Executive Summary

Crucial to any action towards waterway management on farms is information on what might be done and how well such action has worked already. This publication gives 16 case studies of how New Zealand waterway owners and managers are dealing with problems relating to riparian pollution and contamination.

1. Managing erosion and drought: drystock farming on the Huatoki Stream, Hawke's Bay. The study deals with faecal contamination from sheep and cattle farms on rolling to steep hill country in central Hawke's Bay. Soils are mainly silty loam, underlain by muddy siltstone. The stream is a tributary of the Porangahau River, which has high recreational use.

2. Dairying and border-dyke irrigation along the Waikakahi Stream: a water management challenge. The land is in South Canterbury and used to be sheep country; in the last ten years, the Waikikahi Flats have become dairy farms. The land was originally wetland and swamp, a flood channel for the Waitaki River.

3. Waipunahau (Lake Horowhenua): restoring the mauri. The lower North Island lake is heavily eutrophied and the water is undrinkable. The lake bed, margin and Hokio Stream (the outlet) are now owned by the Muaupoko's Lake Horowhenua Trust. The Trust has been instrumental in planting a first round of native plants and in establishing a native plant nursery which will also train Muaupoko young people in skills needed for future stages.

4. Whangamata Stream: riparian, stream and water quality changes over 24 years of retirement. The stream is on the northern edge of Lake Taupo and is a significant trout spawning stream. Before retirement it was heavily grazed, wide and shallow, and had eroding banks. Its 24-year history of rehabilitation is fully documented and is a valuable indication of what can be expected in current improvement initiatives.

5. Peat farming in the Waikato: striking a balance between production and the environment. For peat farming to work, there must be a balance between maintaining a water table low enough for production and high enough to minimise shrinkage and impact on adjacent wetlands. This study looks at two dairy farms which have addressed the problem.

6. Deer farming and riparian management in Southland. High sediment loads from deer-induced erosion can be a major cause of water contamination. The study looks at two deer farms: one long-established, and one comparatively new.

7. Whaingaroa Harbour Care: community initiative to restore a harbour and a fishery. Raglan locals established a society to address the deteriorating state of their harbour, which has a narrow exit to the sea and serves as a catchment for pastoral farming and plantation forestry. Much planting has been done, and many members of the wider community have changed their attitude towards riparian management.

8. Dairying on pumice: controlling erosion, willows and poplars. Much of the volcanic pumice soils in the Reporoa basin, between Taupo and Rotorua, have major erosion problems following conversion to pasture lands. The Torepatutahi Catchment Scheme is recommending major land use changes and an extensive soil conservation programme.
9. Orcharding and sustainable land and water management in Eves Valley, Nelson. Pesticides are an essential part of orcharding but can damage water quality in a variety of ways. ENZA has introduced a voluntary integrated fruit production programme, designed to meet international demands for food safety and environmental responsibility, and most orchardists are participating in this.

10. Riparian habitat restoration on the Mangahanene. The stream, on the northern side of Lake Karapiro, near Cambridge, drains pasture on which sheep, cattle and deer are farmed. The stream passes through erosion-prone alluvial pumice. The landowners intend to re-establish indigenous vegetation and restoring the riparian ecosystem to be as self-sustaining as possible.

11. Commercial forestry and riparian management: environmental management by self-regulation. The study looks at Weyerhaeuser New Zealand's management of production forest in Nelson and Marlborough. The company has an environmental management system for its own operation and is working with the Tasman District Council to assess such a system in relation to the aims of Resource Management Act.

12. Riparian management in peri-urban Auckland: lifestyle blocks and landcare initiatives. When there are a large number of landowners, riparian management may be difficult, as owners are driven by a variety of goals and issues. One individual property at the Kumeu River is examined; also profiled is a community-based landcare initiative in the Hays Creek catchment, which supplies Papakura.

13. Commercial vegetable growing in the Franklin District: the search for sustainability. The property grows onions, carrots and potatoes for Europe and Asia; the owners are keen to monitor sediment loss and nitrate contamination of groundwater while maintaining their production at competitive levels. The owners are participants in the Franklin Sustainability Project, which is coordinated by a wide variety of organisations having an interest in land management by commercial vegetable growers.

14. Sustainable land and water management in the Waitomo Valley: reducing erosion to save a cave. The remaining life of the Waitomo Glowworm Grotto is threatened by build-up of sediment. A multidisciplinary catchment management group was set up; after a slow start, the landcare concept was applied, involving property protection plans and Land Improvement Agreements over a 99-year period. More work than originally planned has already been done, owing to the enthusiasm of landowners.

