

Working together to protect our water quality

BY SANDRINE MARRASSÉ & JACQUIE WALTERS



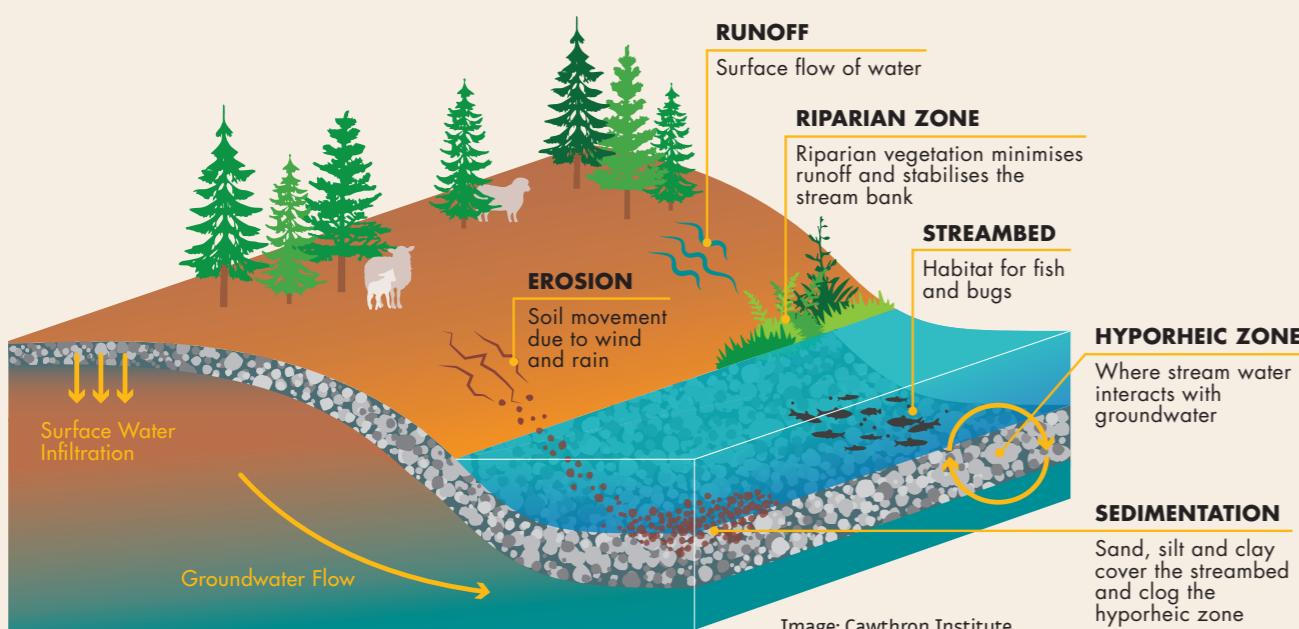
Water quality is a pressing issue for communities around New Zealand. One of the contributing factors to diminished water quality is fine sediment. Sedimentation is a natural process in which sand, silt and clay, transported in the water, come to rest on the riverbed, forming a solid

layer. While sediment in our waterways is a natural occurrence, levels that are too high can cause harm within natural ecosystems.

Human land use activities around waterways, such as road construction, farming, urban development and forest harvesting activities, can suddenly increase

the amount of fine sediment that enters the system and have detrimental effects on water quality and the plants and animals that live there.

Nelson Management Ltd. (NML*) invited experts from around the country to come together to discuss sedimentation and its relationship to forestry activity,



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ANDY KARALUS, NELSON MANAGEMENT LTD.

ahead of its upcoming Environmental Management System review. NML extended an invitation to attend the workshop event to a wide range of agencies including Ngāti Toa o Rangatira, Nelson, Marlborough and Tasman District Councils, universities, Cawthon Institute, the Ministry of Primary Industries, science institutes, Fish & Game, other forest owners and the company's own contractors, and Crown Research Institutes such as Landcare Research, Scion and NIWA.

