TRANSPORT AT CROSS

Compared with other countries, New Zealand has a widely dispersed population and a rugged landscape. As a result, our investment in roading, compared with other forms of transport, is high by international standards. We have also one of the highest levels of vehicle ownership in the world, with more than one car for every two people. Although there is about 93,000 kilometres of public road, in many locations all those cars just don't seem to fit.

Recent debate over proposals regarding the future management of New Zealand's roads is focusing our attention on the benefits and costs of the network. Lincoln University, as a result of its location and the skills of its staff, is ideally placed to study the impacts and management of our roading infrastructure.

Three research programmes are currently underway.

ROADS

The Ecological Effects of New Roads

A literature review on the ecological effects of new roads prepared for the Department of Conservation by Lincoln University researchers, is expected to create widespread interest.

"Many agencies are reviewing their methods of restoration of habitats and the mitigation of the effects of development in sensitive areas, so there are a number of key parties who have taken an interest in the document," Dr Ian Spellerberg of the Department of Resource Management says.

Not surprisingly, road construction agencies are interested. According to Spellerberg, the requirement to comply with such legislation as the Resource Management Act is only part of the motivation. He believes there is a definite and growing concern amongst developers about their effects on the environment that goes beyond merely complying with minimum requirements.

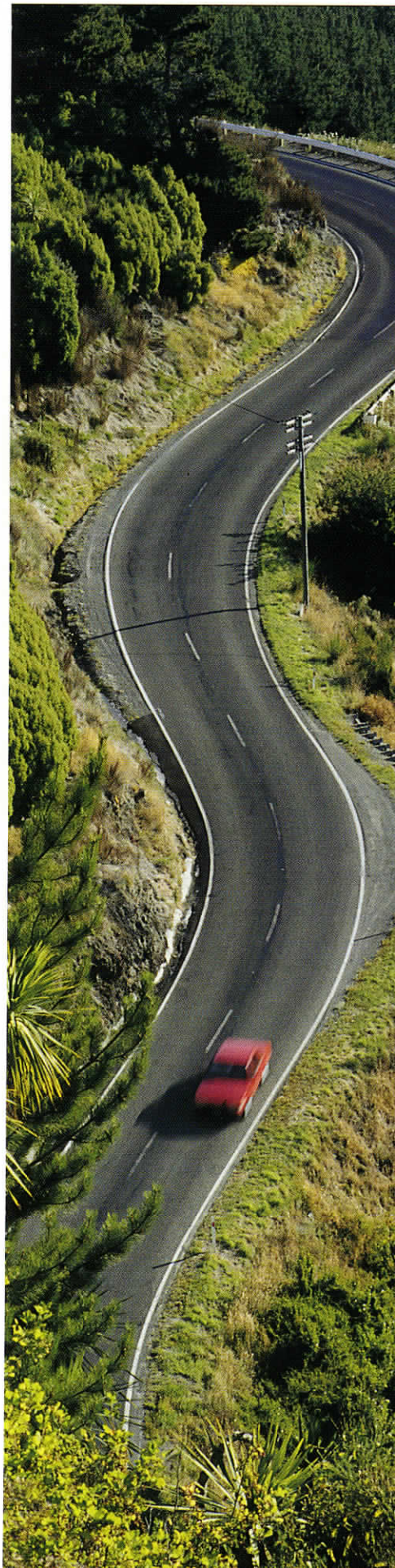
"We are far more aware of the need to tidy up the effects of our actions, and look beyond the immediate benefits to humans of our developments," says Spellerberg. "Long term impacts are becoming more clearly understood."

