

LAKE ECOSYSTEM RESTORATION NEW ZEALAND

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Outcome Based Investment

The LERNZ programme underwent its 4-year review from 11-13 November 2008. An extensive set of documentation consisting of publications, reports and summaries of the LERNZ programme was put together for the review, and this material is available on CD by contacting Austin Zhang (azhang@waikato.ac.nz). We sincerely thank Annie Perkins of Groundwork Associates and our collaborators as well as members of our Governance Group, External Science Review Committee and End User Advisory Group for donating their valuable time to participate in the review.



8 - 10 December 2008
The University of Waikato

Online registration:
www.LERNZ.co.nz

DYRESM-CAEDYM/ELCOM-CAEDYM Workshop

LERNZ is hosting a lake modelling workshop on 5 December and 8 to 10 December 2008 (see left). The first day (5 December) is geared towards new users of the models and will familiarise beginners with the data requirements of the models. The final three days of the workshop will include advanced topics and will be led by several prominent national and international lake modellers. Some of the topics to be covered include: calibration of the models, sediment diagenesis, developing climate change input data, ice cover, sensitivity analysis and opportunities for comparative studies and publications.

Registration is free.

Please contact David Hamilton: davidh@waikato.ac.nz



Aareka plants threatened species in a Hamilton Zoo wetland.

Profile: Aareka Hopkins

Aareka Hopkins graduated in 2007 from University of Waikato after completing his MSc thesis on the potential for charophyte re-establishment in large, shallow, eutrophic lakes. His research focused on Lake Waikare; the location of his hapū, Ngāti Hine. Aareka was funded collectively by a Tūāpapa Pūtaiao fellowship (FRST), Waikato Raupatu Lands Trust, Taharoa IC2 Incorporation, The Maori Education Foundation, Trust Waikato, and the National Wetlands Trust. Aareka now leads his own company, AM² & Associates, which identifies projects important to lake restoration in New Zealand, applies for funding, and undertakes the restoration work. AM² & Associates has been involved in the potential re-establishment of indigenous fauna and flora such as littoral aquatic plants and freshwater mussels, with the goal of enhancing and maintaining water quality in lakes. Aareka has conducted his core activities through LERNZ, providing funding for facilities and specialist equipment for his company's restoration projects.

Aareka has organised several information days for the North Waikato community to learn more about lake ecosystems. A hui at Te Kauwhata that focused on Lake Waikare attracted 70 attendees in 2006, and a community information day on Waikato shallow lakes in Huntly attracted more than 100 people in 2007. Both of these events involved speakers from district and regional councils, government and non-government agencies, and the University of Waikato. Aareka is planning a shallow lakes workshop and information day for 1st December 2008 at the University of Waikato.

Aareka is also actively involved in Waikato-Tainui schools education programmes to promote interest in science as a tertiary study career, and in kaitiakitanga (guardianship) in their rohe (area). He was the primary organiser of a 2-day bioscience wānanga, or education live-in, at the university of Waikato marae. Last year's wānanga hosted 28 students of Waikato-Tainui descent from 7 secondary schools (from Papatoetoe to Cambridge), and was sponsored jointly between Waikato Raupatu Lands Trust and the University of Waikato. It was so successful it is to become an annual event. (Contact Aareka Hopkins: aareka@am2.co.nz)

WAIKATO
**Shallow Lakes
Restoration
WORKSHOP**
1st December 2008
Waikato Management School
University of Waikato
Gate 7, Hillcrest Rd
Hamilton

Koi Carp Classic 2008



26 kg grass carp next to the winning heaviest koi carp (8.7 kg) from the 2008 World Koi Carp Classic. (Photo: Grant Tempero)

Waikato University was once again involved in the World Koi Carp Classic which took place from 1-2 November 2008 on the shores of Weavers Lake. An impressive 4.27 tons of koi carp were caught despite the cold, wet conditions. Unfortunately, no previously tagged koi carp were returned this year, but the total for the weekend was 1770 koi with an average weight of 2.41 kg. The largest carp was shot by Dennis Powell on Saturday and weighed in at 8.7 kg. The highlight of the weekend was the 26 kg (1.19 m FL) grass carp from Lake Whangape caught by junior competitor Cameron MacDonald.