15. Mangakahia River Valley Landcare: managing water and weeds in Northland. The catchment drains the area west of Whangarei, adjoining the Wairoa River, and is large by Northland standards. A river landcare group is confronting significant issues for the valley, which is half pastoral, and the other half either plantation forestry or podocarp forest and scrub. The Mangakahia River floods

regularly and rapidly, carrying large amounts of silt. Farm stock have free access to its edge. Two individual farm properties are described.

16. The Upper Kaituna Catchment Control Scheme: has riparian retirement been successful? The scheme was designed for Lakes Rotorua and Rotoiti, and its results after 10 years are examined in detail. Sediment and phosphorus loads and streambank erosion have both decreased; nitrate and particulate nitrogen loads have increased. Future recommendations and expectations are given.

Making a Difference: Turning Words to Action and Action to Results

Most rural people are aware that our waterways aren't in the condition they used to be, and are irritated by the fact that they can no longer safely drink from the stream they used to as a kid. Many rural people realise that farming practices are contributing to the deteriorating state of our waterways, and that something should probably be done about it. Quite a percentage of rural people accept that they and their farms could be adding to the problem, and they would like to do something about it. Some, but not enough, are doing something about it. The important questions are why are more people not doing more, and what is required to turn words into action?

Too many human factors relating to *motivation*, *perception* and *information* are the reasons why intentions aren't translating to action. To be motivated, people must have an important enough reason or incentive to change the way they manage water. Many have a perception, or general misconception, of what sensible water management need entail. Also they lack information, ie, readily available practical and cost-effective options for management that will produce positive results.

Sixteen case studies follow which outline the experiences of rural New Zealanders when it comes to sustainable land and water management and riparian restoration. They cover the length and breadth of New Zealand and as many rural situations as is possible in 16 case studies. The challenge at the start of this project was to link the various experiences and practices together in a coherent fashion. As it has turned out, there are common messages and experiences coming out of all of the case studies, and some of these are summarised below.

Money

The most critical element of motivation towards things riparian is money, or in many cases, the lack of it. Irrespective of moral or philosophical support for sustainable farming practice, a shortage of cash, accompanied by the perception that riparian management is inevitably costly to the pocket and to farm productivity, is the overriding reason expressed for lack of action. Expensive nine-wire post and batten fencing at $8 to $10 a metre, and 10-metre wide grazing retirement strips along productive river terraces is the common view of good riparian practice. In many situations, this perception is being reinforced by publicity and practice; permanent riparian margin retirement is often marketed as the panacea of sustainable water management, the cure-all for all of our water quality problems. In reality, it is merely one of the many management options open to landowners; there are several alternatives that can make significant improvements to water quality at low, or no, net cost.

On the other hand, all of the most substantial and successful riparian projects have had ready access to money. The Upper Kaituna Scheme in the Bay of Plenty (see *Case Study 16*), the Lake Taupo and Reporoa Catchment Schemes (*Case Study 4* and

Case Study 8) and the Waitomo Catchment Scheme (*Case Study 14*) are among the largest undertaken in New Zealand; they were also heavily funded by central government during the 1970s, 1980s and early 1990s. Participants agree that they would not have undertaken the retirement work if a large percentage of their costs had not been paid for. However, of even more interest, several of those participants acknowledge that with the benefit of hindsight they would now not hesitate in undertaking the work.

Farm productivity

There is a strong perception among landowners, and among many field advisers, that riparian and water quality management invariably must result in lost farm productivity, upfront costs with no likelihood of a return, and the creation of obstructions to farm management. This perception is a significant reason why more riparian management is not being undertaken, but there is increasing anecdotal information and experience available to suggest that farm productivity can, in fact, benefit directly from improved soil and water management practices. Livestock and pasture management practices which reduce erosion and surface runoff will provide production gains by the prevention of excessive pasture damage and soil and fertility loss, and at the same time, significantly reduce the contamination of our waterways.

Several farmers interviewed for the case studies have seen the on-farm benefits of changed practices and appropriate land retirement and are now continuing to pursue improvements as much for the benefit of their farms and farm management as for the positive environmental benefits (*Case Study 14* and *Case Study 16*). Their on-farm productivity has not fallen at all despite sizeable areas of riparian fencing and tree planting. They are now spending their operating capital on their better land that produces more for every extra dollar spent on it (*Case Study 14*).

Funding and technical assistance

Several regional councils offer significant levels of financial support for riparian works (see *Case Study 1*, *Case Study 8*, *Case Study 14* and *Case Study 16*), especially riparian retirement and planting, and most offer free technical assistance, some in the form of farm and environmental plans (*Case Study 16*).

