



Manaaki Whenua
Landcare Research

Landcare Research DISCOVERY

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Making the connections: urban research for change

At a global scale mankind has evolved into a resource-hungry animal. Our oil consumption accelerates as supplies dwindle, and at the local level we develop larger houses per household, which are expensive to maintain and service.

New Zealand has been cited as a “hot spot” where the number of households is rising at nearly twice the rate of the population. The resulting urban sprawl is most striking in Auckland but the effects can be seen throughout the country. The Auckland Regional Growth Forum anticipates that 70% of all new growth in New Zealand over the next 50 years will take place within metropolitan Auckland, making sustainability a critical component of future urban design.

This edition of *Discovery* champions examples of research being put in practice. We begin by profiling examples of sustainable building approaches and low impact urban design and development to facilitate nature’s role in urban development.

Also in this issue, *Discovery* goes down the drain, quite literally. Far from being “dull as ditchwater”, stormwater (and what to do with it) is becoming increasingly topical as our cities expand. Planners are recognising that conventional development leads to adverse effects from stormwater runoff in urban areas, and contributes to escalating costs of infrastructure. New design and development practices implement features from

natural systems and new low impact technologies. They can minimise and mitigate environmental damage as well as reduce energy requirements and waste. While there are major constraints (not least in lack of data and will to change) our research is helping drive implementation.

With this in mind we have advanced research that provides information on the environmental performance at building, development site and catchment scales and the economics of conventional versus alternative development. The potential for integration amongst different types of instruments (district plans and codes of practice) will be a pre-requisite for the development of a rational set of incentives. Landcare Research is contributing to planning discussions in many parts of New Zealand, including Taupo and the Waikato (as outlined on pages nine through 11).

We also outline a fledgling project that looks to traditional Māori building designs and settlement forms for their potential to contribute to urban settlement.

We finish with a hikoi through Christchurch that illustrates positive results of sustainable practice.

Landcare Research will continue to demonstrate the technical and ecological benefits of these approaches in the built environment. Currently we are working with environmental planning, landscape and urban consultants Boffa Miskell on sustainable principles for a major new development. New partnerships like this and inter-disciplinary approaches are essential to make progress in taking research thinking into routine practice.

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Photo credits: left to right, Harley Betts 1, 2, 6, 8; Dave Morgan 3; Landcare Research Slide Collection 4, 5; Peter Buchanan 7.

Robert Lamberts, Crop & Food Research

I Sustainable housing – is New Zealand ready?

To most people, sustainable housing seems an attractive, even noble idea. But would the benefits of sustainable houses or neighbourhoods warrant the cost and effort? Renowned architect Dr Robert Vale is finding out.

With the energy crises of the 70s as a backdrop, Dr Vale and his wife Professor Brenda Vale pioneered the development of energy self-sufficient, water-conserving, easily maintained sustainable housing in the United Kingdom. The pair continue their research, writing and design work today, facing similar (and additional) concerns to those of the 70s. Oil demand is predicted to outstrip supply in about 20 years, and housing built today may need to withstand extreme weather events brought about by climate change.

Dr Vale now shares his time between the University of Auckland and Landcare Research. Along with Dr Sumita Ghosh and Dr Nalanie Mithraratne of Landcare Research, he is researching whether sustainable residential developments would be technically viable in a New Zealand context.

“We know they can succeed, and in much harsher climates. For example, our Hockerton Housing Project in Nottinghamshire cost the same as a conventional complex there, and unheated indoor temperatures averaged 17°C in –6° weather. Residents’ power bills were negligible.

“A sustainable housing subdivision in New Zealand would look remarkably like a conventional one. However, most windows would face north; and houses would feature excellent insulation, solar panels or other visible means of

producing electricity, and rainwater tanks.

“But would ‘no bills’ houses be attractive to buyers here? How many are needed to make a real difference?

“Developers are often exhorted to build more sustainably, but with very few sustainable houses present, we have few facts to base decisions on. It’s my job to check the science behind the assumptions.”

