION POTENTIAL OF MARGINAL AREAS			
Excellent condition (5), 5-10 years (3), 10-50 years (2), Significant barriers (0)	3	9	Wilding conifer control.
TOTAL SCORE		109	3 ESTIMATES

ABBREVIATIONS USED IN THIS REPORT

ARC	Auckland Regional Council
AWF&GNZ	Auckland/Waikato Region Fish and Game New Zealand
DoC	Department of Conservation
ERF&GNZ	Easter Region Fish and Game New Zealand
EW	Environment Waikato
F&G	Fish and Game (used to refer to a local group affiliated with AWF&GNZ)
FBIS	Freshwater Biodata Information System
HCC	Hamilton City Council
MfE	Ministry for the Environment
NIWA	National Institute for Water and Atmospheric Research
OSNZ	Ornithological Society of New Zealand
QEII Trust	Queen Elizabeth II Trust
SENZ	Solid Energy New Zealand
TLI	Trophic Lake Index
UoW	University of Waikato

MAPS



Significant Lakes of the Waikato Region - Waikato District north-west -

Created by - RyanC Date - 27.10.2010 Scale - 1:100,000 (A3)
Projection - NZTM File Name - SNA_Lakes_Maps_100k_North

Significant Natural Areas data are derived from interpretation of aerial photography along with information from ecological reports and data (where available), local ecological knowledge and/or limited field surveys. The data are provisional and should be used for indicative purposes only. The data have been captured at scales of 1:10,000 or smaller and should not be used at greater scales (e.g. 1:5,000) without detailed field survey. 1:50,000 Hydrological data Sourced from NZTopo Database. Crown Copyright Reserved. Textured Landcover image derived from DEM data supplied by Landcare and the LCDB2 owned by the Ministry for the Environment and supplied by Terralink International Limited.

