

Monitoring Research Quarterly (MRQ) is produced by Auckland Council's Research, Investigations and Monitoring Unit, RIMU. Each edition of the newsletter contains reports of RIMU's current work including information about recent publications, research, facts and trends about Auckland. RIMU publications are available on the Auckland Council and Knowledge Auckland websites.



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Auckland housing sector reveals many research challenges

The availability of secure, healthy and affordable housing is fundamental to Aucklanders' well-being. Housing is a core component of our social infrastructure and an important contributor to commercial and industrial development patterns, wealth creation and distribution, and macroeconomic performance. Land and housing markets are critical to managing population and business growth in Auckland and shaping it as a liveable, sustainable city.

Building on the directions in the Auckland Plan, the council has prepared the Auckland Housing Action Plan, which identifies 32 actions to improve housing supply, affordability, quality and choice. Research is needed in order to provide a robust evidence base for implementing the Housing Action Plan, the Unitary Plan and the Auckland Plan.

The housing sector has become increasingly complex, affected by changes in family life cycle, an increasing diversity of need fuelled by an ageing and ethnically diverse population, geographical differences, housing affordability concerns, and innovations in housing finance. Changes in housing forms are interrelated with population growth, changing lifestyles, transport, environmental impacts, technology and the economy. Thus, maintaining a body of research that reflects changes and trends in the housing sector is important to the development of sound housing policy for the benefit of current and future Aucklanders.

Following the closure of the Centre for Housing Research in 2011, housing research in New Zealand has been constrained by limited resources, fragmentation across agencies and variable coverage of issues. RIMU will fill the gap by co-ordinating and promoting housing research relevant to Auckland's needs. The Housing Research Plan, described in the following section, is the first step in that task.

The Housing Research Plan

The Auckland Council Research Strategy identifies five important areas of housing research: supply and demand, housing preferences, housing quality, housing affordability and homelessness. The objectives of the Housing Research Plan are to provide an overview of recent Auckland housing research; highlight research gaps; and identify new housing research projects.

For more information about the Housing Research Plan, please contact Ali Memon, ali.memon@aucklandcouncil.govt.nz





New RIMU research projects announced

Following an assessment of research project proposals, we're excited to announce our new projects for 2013-2015:

Ethnic precincts in Auckland

This project aims to understand the social, spatial and economic role of ethnic precincts in Auckland communities; their impact on levels of social cohesion; and the experiences of business owners. Lead researcher: Dr Carina Meares

Mangroves: recovery trajectories at mangrove removal sites

This project will analyse data on historical mangrove clearances to develop guidelines on the best methods for successful mangrove clearances.

Lead researchers: Dr Jarrod Walker and Dr Megan Carbines

Mangroves: tracking rates of mangrove expansion and infilling

This project will analyse recent rates of local or community-level mangrove expansion, using satellite remote sensing methods. Lead researchers: Dr Jarrod Walker and Dr Megan Carbines

Small-scale residential development sector

This project will explore the motivations, strategies and constraints of developers involved in the small-scale residential development sector in Auckland and examine developer experiences of regulatory controls and council strategies. Lead researcher: Kiely McFarlane

Te Muri Regional Park: land management and stream restoration

This project aims to assess the environmental and economic effects of applying 'sustainable land management practices' on a sheep and beef farm. The results will provide information for the ongoing management of the Te Muri Regional Park and an understanding of rural land management practices. Lead researcher: Dr Martin Neale

The water quality effects of artificial sports fields

This project will identify the contaminant types and quantities from a newly constructed artificial field in order to understand the potential environmental effects of artificial turf fields. Lead researcher: Dr Martin Neale

Youth mobilities in The Southern Initiative area

The project will use surveys and focus groups to investigate how transport options affect access to work, education, health services and social networking opportunities for young people in The Southern Initiative area.

Lead researcher: Emma Fergusson

Please contact the lead researchers for more information about the projects or email research@aucklandcouncil.govt.nz

Recent research activities

RIMU's scientists, researchers, technical specialists and analysts have assisted with many projects over recent months, including:

- published new reports: Capacity for growth study 2012 methodology and assumptions (TR2013/009); Capacity for growth study 2012 results (TR2013/010); Ethnicity and migration in Auckland (TR2013/012); Industry snapshot for Auckland: niche manufacturing (TR2013/016)
- published posters with information about RIMU projects including: Forest and wetland terrestrial biodiversity monitoring programme; Geospatial analysis of train station walkable catchments; Influence of antifouling paints on copper levels in Auckland marinas; Skills shortages and oversupply of labour in Auckland; Water quality effects of artificial sports fields
- hosted the We Know Auckland research networking event on 6 June, which included a talk by Dame Anne Salmond and the public launch of the Auckland Council's research strategy document, Auckland Council research strategy and priority research areas 2013-2016
- worked with council biosecurity staff and the South Kaipara Land Care Group to complete a survey of the invasive submerged freshwater weed hornwort (*Ceratophyllum demersum*) in South Kaipara. A hornwort management plan is now being prepared
- worked with Auckland University's Centre for Infrastructure Research on water asset management, transport planning and stormwater projects. The research alliance group is seeking new research proposals for 2013-2014
- met with Statistics New Zealand officials to help develop data reporting resources for the 2013 census results
- installed acoustic sensors in North Shore streams for better stream flow data for stormwater models
- completed capacity modelling of residential zones for the draft Unitary Plan
- completed the 2013 ISO 9001:2008 quality assurance audit for environmental monitoring
- Dr Martin Neale gave a presentation at the Society of Freshwater Science meeting in Jacksonville, Florida
- met with the Franklin Local Board to discuss environmental monitoring of Waiuku Estuary.