Initial surprises

Dr Vale’s early research indicates, to his surprise, that changing our behaviour can do more to reduce oil and gas dependency than changing our housing.

“Behavioural choices such as our holiday destinations, modes of transport and whether we eat locally-grown food has a far greater impact on the environment than anything we do with our houses. If we lived in the ultimately sustainable house, we could reduce our environmental impact by roughly 10%, whereas behavioural changes may make as much as 20% of a difference.

“Sustainable housing will be most effective

if it suits our lifestyle. For example, higher density housing is traditionally considered more sustainable. That’s fine, if we all walk to work in the city centre. But if food is more scarce and expensive as oil prices rise, maybe quarter acre sections would be better, so we can grow food and even raise chickens.

“Developers may wish to site houses near public transport links like bus routes, railways and cycle paths. Houses would be less dominated by garage doors, with the emphasis on fewer cars.”

Dr Vale is also examining the technical aspects of what sustainable housing should look like, starting with water use, with an initial focus on Auckland.

“How much water will be saved through using rainwater tanks compared with mains supply only? To what extent do these tanks help reduce contaminants in stormwater? Would it be best to have a tank for every house, or larger tanks for the whole neighbourhood? As yet, we know little about this.”

The next step will be to establish hard figures on energy use. Is it better to have



■ An example of sustainable housing: The Hockerton Housing project designed by Brenda and Robert Vale and completed in 1998. Among its energy-saving features are solar panels, triple glazing, and food-growing areas.

windfarms in Wairarapa for example, or solar panels on everyone's roof?

Also, would it be best to build sustainable housing from scratch? Or would it be cheaper and more feasible to retrofit?

One proven benefit Dr Vale points out is that sustainable houses will reduce our health costs.

"Most New Zealand houses are severely

underheated according to World Health Organization standards. BRANZ research shows that many houses in New Zealand have an average indoor temperature of less than 16°C, which may be a contributing factor to New Zealand having the highest rate of childhood asthma in the world.

"Retrofit projects by EECA and others have shown health benefits from the improved

insulation found in sustainable housing."

Funding: FRST (Foundation for Research, Science and Technology).

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|"Green" building gets A+ report card

Landcare Research's high-tech eco-friendly science building in Auckland is one of New Zealand's few commercial sustainable buildings. It has already won accolades since its opening last year, and is now standing up to the scrutiny of staff researchers assessing its sustainability scorecard.

The building on the University of Auckland's Tamaki campus houses offices and laboratories, as well as New Zealand's largest collections of insects and fungi. It is designed for very low electricity use and minimal use of water, stormwater and sewerage systems through rainwater collection, irrigated gardens and composting toilets.

The "Tamaki building", as it is known, won the EECA Energy-Wise Commercial Building Award at the Property Council of New Zealand Awards in May; and was one of six recipients of the Green Ribbon Award conferred by the Environment Minister to "environmental heroes". Landcare Research received the award along with engineers Connell Mott MacDonald, and architects Chow:Hill.

Robert Vale was a consultant on the sustainability aspects of the building, and is leading a small team of Landcare Research staff members in reviewing the first year's performance. "The building is performing at least as well as it should be, given all it had to achieve within a standard budget. In that respect, it scores an A+."

Electricity costs were projected to be two thirds lower than a comparable

conventional building, with savings of up to \$70,000 per year expected. Dr Vale says the building used 175 kilowatt hours per square metre in electricity and gas in its first year, thanks mainly to its high mass, insulation and shading.

"An efficient conventional office building uses 100, but a laboratory uses 300. The Tamaki site includes air conditioned research glasshouses, energy-hungry laboratory equipment, and 29 fridges and freezers, some maintaining temperatures

down to -80 C. That's a pretty intensive electricity demand, so the performance is very good. The building is also fulfilling expectations for low water consumption.

"Consumption for the whole building is less than what would be considered a sustainable office building, at less than seven cubic metres per capita per year, including water use from greenhouses.

"The rainwater collection system and waterless composting toilets are the main



■ The Tamaki building.

contributors to this water saving.”