Several landcare and community groups around the country have very effectively raised substantial amounts of money from a wide variety of sources to fund riparian works (*Case Study 3* and *Case Study 7*).

International markets

Discussions with farmers around New Zealand have revealed that many consider the increasing international demand for sustainably produced produce, accompanied with the belief that New Zealand's clean and green image is under threat by poor land management practices, is reason enough for the adoption of improved land and water

management practices. Others, however, express scepticism as to whether there is any direct market evidence of such international demand.

In compiling material for this publication, several examples have arisen where international markets are demanding evidence of sustainable production from New Zealand producers. Two examples are discussed in *Case Study 9* and *Case Study 13*. A third example is now making an impact on New Zealand's prime lamb trade. Marks and Spencer (through New Zealand meat processors, Affco), large and renowned retailers in Europe, now offer a premium on lamb when the farmer can demonstrate sustainable farm management and production methods. A Code of Practice has been compiled and farms are audited annually by the Ministry of Agriculture and Forestry to ensure compliance.

In addition, some larger export organisations are taking the initiative and developing their own codes of practice to show the world they have the systems to ensure effective quality control (*Case Study 11*).

Expectations

Research for this publication has revealed that the expectations of many landowners may be somewhat misplaced when it comes to the speed of stream and waterway recovery following riparian retirement. In some cases at least, these false expectations may have arisen from information provided by regional council staff or other professional advisers.

Equally, there is evidence of situations where the riparian management advised or undertaken may not achieve the objectives set for the project. In particular, riparian areas retired and planted in a solid cover of native trees and shrubs may, on its own, have limited long-term ability to filter and strip water and surface runoff of nutrients.

These issues are well analysed in *Case Study 4* and *Case Study 16* where long-term research has revealed some interesting trends.

Innovation

In some New Zealand locations, combinations of certain farm management practices, soil types and water availability can elevate the threats to water quality to very high levels (*Case Study 2*, *Case Study 3*, *Case Study 5*, *Case Study 6* and *Case Study 13*). The development of management prescriptions to reduce the potential or actual impacts on water in these high risk situations requires a thorough knowledge of water processes, a detailed understanding of local conditions and farm practices, and a lot of innovation. Sustainable long-term solutions cannot be developed for these difficult scenarios without the contributions of all parties involved, and a lot of well monitored trial and error.

Information

Landowners frequently shy away from active water or riparian management because of misconceptions they hold, and often these misconceptions arise from the provision of inaccurate or incomplete information. Landowners talked to in the preparation of this publication repeatedly stated or asked:

- to be provided with information that enables them to understand how water contamination occurs, as opposed to just having remedial actions spoon fed to them
- to be active participants in the development of solutions and alternative management practices (*Case Study 16*)
- to have available a range of improved management options to suit a range of financial and farm management situations
- that positive results would only be achieved by consultation and a voluntary approach rather than by regulation (*Case Study 2*).

There are various mechanisms available to assist the better dissemination of information and collective development of ideas. These are discussed below.

Landcare groups

Landcare groups can take many different forms. They can be formally incorporated organisations formed and run entirely by members of the community to manage a community issue (*Case Study 7*); they can be a semi-formal collection of local enthusiasts who meet to deal with environmental problems and are guided by regional council field staff (*Case Study 8* and *Case Study 15*); they can be groups initiated by regional councils to address local issues (*Case Study 2*, *Case Study 12* and *Case Study 16*); or they can be casual, irregular farmer gatherings where all issues of farming and the environment are discussed (*Case Study 1*). Any one or any variation of these can function effectively as long as the initiative actively involves local landowners and they feel free to willingly participate.

New Zealand Landcare Trust

The New Zealand Landcare Trust was established in 1996 to encourage and facilitate sustainable land and water management throughout the country, particularly by promoting and coordinating landcare groups. The Trust is funded by the central government, and the Trust board has representation from seven groups: Federated Farmers of New Zealand (Inc.), Federation of Maori Authorities (Inc.), Federated Mountain Clubs of New Zealand (Inc.), Fish and Game New Zealand, Ecologic Foundation (the former Maruia Society), Royal Forest and Bird Protection Society of New Zealand (Inc.), Women's Division of Federated Farmers (Inc.).

New Zealand Landcare Trust has several regional coordinators scattered around New Zealand whose role it is to work with landcare and other rural groups, providing information, support and technical guidance where it is required. The Trust can be

contacted through its main office in Canterbury: PO Box 16-269, Christchurch, phone (03) 349-2630; fax (03) 349-2640; e-mail: info@landcare.org.nz

Farm and environmental plans

In some regions, landcare groups have less of a focus and instead regional councils offer an advisory service directly to landowners. This is often offered in conjunction with funding support for riparian works (*Case Study 1*, *Case Study 6* and *Case Study 16*). The opportunity exists for the various agricultural industry groups to provide environmental management information and support to their members via their networks of field representatives but at this stage that is not happening as well as perhaps it could.