NML's Estate Value Manager Andy Karalus says the company is aware of sedimentation concerns amongst both specialists in that area of environmental management and the wider community, and initiated the workshop after reading media coverage that conflicted with the company's monitoring results. "The coverage was pointing the finger at forestry as being responsible for excess sediment in coastal waterways," says Andy. "I compared this with the freshwater monitoring that we do in catchments, which shows pine plantations generally deliver high quality water, and couldn't reconcile the two. We decided to get everyone in the room together and see if we could learn something."

NML contracted an independent facilitator to guide discussions at the workshop with the aim of developing joint priorities for further work informed by a varied group of opinions – from forestry industry proponents and critics of forestry alike.

Workshop attendees were invited to contribute to the agenda beforehand, present to the group and collaborate on potential solutions. The workshop was held over two days and included field trips to some of NML's active harvesting sites, presentations from attendees, group discussions and Q and A sessions.

What impact does geology and land type have?

A major topic at the workshop was geology and land type and its implications for sediment production in forestry harvesting sites. "As part of our planning



ABOVE Golden Downs forest. Photo: Ishna Jacobs

LEFT The group gathers near Tapawera to hear Dr. Les Basher, geomorphologist for Landcare Research. Photo supplied

process, we look at our landscapes and do a risk evaluation based on geology," says Andy. "Granite-rich areas are considered high risk, relatively unstable country prone to wash erosion, so we put a lot of effort into managing our earthworks in that area. But when you look at it from a freshwater point of view, granite areas produce heavy grains and they deposit quickly, whereas in Moutere gravel areas the high clay content stays in suspension in the waterways for longer and leaves a bigger footprint. We change our focus depending on land type and try to reduce the connection between our earthworks and the streams."

High-intensity storm events

High-intensity storm events in the upper catchments can contribute greatly to slope failures in both conservation and forestry land. Large slope failures are often the focus of media attention. Dr. Les Basher, a geomorphologist for Landcare Research, presented to the workshop group at a site near Tapawera where an extreme rainfall event occurred in 2010. "Events like that are uncontrollable if you are going to harvest trees in areas where high-intensity storms occur," says Les. "One big issue the forestry industry faces is assessing the risk of these events and making decisions about acceptable levels of risk. Forestry clearcuts always look bad to the public and often the mess in the waterways is directly attributed to forestry activity but it's not as simple as that."

Les has identified some important areas for further work. "There is a need to better formalise risk management. This is something we're working on at a national level by trying to establish frameworks underpinned by scientific data, in order to quantify the factors that go into a risk management matrix."

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LANDCARE RESEARCH

recover after a few years. What's reported in the media are often the bad stories, and public perception focuses on the messy look of forestry sites. However, many people are unaware of the work behind the scenes that forestry companies do to mitigate risk, and how beneficial forests are for the 25 years when the trees are growing and protecting the land from erosion," says Les.

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practices generate the most sediment. Research indicates that, aside from major landslips due to storms, the most sediment generated from forestry sites is via roads, skid sites (the areas where machinery moves and processes logs ready for transport) and tracks.

Managing the areas where disturbed soil can gain access to freshwater is an issue that is being monitored and constantly improved. Nicky Eade, an environmental scientist for the Marlborough District Council acknowledges that there is a lot of attention focused on best practice management of these areas, including avoiding, remediating and mitigating the effects of soil disturbance.

"These are the types of things that councils control through rules and standards, and monitor in the field," says Nicky. "Where forestry sites are in close proximity to sensitive receiving environments, there is not a lot of margin for error before adverse effects can occur. Larger companies like NML may have robust planning and operating systems in place, and good long-term relationships with competent contractors, but this is not always the case in many harvest situations, and without close monitoring and supervision, major non-compliances can and do occur."

Freshwater ecology

Joanne Clapcott, a freshwater ecologist for the Cawthron Institute presented on freshwater ecology threats and resilience. Joanne raised the issue of riparian buffer zones as sediment control measures, which created a great deal of discussion. "This is very context dependent; for example, for steep streams it would be pointless having buffer zones because you would need the whole hillside to be planted, not

just a strip. In my experience, buffer zones should be related to the slope of the land and the size of the water body. When you're getting down to mid-slope of a metre-wide stream then, in my opinion, there should be at least five-metre buffers on each side to minimise runoff and maximise bank stability. This is contentious because riparian systems generally aren't recommended to protect against sediment movement: it's all the other benefits they bring, such as shade, corridors for native wildlife and habitat for birds."