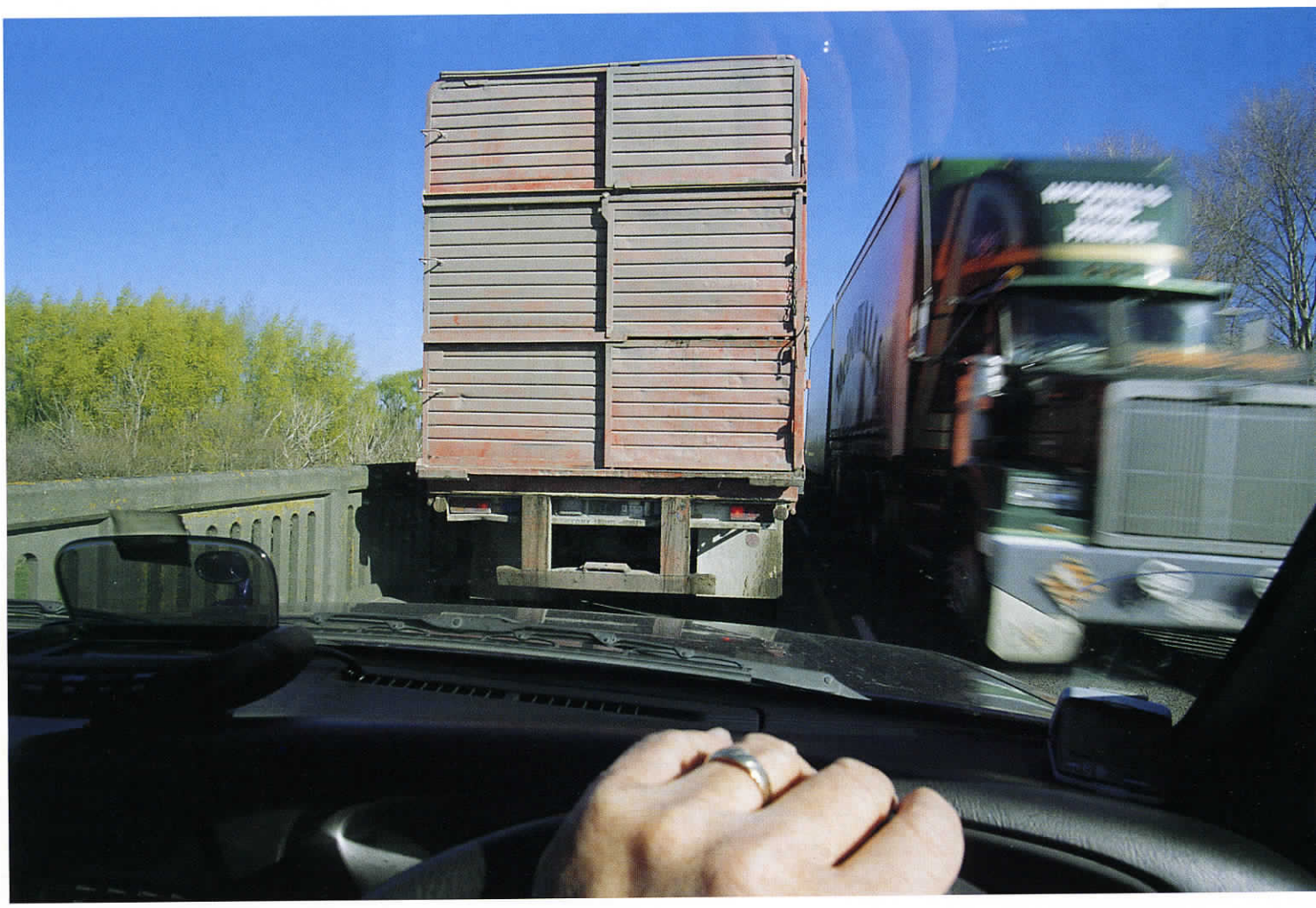
Although similar reviews of the effects of new roads have been published in previous years, the review by Dr Spellerberg and Toni Morrison of the Department of Resource Management covers new ground, particularly in providing improved data about the impacts of habitat fragmentation and the mitigation of effects. Other issues covered include heavy metal deposition on roadsides, gas emissions of vehicles, local changes in hydrology, habitat loss, the dispersion of invasive plants, the impacts of dust, sand, noise and light on biota, and of course, road kill.

Although published reports particular to New Zealand are not common, a number of studies specific to this country were identified. Amongst these were reports on erosion, vehicle emissions, changes in microclimate, the introduction of exotic vegetation, and the effects of roads on animals. Studies on the latter indicate that new roads facilitate the introduction of small mammals into forests.

The data collection process used for the review illustrates how the Internet is becoming a standard medium for research. Spellerberg and Morrison posted a Web page on the Internet and received sufficient interest to make it worthwhile. "The Web site only supplemented our traditional research methods, but certainly provided access to the more obscure publications that we would not normally encounter," says Spellerberg.

The data is to be published by the Department of Conservation and Spellerberg intends to author a summary in a peer review journal.