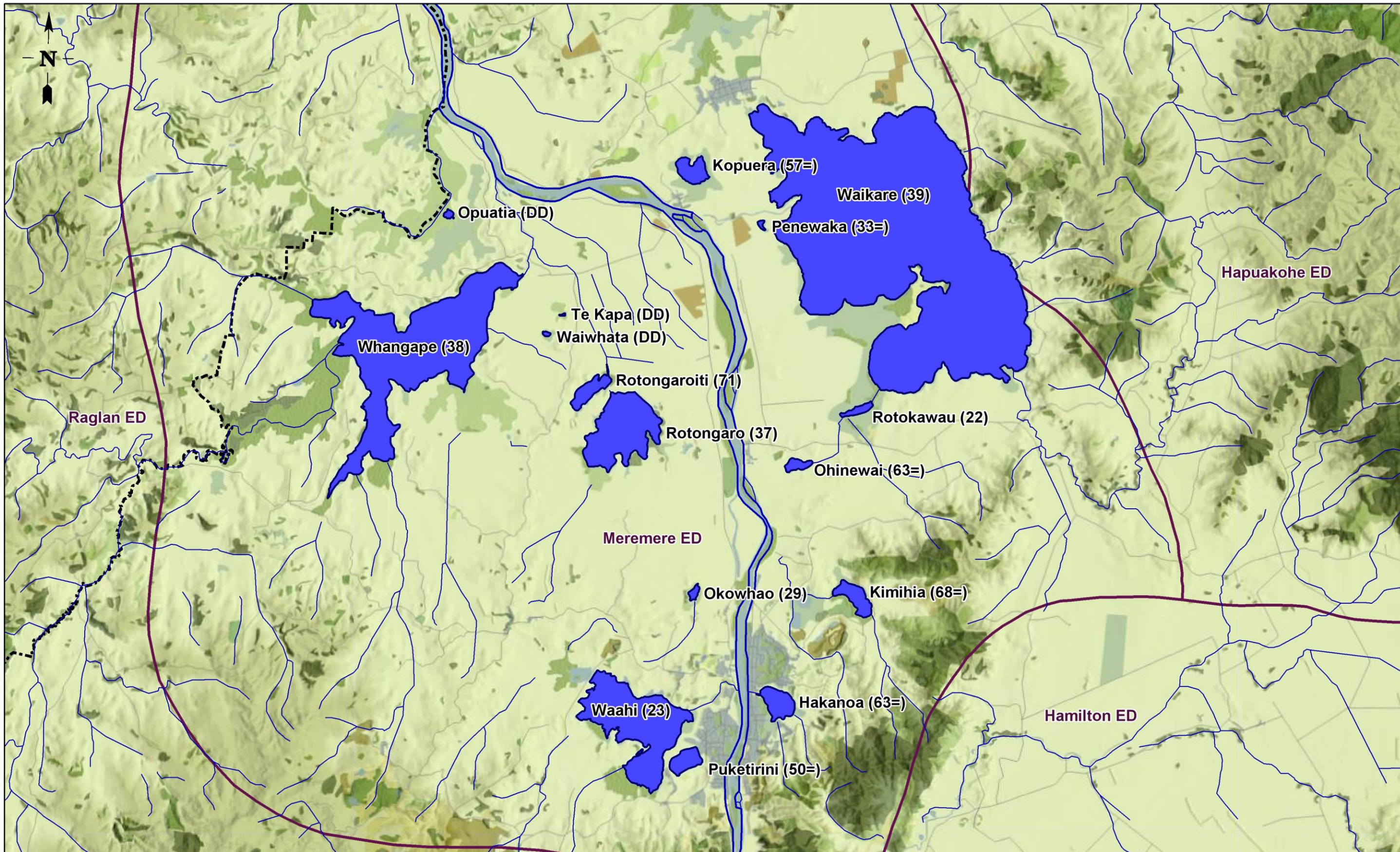
Legend

- A (1) Lake, Name & (Rank)
- River
- A Ecological District Boundary
- Territorial Authority Boundary

0.0 2.5 5.0
Kilometres



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Significant Lakes of the Waikato Region

- Waikato District central -

Created by - RyanC Date - 27.10.2010 Scale - 1:100,000 (A3)
 Projection - NZTM File Name - SNA_Lakes_Maps_100k_North

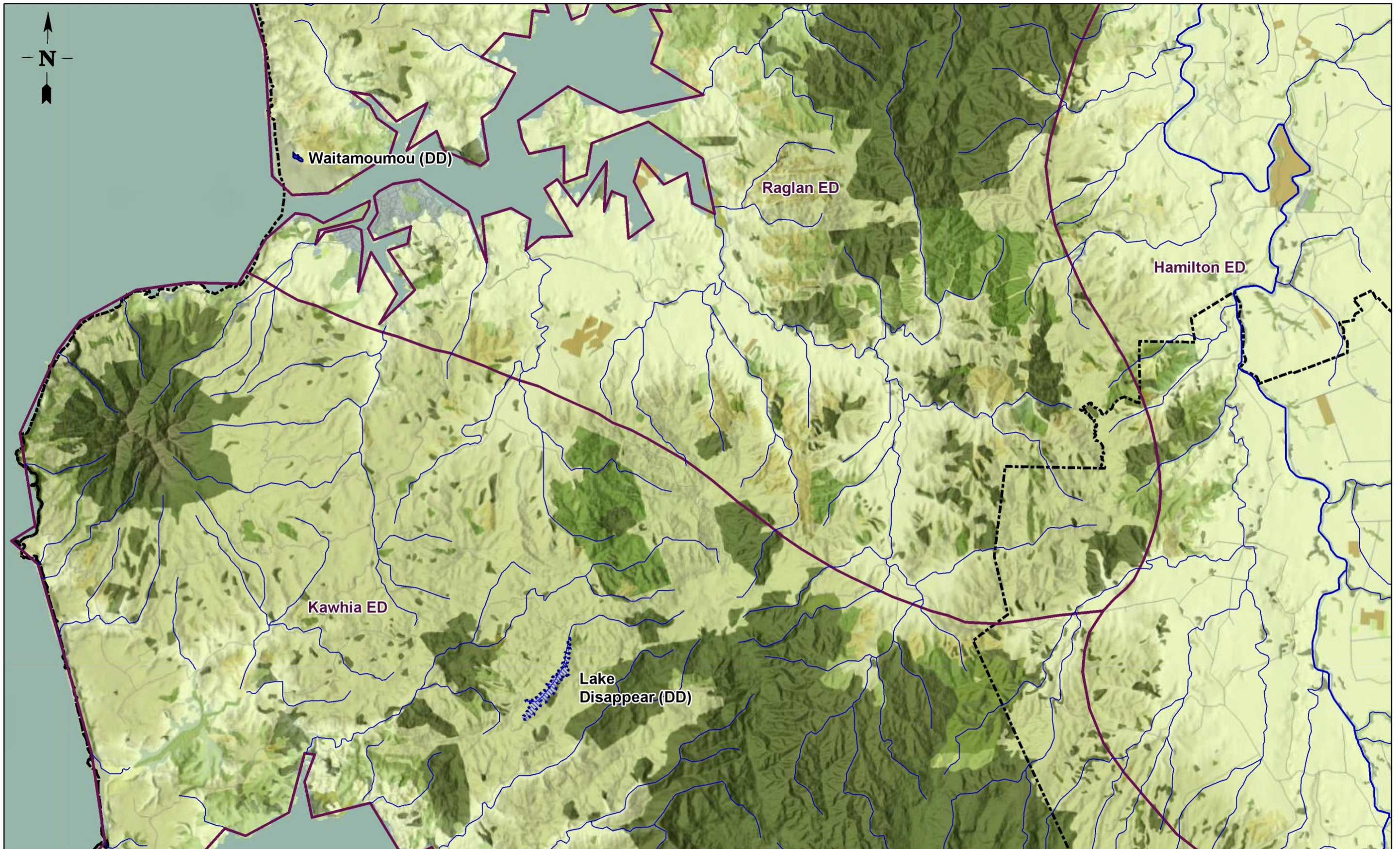
Legend

- A (1) Lake, Name & (Rank)
- A Ecological District Boundary
- River
- A Territorial Authority Boundary