The reports noted here are available on the <u>Auckland Council</u> or <u>Knowledge Auckland</u> websites.

RIMU students' research presentations

RIMU fosters emerging science and research talent by offering a student partnership programme with Auckland universities. The programme has students working with our Environmental Monitoring team over summer and students receive an allowance towards their masters degree.

The RIMU-Auckland universities collaboration means that student projects focus on topics important to Auckland, increasing knowledge of how our environment works. Auckland Council provides support through RIMU mentoring, expertise and knowledge and by supplying equipment for fieldwork.

Students present their findings to council staff in April each year. This year's presentations included talks about coastal zooplankton in the Hauraki Gulf, primary production in freshwater systems, sea surface temperature variation at Leigh and seaweed on Great Barrier Island beaches.

If you would like further information about the projects, please contact melanie.vaughan@aucklandcouncil.govt.nz

Niche manufacturing in Auckland

RIMU takes regular snapshots, or assessments, of Auckland's industry and business sectors to gain data and analysis to inform council's involvement in economic development.

The latest industry snapshot considers the niche manufacturing sector, which includes manufacturing and wholesaling of machinery and equipment. The sector, which is now highly diverse and globally competitive, evolved from businesses providing equipment for farming, mining and forestry. It is important for knowledge and technology intensive activities and is increasingly integrated with ICT industries, digital content providers, health technology and biotechnology.

Auckland's niche manufacturing sector has 2500 businesses employing 19,000 people and exporting \$1.4 billion each year, with the main industry clusters located around Mount Wellington-Penrose, East Tamaki, Albany and Auckland Airport. The main products produced by this industry include machinery and equipment for weighing, food processing, packaging, movement of goods, automation systems, and whiteware. Growth since 2000 has been flat overall, but ranging from a 54 per cent fall for appliances, to a 15 per cent rise for pumps and heating equipment.

Industry snapshot for Auckland: niche manufacturing, Auckland Council technical report TR2013/016 and other industry snapshots are available on the Auckland Council or Knowledge Auckland websites or from Ross Wilson, ross.wilson@aucklandcouncil.govt.nz







Figure 1: urchin barren

Figure 1: kelp forest

Figure 1: turfing algae

Satellite maps underwater reef communities

RIMU is working with research company EcoGis to map rocky reefs in the Hauraki Gulf using satellite imaging technology. Currently, there is no large-scale mapping of intertidal (above water) and subtidal (underwater) rocky reefs in New Zealand. This means that we have no detailed knowledge of how much of a particular habitat exists underwater or how often it changes. RIMU is using satellite imagery and multispectral analysis to identify and classify both physical habitats — reefs, sand and mud; and biological habitats — kelp forest, urchin barrens, algae areas on Hauraki Gulf rocky reefs (see Figure 1).

Images are taken by Digital Globe's World View Two satellite which orbits the earth every 24 hours at an altitude of 770 km. The satellite uses eight narrowly focused multispectral bands (light bands) to map and differentiate features on the earth's surface. Two of the satellite's spectral bands are particularly useful for RIMU's reef mapping project:

- the coastal band, which allows for greater penetration into water and measuring depth
- the yellow band, which is important for vegetation identification and analysis.

Using the satellite images and the coastal and yellow bands has enabled mapping of underwater reefs and associated habitats to 18 metres deep, which is a first for New Zealand. For the Tawharanui Peninsula (see Figure 2) scientists have identified areas of intertidal reef, sandy beaches, subtidal sand areas and three subtidal reef habitats (kelp forest, mixed algae and urchin barrens - see Figure 3). Close examination of images and checking aerial photograph overlays (see Figure 4) shows that the predicted habitats derived from image analysis reflect actual features identified from land, beach and offshore visits.



Figure 2: Tawharanui Peninsula



Figure 3: Tawharanui Peninsula habitats

When the results of the analysis are confirmed, stylised maps of the habitats are created (see Figure 5).

The analysis of the satellite imagery has produced a map for most of the Hauraki Gulf showing reef locations and the spatial coverage of the different habitats. Using the map, the total areas of habitats – intertidal and subtidal reefs, kelp forests and urchin barrens – can be estimated for the whole Hauraki Gulf. These habitat areas can then be used to calculate reef productivity, which helps to understand the role of reefs in supporting the Hauraki Gulf's marine ecosystem. The maps and satellite image data layers will be used for the marine spatial planning of the Hauraki Gulf, enable greater planning for the use of the Gulf and aid in tracking both large and small changes of marine habitats.

For more information about the reef-mapping programme, please contact Dr Jarrod Walker, jarrod.walker@aucklandcouncil.govt.nz



Figure 4: Aerial photo overlay with habitat outlines



Figure 5: Stylised habitat map



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For more information about Auckland related research, data and monitoring programmes visit the Research Unit's websites, <u>Knowledge Auckland</u>, <u>Monitor Auckland</u> and <u>State of Auckland</u>.

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