New MSc student -Chenguang Zhang

Chenguang Zhang graduated in July 2007 with his BSc degree from The University of Waikato. He has worked with LERNZ for the past year, and he recently started his Master's project co-supervised by Prof. David Hamilton and Dr. Liancong Luo.

Chenguang's research is focused on utilising high-frequency monitoring data in Lake Rotorua to characterise the dynamics of cyanobacteria blooms. He will use temporal and spatial data collected from the Lake Rotorua buoy in the 3D model ELCOM-CAEDYM. Using this model he aims to predict the behaviour of cyanobacteria blooms in response to changes in external nutrient loading and meteorological conditions.



Louise Iversen & Helle Lykke Sønderbo



Louise Iversen (left) and Helle Lykke Sønderbo (right)

Louise Iversen and Helle Lykke Sønderbo are Environmental Engineering students visiting The University of Waikato from Aalborg University, Denmark. They are working with lake ecosystem models (DYRESM-CAEDYM) to simulate how future climate change and increased nitrogen loads will affect

the physical and ecological dynamics of polymictic Lake Rotoiti. They arrived in Hamilton mid-August and have been supervised by Professor David Hamilton and PhD student Dennis Trolle. They will hand in their final report in early December, and will then return to Denmark where they will present and defend the project as a portion of their MSc in mid-January.

Recent Publications:

Daniel, A., Hicks, B.J., Ling, N., and Bruno, D., 2008. In Press. Acoustic and radio transmitter retention in common carp (*Cyprinus carpio* L.) in New Zealand. *Marine and Freshwater Research*.

Knox, M.A., Hicks, B.J., Banks, J.C., and Hogg, I.D., 2008. Fish biosurveillance by genetic methods: a feasibility study. CBER Contract Report No. 90. Centre for Biodiversity and Ecology Research, Department of Biological Sciences, School of Science and Engineering, The University of Waikato, Hamilton.

Michel, C., Hicks, B.J., Stöling, K.N., Clarke, A.C., Stevens, M.I., Tana, R., Meyer, A., and M.R. van den Heuvel. 2008. Distinct migratory and non-migratory ecotypes of an endemic New Zealand cleotrid (*Gobiomorphus cotidianus* McDowall 1975) - implications for incipient speciation in island freshwater fish species. *BioMed Central Evolutionary Biology* 8: 49. doi:10.1186/1471-2148-8-49.

Paul, W., and Hamilton, D., 2008. Low-dose alum application trialled as a management tool for internal nutrient loads in Lake Okaro, New Zealand, *New Zealand Journal of Marine and Freshwater Research*, 42: 207-217.

Stevens, M.I. and B.J. Hicks. Mitochondrial DNA reveals monophyly of New Zealand's *Gobiomorphus* (Teleostei: Gobioidae: Eleotridae) amongst a morphological complex. In Press. *Evolutionary Ecology Research*.

Trolle, D., Skovgaard, H. and Jeppesen, E., 2008. The water framework directive: setting the phosphorus loading target for a deep lake in Denmark using the 1D lake ecosystem model DYRESM-CAEDYM. *Ecological Modelling*, 219: 138-152.

Trolle, D., Jørgensen, T.B. and Jeppesen, E., 2008. Predicting the effects of reduced external nitrogen loading on the nitrogen dynamics and ecological state of deep Lake Ravn, Denmark, using the DYRESM-CAEDYM model. *Limnologia*, 38: 220-232.

Trolle, D., Hamilton, D.P., Hendy, C. and Pilditch, C. In Press. Sediment and nutrient accumulation rates in sediments of twelve New Zealand lakes: Influence of lake morphology, catchment characteristics and trophic state. *Marine & Freshwater Research*.