Water monitoring

Landowners are often not aware of the degree of deterioration of their local stream, but when they are shown water quality data their increase in interest can be rapid. Many regional councils carry out substantial water monitoring programmes but the recorded data is not always easily accessible nor easy for non-technicians to interpret.

Water quality data is essential if the doubting portion of the community are to be persuaded there is a problem. Equally, regular monitoring is becoming increasingly important as a measure of the success of restoration efforts. In some cases the recorded information is able to show substantial improvements (*Case Study 16*) and changes (*Case Study 4*) in stream condition; however, the timing and location of routine regional council readings is not always suitable to detect local changes resulting from riparian initiatives.

Landcare groups, in particular, should be encouraged to purchase and use a stream monitoring kit so that they can gain a picture of local water quality condition, and over time record any localised changes or improvements resulting from riparian management. Often, the mere process of learning what life actually exists in a stream can increase motivation substantially. In addition, monitoring can be an effective means of demonstrating the severity of impact of some management practices such as allowing cattle free access to streams. It is important, however, that the expectations of landowners and landcare groups for water quality improvement do not outstrip reality, and that alack of measurable changes in the short term do not become a reason for loss of interest.

Several easy-to-use stream monitoring kits now exist. Some, such as the Hills 2 Ocean (H_2O) kit (produced by the Hawke's Bay Regional Council and Napier City Council) and the Stream Sense Programme (produced by Environment Waikato) have been designed principally for primary and secondary school students. Others, such as the New Zealand Stream Health Monitoring and Assessment Kit (SHMAK), produced by NIWA and Federated Farmers, have been produced to meet the needs of landcare groups and rural landowners. AgResearch (Parminter and Tarbotton, 1997) has

produced a Waterway Self-assessment Scale for rural landowners to assess for themselves the quality of the waterways on or near to their properties.

Ownership status and land protection

Land ownership and property rights have been identified as important land and water management issues by farmers and regional council staff alike. The retirement of riparian margins often brings with it the landowner perception that the rights of ownership will be compromised once the fence goes up. This appears to be especially so where the cost of fencing and planting has been substantially subsidised by outside agencies (*Case Study 16*); landowner commitment to maintenance work within the strip seems to fall away the smaller their own contribution to the capital works.

Several regional councils require the signing of a Land Improvement Agreement (LIA) over the retired area in return for funding assistance (*Case Study 8*, *Case Study 14* and *Case Study 16*). While this provides legal recognition of the protected status of the land and imposes a responsibility on the landowner to manage the site, the degree to which landowners take responsibility for the riparian margins is quite variable.

The Queen Elizabeth II National Trust (QEII) offers an alternative form of protection for areas of significant native bush or wildlife habitat. The Trust will provide funding for perimeter fencing to permanently protect important patches of native bush, and in return place an Open Space Covenant over the land, which is binding on all future owners. As for the LIAs, ownership remains with the landowner but there are specific restrictions, imposed by mutual agreement, on the use of the land to safeguard the health of the indigenous plant and animal life.

Regional councils and the Resource Management Act

The Resource Management Act 1991 (RMA) provides the legal setting for resource management in New Zealand, and so has direct relevance to riparian issues on rural land. The RMA, or perhaps more accurately the way it is enforced in some areas, is repeatedly identified by some rural landowners as a significant reason for their inaction in the areas of sustainable land and water management. It is important, therefore, that the RMA be used as a guide to acceptable land and water practices, not as the reason for them.

The purpose of the RMA is to:

> *promote the sustainable management of natural and physical resources.*

In the Act "sustainable management" means:

> *managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well being and for their health and safety while –*

- *sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- *safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- *avoiding, remedying or mitigating any adverse effects of activities on the environment.*

Regional councils, in particular, have a definite role under the RMA when it comes to riparian management. Their functions include soil conservation, the maintenance and enhancement of water quality, the control of contaminant discharges to land, air or water, and the control of weeds and pests on private land.

The policies and regulations set by regional councils are documented in regional plans. These, and district plans produced by district and city councils, should be consulted to establish what can and can't be done with and to water and waterways in the region.

The Ministry for the Environment has produced a document entitled *Your Guide to the Resource Management Act* (1999). This publication is a useful guide to the operation of the RMA for anyone interested in or affected by the Act. Some other publications are cited in this selection of case studies; a complete list of references is given in the first part of this publication, *Managing Waterways on Farms.*