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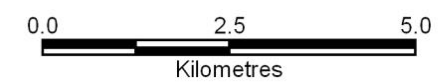
Significant Lakes of the Waikato Region

- Waikato District south-west -

Created by - RyanC Date - 27.10.2010 Scale - 1:100,000 (A3)
 Projection - NZTM File Name - SNA_Lakes_Maps_100k_South

Legend

- | | | | |
|-------|---------------------|--------------------------------|------------------------------|
| A (1) | Lake, Name & (Rank) | A | Ecological District Boundary |
| River | | Territorial Authority Boundary | |



Significant Natural Areas data are derived from interpretation of aerial photography along with information from ecological reports and data (where available), local ecological knowledge and/or limited field surveys. The data are provisional and should be used for indicative purposes only. The data have been captured at scales of 1:10,000 or smaller and should not be used at greater scales (e.g. 1:5,000) without detailed field survey. 1:50,000 Hydrological data Sourced from NZTopo Database. Crown Copyright Reserved. Textured Landcover image derived from DEM data supplied by Landcare and the LCDB2 owned by the Ministry for the Environment and supplied by Terralink International Limited.

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Significant Lakes of the Waikato Region

- Hamilton City & Waikato District south -

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 Projection - NZTM File Name - SNA_Lakes_Maps_100k_North

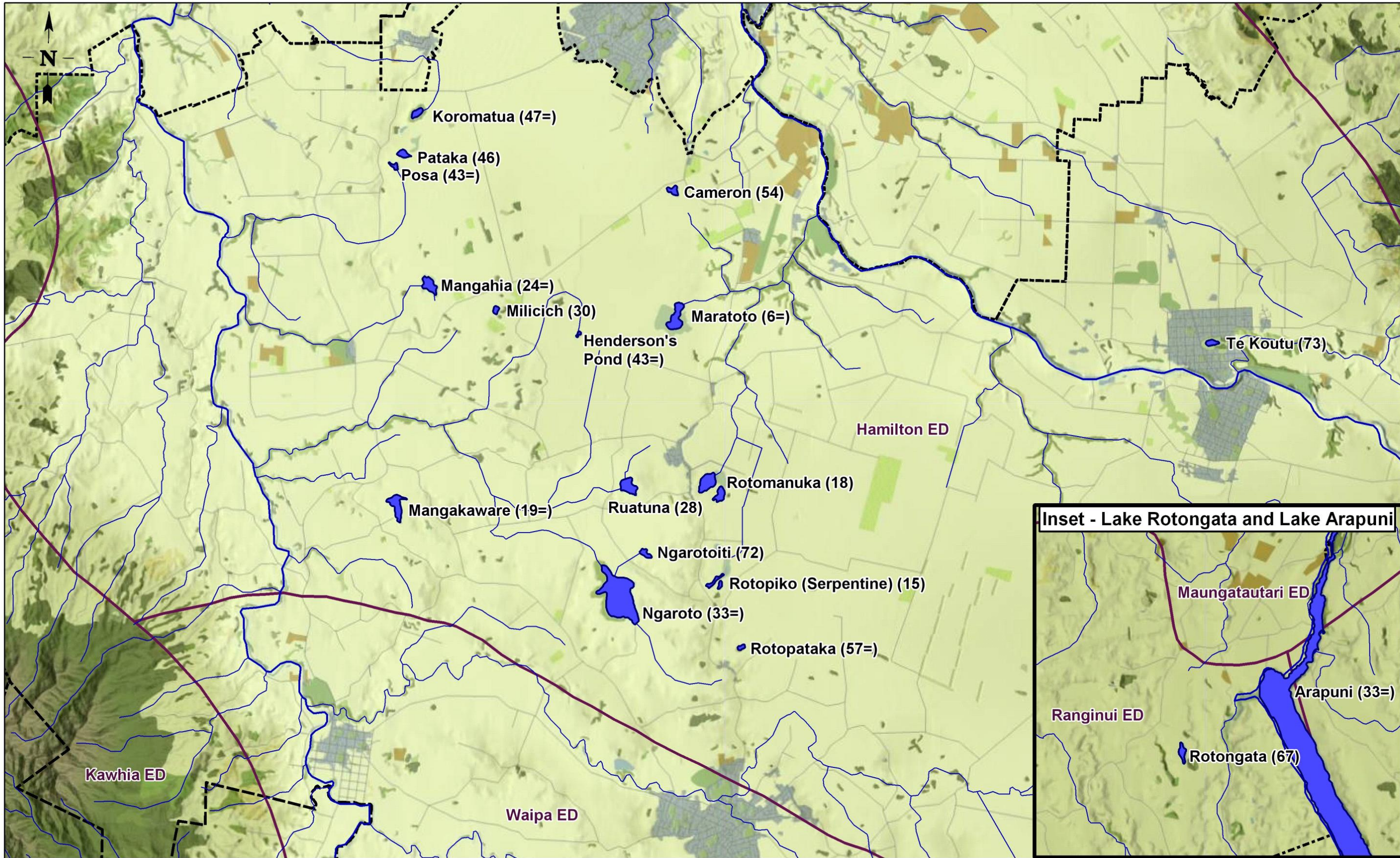
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- A (1) Lake, Name & (Rank)
- A Ecological District Boundary
- River
- Territorial Authority Boundary