Dr Vale says researchers will further analyse water use, for example, by isolating what is used in the office section alone, to better compare performance against environmental rating systems.

The next stage of research will then be to measure the building’s stormwater treatment systems, to find out the amount and the type of pollutants running off. The Tamaki site has “rain gardens” and soak holes designed to minimise runoff into the stormwater system. Even the car park is pervious, and water (plus any contaminants) soaks in where it falls and is filtered through soils before it reaches groundwater.

Researchers will also hold satisfaction surveys to find out people’s views of the building. Additionally, they will examine transport behaviour.

“We will survey the distance people travel, the size of their vehicles, and the degree to which public transport is used,” says Dr Vale.



Sumita Ghosh

■ Robert Vale

As well as being an environmentally friendly home for scientists, fungi and insects, the building also serves as a model for others to follow.

“It attracts numerous visitors, from industry, local government and the commercial sector,” Dr Vale says. “For many, it is their first chance to see how a sustainable commercial building looks

and works.”

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Researchers count cost of stormwater management

Scientists and councils in Auckland are addressing timely questions about the price of managing the city’s stormwater.

Aging stormwater systems in many parts of New Zealand will reach the end of their economic life over the next decade. This presents an opportunity to ask whether the conditions, assumptions and technology behind current systems fit our ever-increasing cities. Conventional systems pipe untreated stormwater into waterways and estuaries, which contributes to erosion and poor water quality. Planners and researchers are seeking ways to use or absorb more stormwater, and are questioning long-held views that clean water is a limitless resource.

Landcare Research staff are working with the Auckland Regional Council and seven



Eva-Petrezia Vesely

■ “Green” parking: this North Shore (Auckland) street features low-impact stormwater provisions - swales and permeable paving – to reduce stormwater runoff.

district and city councils on costings for new low impact stormwater technologies for New Zealand conditions. Low impact approaches work with nature as much as possible. For example, they minimise or avoid impervious surfaces to reduce stormwater runoff, and use vegetation and swales to absorb water and trap pollutants and sediments.

As Landcare Research scientist Éva-Terézia Vesely explains, the researchers are using “life cycle” costing to track the cost of a device “from the cradle to the grave”; from design and manufacturing to usage, maintenance and disposal.

“This is important because future costs associated with the use and ownership of an asset are often greater than the initial acquisition cost. Costs may also vary significantly between alternative solutions to a given operational need.

“Life-cycle costing helps us to compare low impact and conventional approaches, and also to compare one low impact device with another. It also encourages cost reduction through better design.”

However, there is one major hurdle. “We have very poor comparative information about what any stormwater system costs,” says Miss Vesely. “Relatively few councils in New Zealand have detailed design and costing information for the low impact devices they manage. Related pieces of information such as design fees, public consultation costs or construction costs are often not kept together. Staff turnover and time pressures make these details difficult to retrieve.

form to standardise recording of this information. We will also survey councils further afield to gather more costing data, to add to the true picture of what various stormwater systems cost in different conditions.”

Auckland costing and environmental details will be programmed into a database for easy access by end-users.

“It is excellent that councils are so willing to share information to gain a better understanding of the pros and cons of stormwater treatment devices,” Miss Vesely says.

Whilst Landcare Research’s initial focus has been on Auckland, it is also working with stormwater engineers from Tauranga, Palmerston North, New Plymouth, Christchurch and Taupo.

Funding: Auckland Regional Council, FRST (Foundation for Research, Science and Technology)



More fun for fish: this decorative drain in Taupo not only looks good, it contains mesh to prevent rubbish from entering waterways.

“To address this, the ARC and researchers from Monash University and Landcare Research, with input from the other councils have designed a data collection

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New life-cycle techniques in action - the Glencourt Place example

Modelling stormwater management is an efficient way to explore options, but practical insights from comparing new with traditional techniques will deliver better-informed decisionmaking. As well as life-cycle modelling future stormwater options, Landcare Research staff have been costing a pilot low-impact system in practice, with the aim of determining its feasibility.