Stock effluent on New Zealand's roads

One of New Zealand's more thorny transport issues is being tackled by Luxembourg PhD student Jean-Paul Thull. Thull estimates that 180 tonnes of effluent from transported sheep may be deposited on South Island roads each day. This is in addition to 144 tonnes of effluent from cattle. Although spread thinly, this form of pollution has caused the death of at least one motorcyclist, near Tokoroa in 1992, and helps to spread such pathogens as tuberculosis, tetanus, brucellosis and salmonellosis. It is also reputed to damage the country's image as a 'clean, green' tourist destination.

Effluent certainly affects the temperament of other road users, erodes the road surface itself and has negative environmental effects through run-off.

Although technically the act of depositing effluent on roads is illegal, and stock transporters are therefore liable, there are few prosecutions. According to Thull's supervisor, Andrew Dakers of the Department of Natural Resources Engineering, this is because the issue is more complicated than it seems.

"There are a number of stakeholders contributing to the problem, and the stock trucks are merely the meat in the sandwich," he says. "Stock agents take the coordinating role. They will be called by the freezing works when the abattoir is ready for more animals, often with very little warning. The agent advises the farmer who then contracts a transport company. If the company doesn't respond immediately, they're likely to lose the job."

The problems occur when cattle are moved directly from grazing to transport with no holding period. They have no chance to 'empty out' on the farm. Many transport agencies have responded by fitting holding tanks to their vehicles, but the tanks fill rapidly, and there are no legal dumping facilities in the South Island between the farms and the freezing works.

Price competition between freezing works adds to the problem. Stock are often transported greater distances when farmers do not sell to the nearest meat works.

Thull is working through this maze of communication and coordination to seek a fair resolution to the problem. His research is currently being supported by the Canterbury Regional Council and Mobil Oil New Zealand. Transit NZ is also coordinating a national taskforce to help address the issue.

Dakers believes that by focusing on education - to improve coordination between the responsible agencies - and by installing dump sites in the right locations, the problem can be alleviated. "If the mechanisms exist for drivers to avoid the overflow of effluent onto roads, then the law regarding pollution of roads can be enforced," says Dakers. "But first we have to identify and implement the solutions in such a way that they are fair and reasonable."

Thull will also be looking at changes to legislation, the implementation of voluntary standards, such as ISO 14000, and the treatment of effluent. His work may have a double benefit in reducing the illegal dumping of toilet wastes from camper vans.

Ridesharing to Lincoln

Lincoln University's relatively isolated location on the Canterbury Plains has proven to be an ideal catalyst for a project that will seek to reduce the number of vehicles on New Zealand's roads. Or, at the least, increase the number of people in each vehicle.

Dr Glen Harrison of the Department of Resource Management was recently approached by the Energy Efficiency and Conservation Authority (EECA) to develop and test a method of encouraging Kiwis to 'rideshare'.

Dr Harrison has teamed up with marketing and economics lecturer Dr Diane Mollenkopf. At this stage the feasibility study for the project is complete and it is hoped that the chosen method - a Website - can be developed for the University.

Ridesharing refers to an alternative to the traditional sign of a successful democracy: one person, one car. The alternatives include taking a bus, cycling, and, of course, car pooling.

Lincoln University has a reputation for the number of informal car pools which operate from Christchurch. Currently, the methods used to organise car pools are, according to Dr Mollenkopf, "informal and intensive. Names are posted on various notice boards around campus and on the University's electronic noticeboard. There is no one central repository. Our feasibility study identified more efficient means of coordinating rides, and of educating staff and students of the benefits of ridesharing. It is now largely a matter of developing and testing the right software, getting the marketing down right, with the right organisation."

Harrison's and Mollenkopf's research identified a number of rideshare Websites in the USA which show promise. In California and Washington State interactive Websites provide bus timetable information, van and carpooling coordination services, telecommuting advice and even an interactive itinerary planner to help get you from one place to another via a variety of public transport opportunities.

Mollenkopf envisages such a system operating here. "The idea is to develop and pilot a site that can be adapted by other organisations, particularly local authorities," she says. "We would like to be able to coordinate both regular and infrequent commuters. For example, a person may be able to pool with one group on Mondays, Wednesdays and Fridays, and with another group for the rest of the week. Ideally the groups should live in the same area to increase efficiency. We would also like to see a system allowing people on one-off trips, such as to the airport, being able to coordinate."

Mollenkopf believes the team will be able to develop software that can coordinate people from at least the same suburb. Getting the focus down to individual streets will probably be the aim of a more refined package.

"A key objective," she says, "will be education. There are clearly high costs associated with driving a vehicle to Lincoln from Christchurch every day, and not only for the car owner."