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Significant Lakes of the Waikato Region

- Waipa District -

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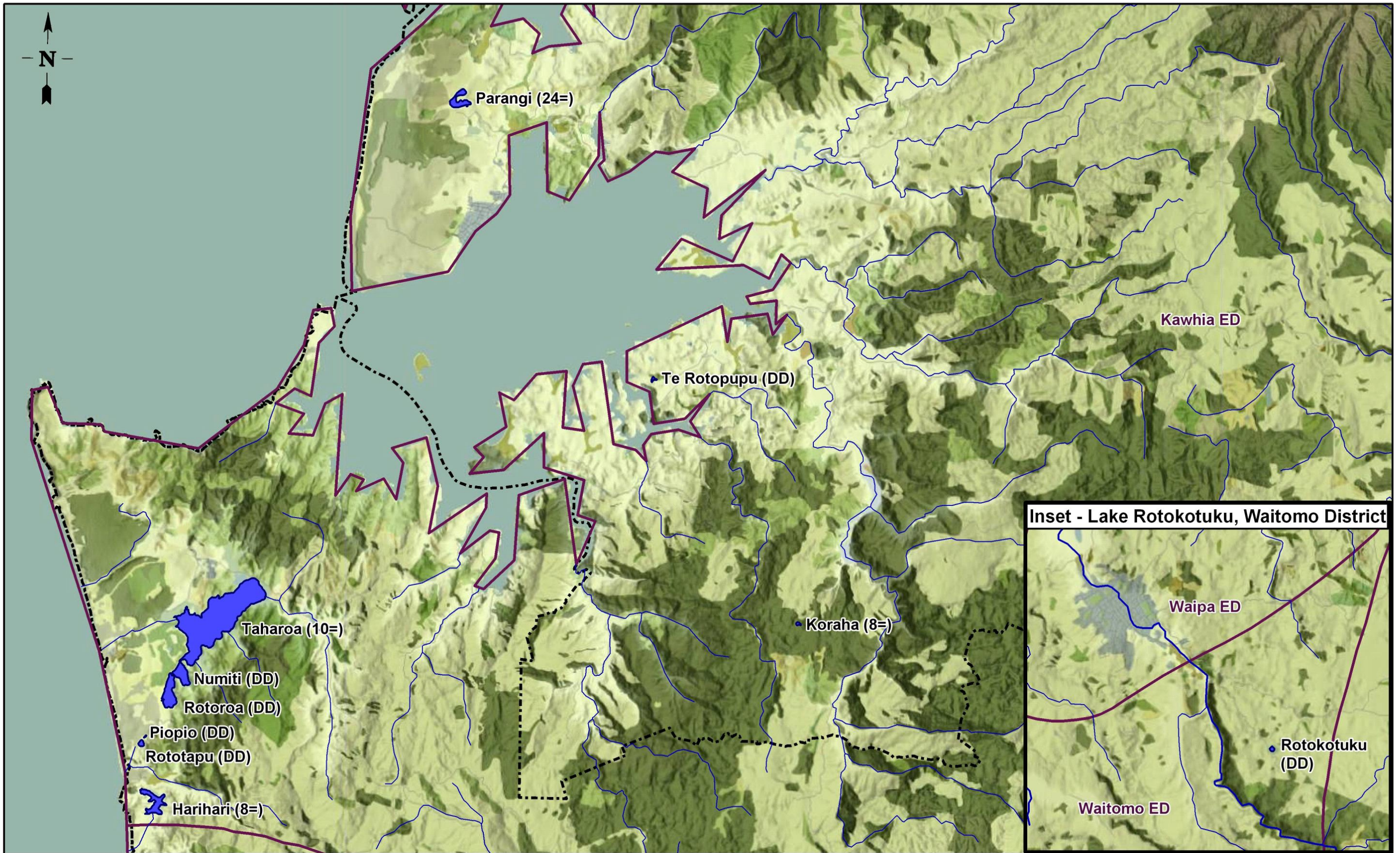
Legend

- | | | | |
|--|---------------------|--|--------------------------------|
| | Lake, Name & (Rank) | | Ecological District Boundary |
| | River | | Territorial Authority Boundary |



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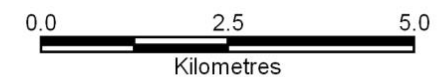
Significant Lakes of the Waikato Region