New Zealand Freshwater Sciences Society

Annual Conference 2008

The New Zealand Freshwater Sciences Society Conference was held on the 24th to 27th of November in New Plymouth, Taranaki, New Zealand. David Hamilton, Brendan Hicks, other staff and students from the University of Waikato attended the conference and gave oral presentations and posters as follows:

Presentations:

David Hamilton - RATES OF NITROGEN LOSS VIA DENITRIFICATION ARE RELATED TO LAKE TROPHIC STATUS

Brendan Hicks - FISH DISTRIBUTION IN LARGE RIVERS - A PERSPECTIVE FROM BOAT ELECTROFISHING

Nick Ling - FISH COMMUNITY AND KOURA RESPONSES TO SEMI CONTINUOUS ALUM DOSING IN THE UTUHIINA STREAM, ROTORUA

Ian Duggan - INVASION RISKS FROM INCIDENTAL FAUNA IN THE AQUARIUM TRADE

Liancong Luo - SIMULATING CLIMATE AND LAND USE IMPACTS ON LAKE WATER QUALITY USING A COUPLED CLIMATE-WATERSHED-LAKE ECOSYSTEM MODEL

Susie Wood - WHOLE LAKE BIOMANIPULATION SHOWS POTENTIAL FOR MANAGEMENT OF CYANOBACTERIAL BLOOMS

Adam Daniel - SEASONAL MOVEMENT OF NEW ZEALAND KOI CARP (*CYPRINUS CARPIO*)

Deniz Özkundakci - PHOSPHORUS REDUCTION IN THE WATER COLUMN OF A EUTROPHIC LAKE IN RESPONSE TO INTENSIVE CATCHMENT AND IN-LAKE RESTORATION MEASURES

Dennis Trolle - RESTORING WATER QUALITY IN NEW ZEALAND LAKES - MODELLING THE INFLUENCE OF INTERNAL LOADING AND FUTURE CLIMATE CHANGE

Jennifer Blair - AN INVESTIGATION OF KOI CARP (*CYPRINUS CARPIO*) MOVEMENT IN THE WAIKATO REGION USING LASER ABLATION OTOLITH MICRO-CHEMISTRY

Richard O'Rorke - IDENTIFYING KEY VARIABLES AFFECTING A MIXED CYANOBACTERIA BLOOM AT LAKE KAINUI

Ray Tana - THE MIGRATION HISTORY AND POPULATION DYNAMICS OF TORRENTFISH (*CHEILARRICHTHYS FOSTERI*, HAAST 1874), IN TWO SMALL WAIKATO STREAMS ON THE NORTH ISLAND OF NEW ZEALAND (WINNER OF THE BEST MSc STUDENT PRESENTATION)

Posters:

Nick Ling - QUANTIFYING HABITAT LOSS FOR THE ACUTELY THREATENED NORTHLAND MUDFISH USING GIS ANALYSIS

Nick Ling - HEAVY METAL BIOACCUMULATION IN TE ARAWA LALES KOURA

Amy McDonald - GAMBUSIA DENSITY AFFECTS GROWTH BUT NOT SURVIVAL OF MUDFISH IN CONSTRUCTED PONDS

Sean Taylor - MORPHOLOGICAL CHARACTERISATION OF KOURA HAEMOCYTES AND THEIR RESPONSES TO ENVIRONMENTAL STRESSORS

Mathew Allan - NEAR REAL TIME WATER QUALITY MONITORING OF LARGE LAKES USING MODIS SATELLITE DATA

Chris McBride - MONITORING WATER QUALITY IN THE ROTORUA LAKES USING WIRELESS SENSOR BUOYS

Peter Ellery - RESTORATION OF FLOODPLAIN HABITATS FOR INANGA IN THE KAITUNA RIVER, NORTH ISLAND, NEW ZEALAND

Mike Riceman - THE USE OF OTOLITH MICROCHEMISTRY TO INVESTIGATE NATAL ORIGINS AND MOVEMENT OF LACUSTRINE WILD RAINBOW TROUT. ABSTRACT PRESENTED AS AN ORAL PRESENTATION TO THE NEW ZEALAND FRESHWATER SCIENCES SOCIETY

For more information visit

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