In the first project of its type in New Zealand, the North Shore City Council offered 25 homeowners in Glencourt Place, Glenfield, the option of installing rainwater tanks to reduce runoff from roofs and alleviate flooding problems.

This removed the need to reticulate the area with stormwater pipes and to upgrade the downstream reticulation to take the increased flow.

Plumbers connected the rain tanks to

houses so stored rainwater could be used for toilet flushing, laundry and gardens. This is expected to save each property owner up to \$150 per year on water rates.

Stored water that is not used is discharged

slowly to infiltration trenches, thus avoiding the peak flow rates that cause flooding and stormwater contamination of streams and beaches.

The council paid for installing the rain tank and plumbing, while property owners pay for maintenance. Initial estimates of purchase and installation costs indicated the low impact approach would cost less than upgrading the conventional piped system.

However, Miss Vesely says life-cycle costings show the low impact system to be of a similar rather than a lesser cost; in part because of the costs associated with the learning process involved in employing new technology.

"Life cycle costs over 50 years for the conventional approach range from \$610,000 to \$620,000, and for the low impact approach, from \$610,000 to \$650,000 including the water savings.

"The newness of the low impact approach translated to higher costs for design, project management and consultation



■ A rainwater tank in Glencourt Place.



■ Éva-Terézia Vesely

- about a third of the total. The added cost could be viewed as an investment in innovation, and be expected to drop in future.

"Also, this was a retrofitting project, so we faced expenses such as altering the guttering on the houses, manoeuvring raintanks into tight spots, and reinstating gardens where we had to disturb them!

"Low impact installations in new suburban developments are likely to cost less, especially as technical knowledge and skills improve."

Costing of environmental benefits,

modelling the impact of future water prices and assessing the implications of these for changing public attitudes were outside the scope of the research. However, Miss Vesely says these factors are also likely to reduce the comparative costs for low impact designs in future.

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■ New leaders strive to bring the green into the black

Making environmental management positive for business is a key goal of Landcare Research's new chief executive.

Dr Warren Parker took over the helm from founding CEO Dr Andy Pearce in July. Dr Parker has wide experience in senior management in the science and research communities. His most recent former roles include Chief Operating Officer (Science) at AgResearch, with key roles in strategy and new business development, and Visiting Research Manager at IMBcom Pty Ltd in Brisbane, the commercialisation company for the

University of Queensland's Institute for Molecular Bioscience. The IBMcom role was a secondment from AgResearch.

Dr Parker says Landcare Research has played a pioneering role in developing greater understanding of New Zealand's land-based ecosystems and how they can be better managed. It has also helped introduce concepts for sustainable business, including the Triple

Bottom Line approach and methods to reduce waste and resource-use, thereby lowering costs.

However, there is considerable scope for further work with the private sector, in part to help dislodge what he describes as "the widespread suspicion of the environmental 'agenda'", but also to increase their engagement in social responsibility, for example, restoration of

biodiversity and recovery of endangered species.

“Sound environmental management needs to be sound business. If we’re genuine about caring for the overall New Zealand environment, then businesses need to see a profitable, positive way forward.

“Through innovation we can develop high-value, low-resource-use products and services in areas such as ecosystems research, genomics and nanotechnology.

“We can continue to advance changes in business systems and practice to improve resource-use efficiency and extend the use of natural products, biomaterials, and biomimicry – products that imitate natural processes. We can also help to design and assess market-based instruments to incentivise and reward efficient and sustainable resource use.

Another aim is for Landcare Research to enhance connections with global research leaders to strengthen the impact of Landcare Research’s science, both within and outside New Zealand. “Many of our environmental challenges have global dimensions – climate change, biosecurity, free trade, energy,” Dr Parker says. “Leading research from the Northern Hemisphere and Australia presents opportunities for New Zealand.

“Landcare Research’s science has significant economic impacts – for example, better pest and weed control measures, alternative forms of energy, and smart ways to enhance biodiversity.

“Our aspiration is that New Zealanders will enjoy a better environment and economy because of our research.”