- Otorohanga & Waitomo Districts -

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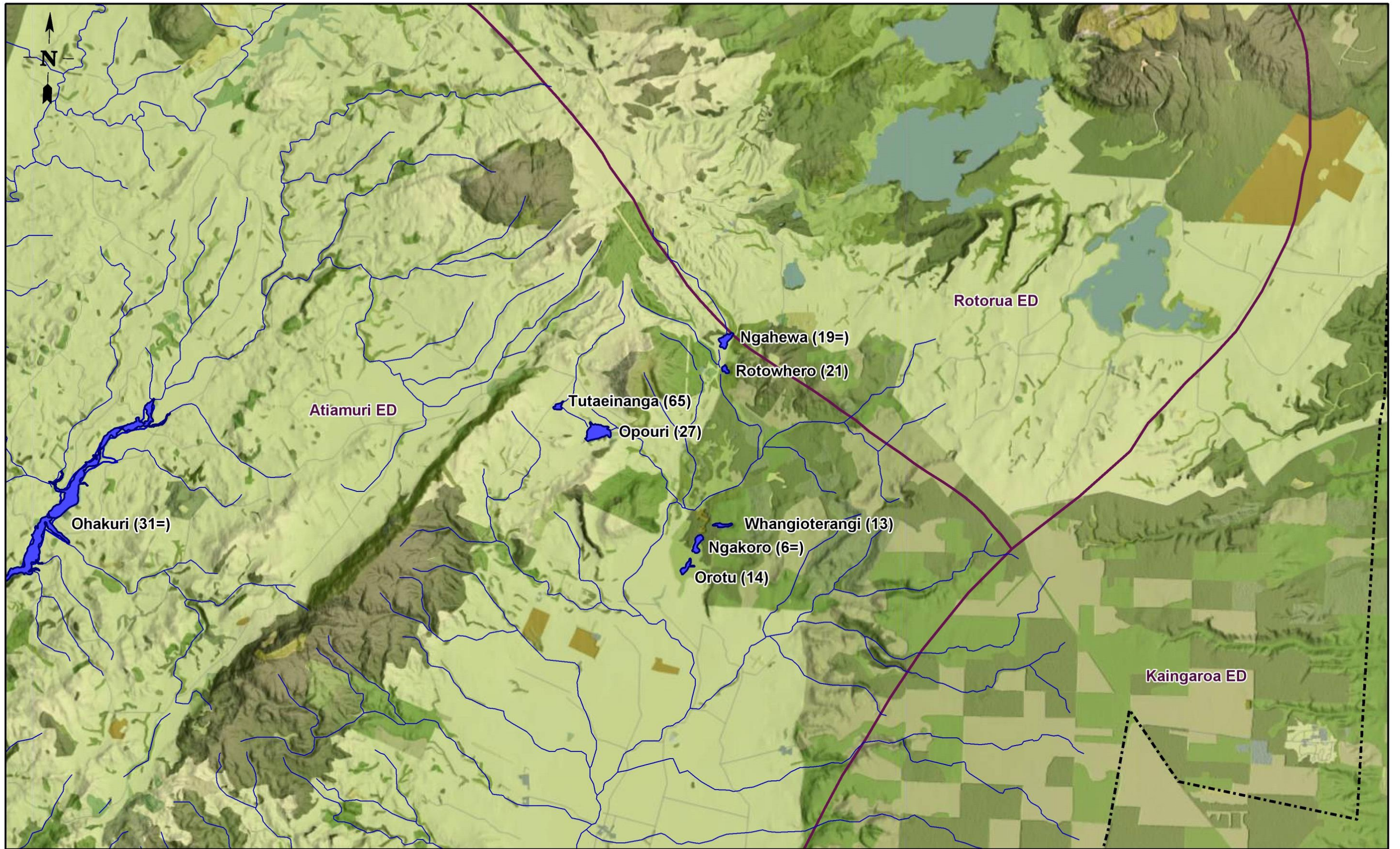
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- A (1) Lake, Name & (Rank)
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- River
- Territorial Authority Boundary



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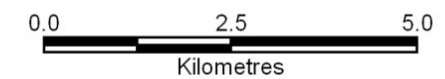
Significant Lakes of the Waikato Region

- Rotorua District -

Created by - RyanC Date - 27.10.2010 Scale - 1:100,000 (A3)
 Projection - NZTM File Name - SNA_Lakes_Maps_100k_South