Dr Parker has joined his predecessor Dr Pearce in addressing what he sees

as underinvestment in New Zealand’s research, science and technology sectors.

A New Zealand economy promoting high-margin sustainable products with enhanced natural capital requires increased investment in research.

“There is a big dividend to New Zealanders’ future prosperity and wellbeing by investing more in research that underpins sustainable development.

“Unless we respond to the symptoms that the environment is showing us that it is under stress, our children will not enjoy the extent of beautiful landscapes, safe drinking and swimming water, or interaction with wildlife that we or our parents did.”

Dr Parker is married with three children. He describes his interests as gardening, walking, and sport (now just watching!).

Meanwhile, **Graeme Boyd** has joined the board as a director. Mr Boyd, who is now running his own contracting business Boyd Insight, was for eight years until September the CEO of the Tauranga-based natural health company Comvita Limited, and lists his key interest as the commercialisation of science.

“I have spent the last 30 years working in this area, with ICI New Zealand and more recently Comvita, so I have many relevant skills to bring to Landcare Research.

“Landcare Research has excellent science and technology awaiting opportunities to be marketed to New Zealand and the world. For example, there is significant potential for some of the technologies used in the sustainable Tamaki building to be promoted commercially.

“I’m also interested in possibilities for extending the capabilities of Sirtrack, our highly successful subsidiary company specialising in wildlife tracking equipment, possibly through using technologies from elsewhere in Landcare Research.”

Mr Boyd says he regards sustaining resources for future generations as important, to achieve a balance between consumption and regeneration. “Greater efficiencies are possible in urban living environments and transportation,” he suggests.

Mr Boyd is married with three adult daughters, and loves music, rugby and golf.



Robert Lamberts, Crop & Food Research

■ Warren Parker



■ Graeme Boyd

Past patterns inspire future housing options for Māori

In a new research project, traditional Māori settlement form and building design will be studied for their application to Māori aspirations in today's world. Manaaki Whenua Landcare Research, in collaboration with Ngāi Tahu and Auckland's Ngāti Whātua o Orākei hapū, will explore ways in which traditional and contemporary Māori values and principles can contribute to improved urban settlement patterns — especially for, but not limited to, Māori.

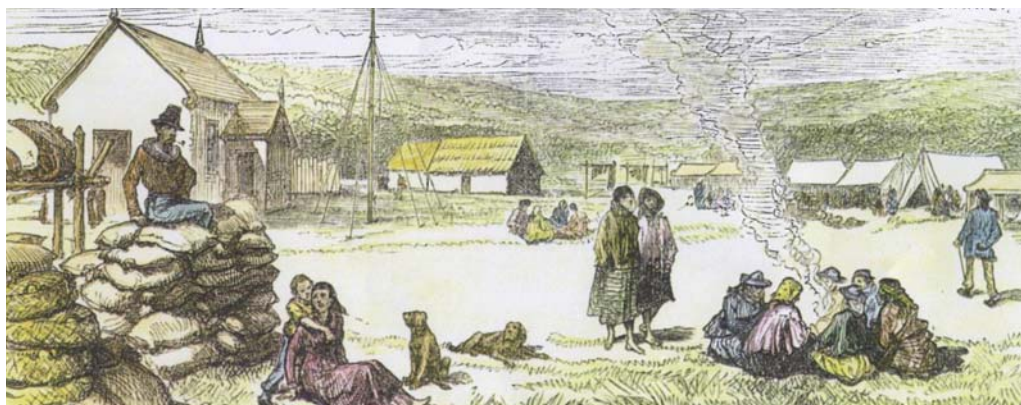
Both Ngāti Whātua o Orākei and Ngāi Tahu are forming concepts for environmental management and settlement development that focus on sustainable, low impact urban environments. In particular, Ngāti Whātua are interested in developing housing at Bastion Point that is both modern and reflective of cultural values and design principles. Ngāi Tahu have similar plans for some of their property. The project will look at papakāinga or the Māori "village" concept, and extend its examination to individual homes, neighbourhood-sized subdivisions, marae and even office building developments led by Māori.

Manaaki Whenua researcher Craig Pauling (Ngāi Tahu) says this is an ideal opportunity for Māori to take a proactive role in developing the living environments of their people. However, there is a barrage of social, cultural, economic, environmental, political and legal hurdles that confront Māori in doing so.

"An increasing number are looking to return to their original roots," Craig says.

"Māori are asking how their families can be brought home to their whenua (place) and marae, when they are so used to living in cities, in conventional housing and subdivisions.

"Other questions being posed include: are there aspects of traditional Māori



Orākei settlement (near Bastion Point) c.1860s.

housing that might be applied to modern-day planning that produce, for example, more self-sufficient and energy-saving housing?

"How do we get around the difficulties of multiply-owned Māori land? Is a return to traditional papakāinga-type settlements viable, or indeed preferable? "Manaaki Whenua can now begin to answer these questions. Our new Tāmaki building incorporates many of the features that Ngāti Whātua o Orākei and Ngāi Tahu are considering for their own projects, such as composting toilets, water and energy-saving devices, and better heating alternatives."

Ngāti Whātua o Orākei Māori Trust Board heritage and resource manager Ngārimu Blair is also a researcher in the project. "To quote Winston Churchill – we shape our buildings, and then they shape us. "Our papakāinga should optimise the relationships between our community, the natural environment, and the built environment. We will refer to our historical patterns of papakāinga and pa layouts, and through research and consultation develop a comprehensive

design that respects Papatūānuku (Mother Earth) and reflects the needs and wants of our community."

Māori architects and academics will also be approached to participate in the research, and local body planners will advise on design and resource consent issues. It is hoped that this research will further develop Māori aspirations and build capacity for Māori to take a lead role in an area of increasing global concern, and argue for the development of low-cost, energy-saving, self-sufficient housing that fits Māori housing needs in a contemporary setting.

The project will begin in January 2006 and will run for two years.

Funding: Ngā Pae o te Māramatanga (the National Institute of Research Excellence for Māori Development and Advancement)

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I Taupo plans to stay beautiful

New urban design techniques may come to the fore as planners seek the best course for the Taupo District to cope with significant growth pressures, mainly from development on the town's periphery.

The Taupo District Council is currently preparing a district wide growth management strategy for the next 50 years. At its heart is the need to protect the spectacular environment, the tourism industry, and lake water quality.

The council sought input from staff of the Centre for Urban Ecosystem Sustainability (CUES), a partnership between Auckland University and Landcare Research. CUES collaborates with local government, the public and research institutions nationwide on establishing case studies for Low Impact Urban Design and Development (LIUDD).

CUES researcher Marjorie van Roon (University of Auckland) worked with the council on ideas for incorporating LIUDD principles into residential and rural-residential developments, particularly in Taupo west. Low impact designs aim to decrease infrastructure costs to council and ratepayers, decrease flooding, and improve water quality and biodiversity.

Mrs van Roon presented an alternative to conventional rural lifestyle blocks.

Her plan shows clusters of homes set in a wheel-shaped subdivision. Homes face outwards for private rural vistas.

Setting houses closer together this way allows for more efficient infrastructure provision, saving money on roading, water reticulation and stormwater piping. Swales and rain gardens absorb stormwater, further reducing piping and the flow of contaminants into waterways.

Better economies of scale for sewerage provision will reduce the need for and nitrogen output from septic tanks.

Also, reducing lifestyle block sprawl may leave more land free for productive purposes. It would reduce disturbance from earthworks and road construction, provide for reforestation of ecologically sensitive areas and boost native biodiversity.

Mrs van Roon says the LIUDD-inspired plan is a paradigm shift, but not as much as some may think.

"Many people move to rural areas for the visual environment, rather than to tend the land. Although the houses are closer together, backyards face the fields, and neighbours would see very little of each other if that's what they want."

Mrs van Roon says her plan was put to the public and the response was mainly positive.