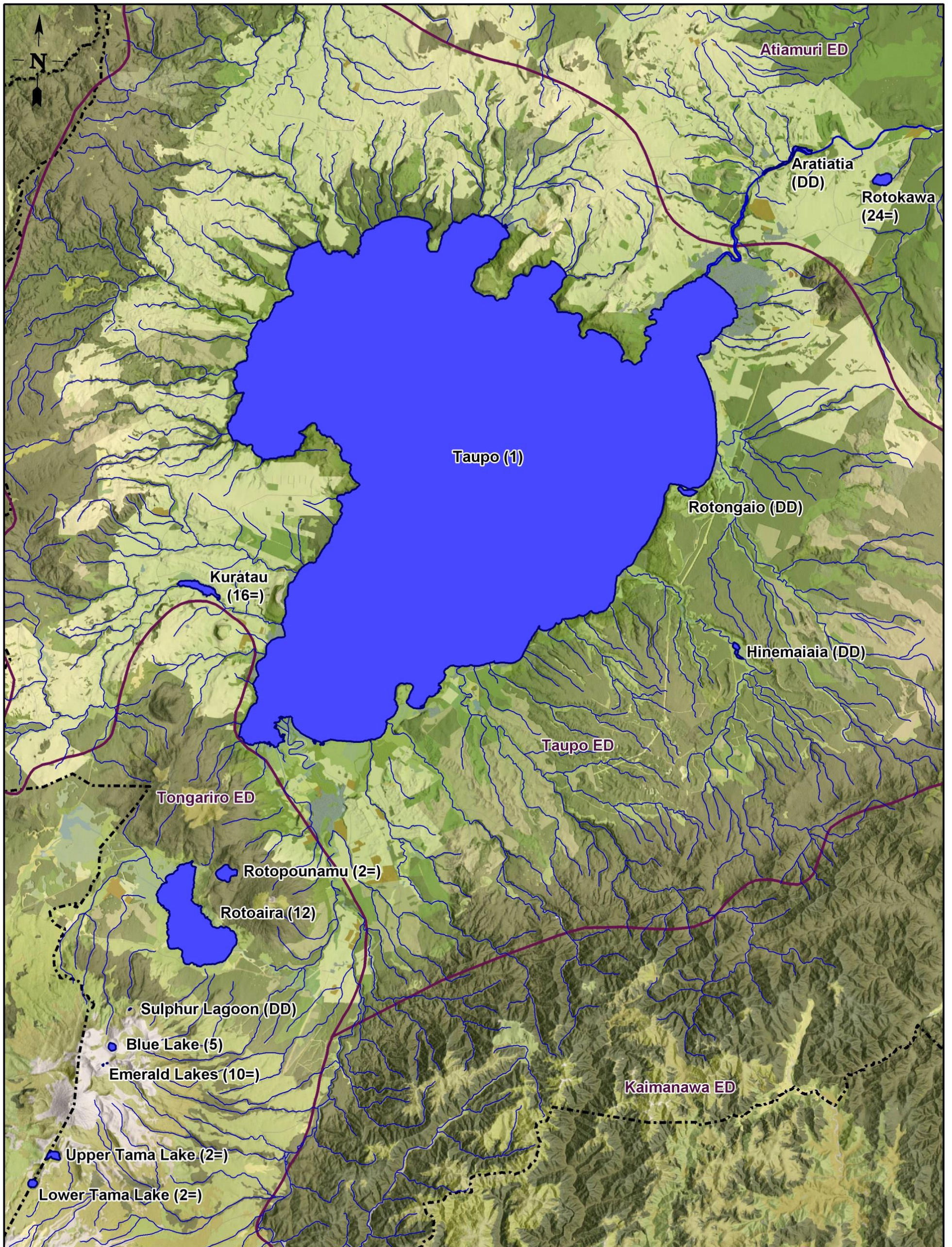
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- A (1) Lake, Name & (Rank)
- A Ecological District Boundary
- River
- Territorial Authority Boundary



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Significant Lakes of the Waikato Region - Taupo District -

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Projection - NZTM File Name - SNA_Lakes_Maps_225k