"However, this is just the beginning of a chain of plan changing, consenting, and developing steps needed to follow to make LIUDD a reality."

The Taupo District Council's Environmental Services Manager Damian Coutts says Council hopes to include sustainable urban design principles in its growth strategy, which will be released for public consultation in March.

"We value the opportunity to 'pick the brains' of researchers, and gain ideas outside the scope of conventional planning.

"The district faces the growth pressures of much larger centres. Our physical environment is so spectacular, and our tourism industry so crucial, we have much to lose if we get it wrong."

Funding: FRST (Foundation for Research, Science and Technology)



Marjorie van Roon and Craig Whitehead, University of Auckland

Conventional rural development (left) and a low impact alternative showing modified road and housing layout.

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Researchers help local councils “map” the future

Scientists are creating tools to help councils in the Waikato look into the future and make better planning decisions.

Recent changes to the Local Government Act require local councils to prepare long-term council community plans that will provide integrated planning for at least 10 years. Environment Waikato is leading a project called “Choosing Futures Waikato” that asks communities what they want for their future. By coordinating planning among all districts within the region, EW hopes to generate better outcomes and avoid unexpected conflicts.

As part of the project, EW leads a Research Working Group that includes Landcare Research, the New Zealand Centre for Ecological Economics (NZCEE - a collaborative venture between Landcare Research and Massey University), AgResearch, NIWA, and Scion (formerly Forest Research).

The group is developing methods and tools to help councils and communities evaluate planning scenarios for 10, 20, or 50 years into the future.

Landcare Research and NZCEE staff are developing a prototype systems model that integrates aspects of the environment, economy, and society. The computer model will allow users to evaluate the impacts of different planning scenarios, depicting outcomes as maps, graphs and tables.

As Landcare Research scientist Dr Daniel Rutledge explains, a systems approach offers advantages over conventional approaches. “It explicitly links different issues, which can help identify unexpected consequences. It identifies limits, particularly those related to land availability. It helps people explore different options. For example, we can show what an area would look like with new housing here, new roads there, and where potential traffic problems may result.”

Landcare Research and EW have enlisted Thames-Coromandel and South Waikato district councils to help develop and test the prototype model. Thames-Coromandel faces the challenge of accommodating rapid population growth while maintaining the natural character of the district. In contrast, South Waikato faces major land-use change from forestry to dairying.

Should Thames-Coromandel continue to encourage population dispersal along the coast, or concentrate it in key areas? Should the district have Gold Coast-style high-rise apartments, or restricted

building height, as in Queenstown? Will Aucklanders price locals out of the market? If so, how would that affect infrastructure?

Meanwhile, South Waikato faces a very different set of questions. How will more “cow cockies” and fewer logging gangs affect overall population levels and the need for roads and schools? What will more dairying mean for the local bottled water industry?

“By partnering with councils, we gain insights into the issues and problems they face and can direct our research appropriately,” Dr Rutledge says.



Images courtesy of Environment Waikato

■ *The changing face of the Coromandel town of Whitianga. Above: a 2003 aerial photo. Below: a projection of what the town may look like in 2030 if currently planned development is implemented.*

Dr Beat Huser, manager of Sustainability Projects at Environment Waikato and leader of the Research Working Group, says this new, holistic approach is both refreshing and challenging.

“The shift to long-term planning horizons requires new thinking and new capabilities.

“It also requires much more coordination between government, non-government

and research agencies, and business and the community.”

Dr Rutledge says “futures research” tools can be applied throughout New Zealand.

“Ultimately it’s about the quality of life that we want for ourselves, our children and our grandchildren,” Dr Rutledge says. “We cannot ‘have it all’, so we want to help people choose what they want and at the same time give future generations the

opportunity to make their choices.”

Funding: FRST (Foundation for Research, Science and Technology)

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I Hikoī highlights urban environments’ journey

A hikoī has highlighted how parts of Christchurch are bouncing back from environmental damage – particularly wetland areas.