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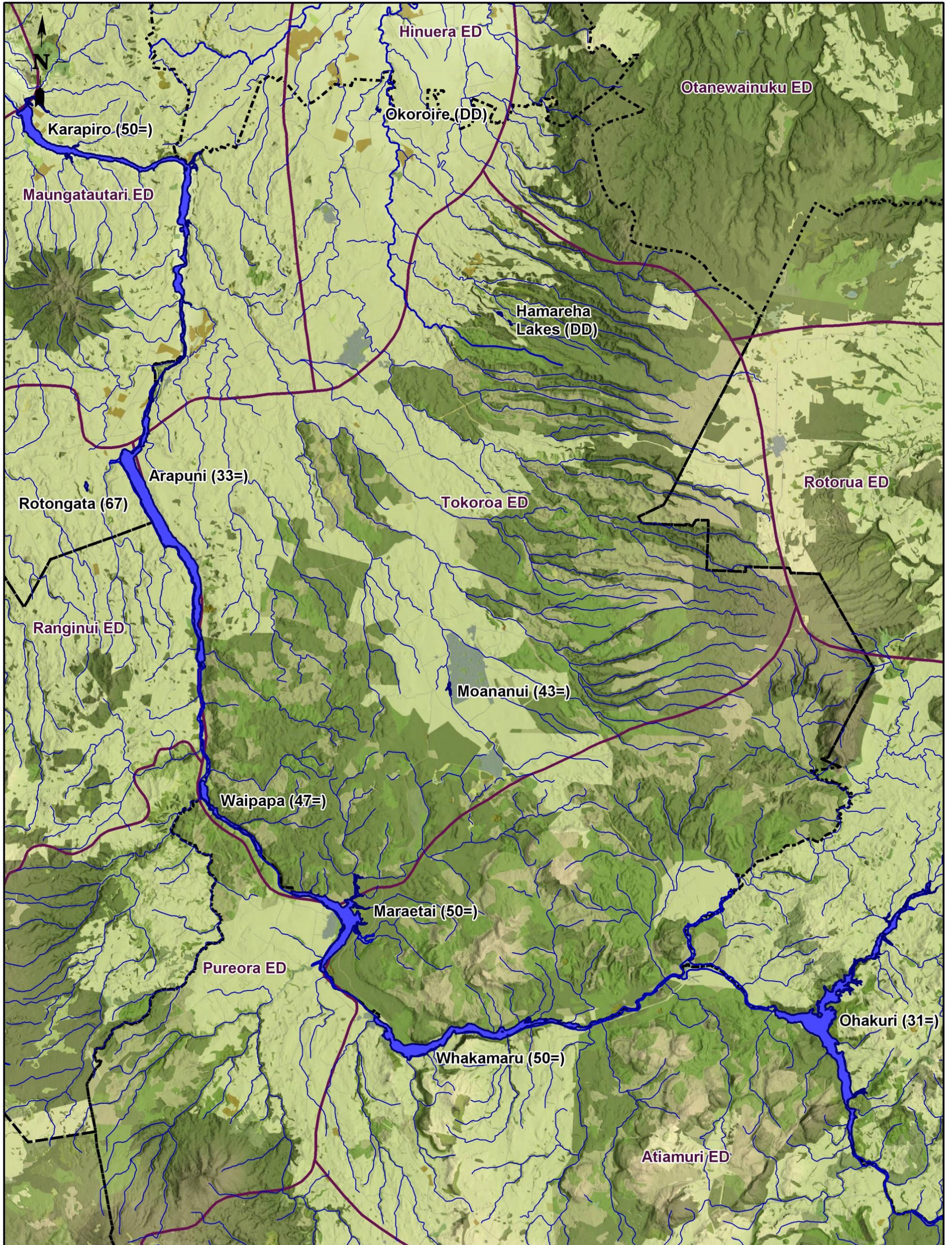
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- A (1) Lake, Name & (Rank)
- River
- A Ecological District Boundary
- Territorial Authority Boundary

0.0 5.0 10.0



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Significant Lakes of the Waikato Region

- South Waikato District & Hydro Lakes -

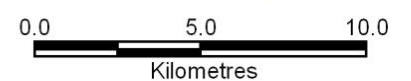
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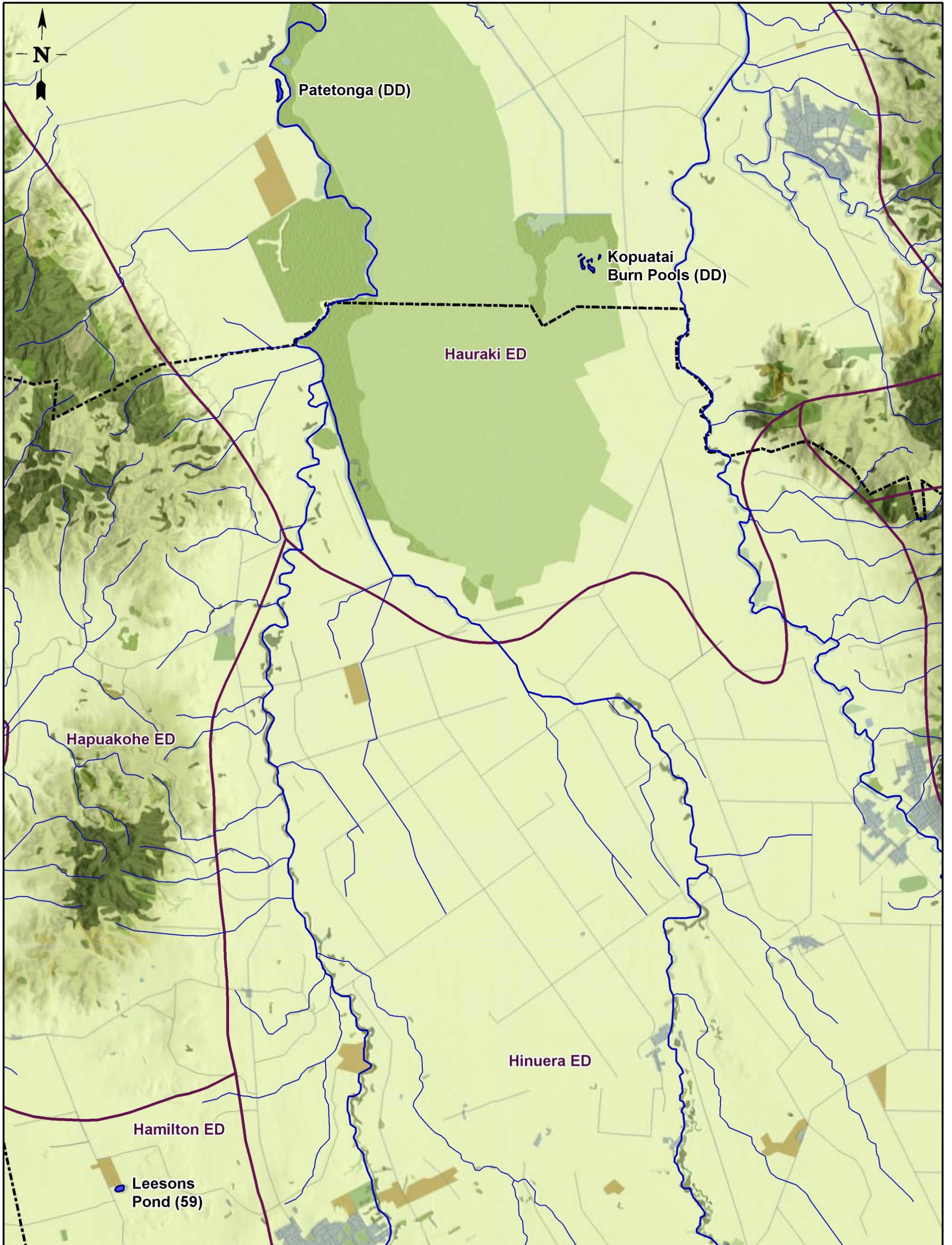
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Legend