Visitors from Northland to Southland attended the restoration hikoī (travelling workshop) in October. This format was chosen to ensure the information exchange was tangible, practical and useful. It canvassed examples of urban restoration and showcased Māori working with the wider community to revive damaged environments. Most Māori now live in urban areas, and many of their traditional resources, including mahinga kai (food gathering areas), have been degraded or destroyed. Sites visited by the hikoī were selected to cover a broad range of restoration and integrated-catchment-management issues, highlighting the role of urban marae and other urban environments in restoring biodiversity.

Manaaki Whenua Landcare Research initiated the hikoī, along with the Kaupapa Taiao unit of Te Rūnanga o Ngāi Tahu. The organiser, Dr Colin Meurk of Landcare Research, says many of the sites are being restored in ways that fit with modern thinking on low impact urban development.

Travis Wetland, near the suburb of Burwood, is New Zealand’s largest urban freshwater remnant, and was once a significant mahinga kai to Ngāi Tahu.

“The wetland was under severe pressure from urban encroachment, drainage, landfill, and cattle grazing,” Dr Meurk says. “It’s being nursed back to health through drain closure, lake construction, pest control and revegetation using native plants.

“Lowland wetlands are quite easy to restore, simply because where you have water you have the beginnings of an ecosystem, and plants grow fast. The wetlands act as ‘stepping stones’ – strategically placed groves of native

plants that coax native birds into our cities in greater numbers. As the plants mature, birds are attracted and spread seeds. The network of native clusters becomes stronger, the birds’ food sources become closer, encouraging more birds, and so on.

“We know that more waterfowl and bellbirds have been coming to Travis Wetland, and migratory birds overhead can easily spot it.

“Te Ihutai, the Avon-Heathcote



Craig Pauling

■ Rik Tau (mana whenua, Ngāi Tūāhuriri) of the Avon Heathcote Estuary Ihutai Trust explains restoration efforts to hikoī participants.



estuary, is another mahinga kai area, and hosts internationally significant birdlife including the eastern bar-tailed godwit or kūaka. Safe food gathering may be possible once again when the Christchurch sewage discharge is diverted out to sea, and the salt marshes and island complexes form a buffer between the tidal flats and the urban fence.

"In contrast, restoring urban native bush remnants is a longer-term process, with large trees taking centuries to mature."

The hīkoi also visited Tumara Park, a Ngāi Tahu property development adjacent to Travis Wetland, to see mitigation of stormwater impacts through the construction of detention ponds and swales.

"Tumara Park incorporates the natural water cycle in quite a densely developed urban area, and is aesthetically pleasing as well," Dr Meurk says.

"We are however still learning how to achieve these integrated systems as engineering ecology, biodiversity, people, business and attitudes to aesthetics all come to terms with each other."

Ōtukaikino, on the northern outskirts of Christchurch, was once a wai tapu site used for water burials, but lapsed into a willow-covered swamp. It is now

a wetland reserve, and a place of remembrance and contemplation. "Ōtukaikino is an interesting example of a partnership in restoration between Ngai Tūāhiriri, who traditionally used it for funeral rites; the Department of Conservation, the custodians of the reserve; and Lamb and Hayward, who resource the restoration projects," Dr Meurk says.

Meanwhile, Rehua marae, in the heart of suburban St Albans, shows conservation fitted within a busy urban enterprise. A box drain cut straight through the grounds before a "stream naturalisation programme" by the Christchurch City Council in consultation with marae trustees created stream meanders and graded banks. The new entranceway, bridges and fences are now landscaped with an imposing statement of native plantings.

Craig Pauling (Ngāi Tahu) of Manaaki Whenua Landcare Research says Māori tend to take a very long term approach in their restoration projects, which gives them a unique take on urban restoration.

"We are patient and will set things in place for our descendants – ensuring that our history, traditions and essential resources are sustained for the future."

The restoration hīkoi was the first of



Craig Pauling

Colin Meurk and Mandy Home (Ngāi Tahu) get up close to some native marsh ribbonwood.

its kind. Organisers hope that it will be repeated elsewhere in the country in future.

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