- A (1) Lake, Name & (Rank)
- River
- A Ecological District Boundary
- Territorial Authority Boundary



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Significant Lakes of the Waikato Region

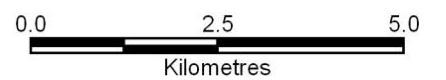
- Hauraki & Matamata-Piako Districts -

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Legend

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INDEX

Blue Lake.....	83	Lake Ohakuri	208
Emerald Lakes	94	Lake Ohinewai	212
Hamareha Lakes.....	102	Lake Okoroire	216
Hendersons Pond	109	Lake Okowhao	219
Hinemaiaia Lakes	113	Lake Opouri (Ngapouri).....	223
Kopuatai Burn Pools	141	Lake Orotu	227
Lake Arapuni.....	71	Lake Otamatearoa	230
Lake Aratiatia	75	Lake Parangi.....	234
Lake Areare	79	Lake Pataka.....	242
Lake Cameron	87	Lake Patetonga/Patetonga Lagoon.....	246
Lake Disappear.....	91	Lake Penewaka	249
Lake Hakanoa.....	98	Lake Pikopiko	253
Lake Harihari	105	Lake Piopio	257
Lake Hotoananga.....	117	Lake Posa.....	258
Lake Kainui	121	Lake Puketi	262
Lake Kaituna.....	125	Lake Puketirini (Lake Weavers)	265
Lake Karapiro	129	Lake Rotoaira	269
Lake Kimihia	133	Lake Rotoiti (Little Lake)	273
Lake Komakorau.....	137	Lake Rotokaeo.....	277
Lake Kopuera	144	Lake Rotokaraka.....	281
Lake Koraha	148	Lake Rotokauri.....	282
Lake Koromatua.....	152	Lake Rotokawa	286
Lake Kuratau	156	Lake Rotokawau	290
Lake Mangahia	164	Lake Rotokotuku.....	294
Lake Mangakaware.....	168	Lake Rotomanuka.....	295
Lake Maraetai	172	Lake Rotongaio.....	299
Lake Maratoto	176	Lake Rotongaro	303
Lake Milicich	180	Lake Rotongarotoiti.....	307
Lake Moananui	184	Lake Rotongata	311
Lake Ngahewa	188	Lake Rotopataka.....	315
Lake Ngakoro	192	Lake Rotopiko (Serpentine Lakes)	319
Lake Ngaroto	196	Lake Rotopounamu.....	323
Lake Ngarotoiti.....	200	Lake Rotoroa	327
Lake Numiti.....	204	Lake Rotoroa (Kawhia)	331

Lake Rototapu.....	334	Lake Waiwhakareke.....	394
Lake Rotowhero.....	335	Lake Waiwhata	398
Lake Ruatuna	339	Lake Whakamaru.....	399
Lake Taharoa.....	346	Lake Whakatangi	403
Lake Taupo.....	358	Lake Whangape.....	407
Lake Te Kapa	361	Lake Whangioterangi (Echo Lake)	411
Lake Te Koutu.....	362	Leesons Pond.....	160
Lake Te Rotopupu	370	Parkinson's Lake (Kohahuake Lake)...	238
Lake Tunawhakaheke	371	Sulphur Lagoon	343
Lake Tutaeinanga	375	Tama Lake (Lower).....	350
Lake Waahi.....	381	Tama Lake (Upper).....	354
Lake Waikare.....	385	Te Otamanui Lagoon	366
Lake Waipapa.....	389	Unnamed 3	379
Lake Waitamoumou	393	Unnamed 9 (Lake Opuatia).....	380