"Usually sediment movement in forest systems is all about roads and mass slumping during or following harvest, in which case small riparian zones aren't going to help much at all; instead it's all about controlling that water flow around roading mainly during harvest times."

Our precious estuaries

Leigh Stevens, marine ecologist for Wriggle Coastal Management does important work monitoring sediment in estuarine environments. "Most of the sediment problems in estuaries come from the upper catchments. We do a lot of work assessing catchments to estimate how much sediment is coming off different land use types. In terms of the workshop, I was really interested in exploring how much we understood about what was coming into the catchment from forestry as opposed to other land uses."

"The stick is always pointed at forestry because it's such a big industry and spatially it covers a lot of land. You only need a small contribution from a large area to create a big problem at the bottom. By contrast, very small areas, such as residential developments, can contribute a large amount of sediment if there is heavy rainfall and this can have the same impact as a small amount of sediment from a large area."

Showing it like it is

Leigh was impressed that NML took workshop participants to see a harvesting site while it was raining heavily. "It was a really brave thing for NML to open up its activities to scrutiny from a range of agencies. It was probably the worst possible time that they could've actually shown it to anybody, but they weren't scared by that. Their approach was to say 'we think we've done the best we can and this is what it looks like, and if you've got better ideas, tell us.'

"We don't often get access to those areas – we can read the reports and make our own conclusions based on what other people have said and done, but getting on the ground and actually seeing it in action – you can't beat that!"

"The thing that really did surprise

me was seeing the standard of operations that NML are putting in place compared to other forestry areas that I've looked at. I realised that there is a massive disparity in the way different operators conduct their business. For me, as a local, it's really heartening to see a company that's doing a really good job, and operating in an open and environmentally progressive way compared to others around the country."

Healthy fisheries

Jacob Lucas, regional field officer for Fish & Game New Zealand presented to the group on the effects of sediment on trout fishing and environments. Fish & Game is also a member of NML's Environmental Improvement Committee, and through this group has input on forestry best practices and operating standards for the benefit of fisheries. "My interest was to speak with the group and make them aware of the importance of maintaining healthy trout fisheries, both recreationally and commercially," says Jacob. "Many of our trout fisheries have a high proportion of exotic forestry in their catchments,

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LEIGH STEVENS, WRIGGLE COASTAL MANAGEMENT

which can have impacts on trout and their habitats, both at a site and catchment level.

"These effects can affect smaller tributary streams where spawning takes place, or larger waterways. For example, the effect of sediment deposition during August to November, when trout fry emerge from gravels, can have a huge impact on the population in subsequent years."

"The forestry industry, in particular harvesting, is highly visible and therefore catches the eye of the general public. This occurs on site, where scarred evidence from harvesting practices are obvious, and downstream. Being part of NML's Environmental Improvement Committee has made me realise that some forestry companies are doing all they can to ensure environmental damage is minimised both in the planning, and harvest and post-harvest stage. It's reassuring to see NML and their contractors take their stewardship role very seriously. They really want to do the best they can for the environment and the people that use it,

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NICKY EADE, MARLBOROUGH DISTRICT COUNCIL

and this integrity comes through in the focus of their staff."

On the ground

Hayden Barnes of Endurance Logging, one of NML's harvesting contractors, is an example of how that care for the environment is put into practice. Hayden says that the planning process itself is crucial to sediment control around harvesting sites. "We come together to plan roading, skid site building and harvesting, six months ahead of operations," says Hayden. "This means that the soil is much more stable and hard and there is less loose material sitting on the surface to be stirred up by machinery moving around. Skid sites are built with what is known as a 'pocket bench' down the hill, slightly off the landing. This acts like a ledge and catches slash and waste that the crew has to move off the landing to make way for machines and logs and prevents it from going all the way down the hillside and potentially into waterways."

The logging method Hayden uses is fully mechanised and set up with a Tractionline winch-assist machine, which is attached via two wire cables to the felling machine down the slope, and operated via a wireless remote. Using these innovations in harvesting technology can mean less ground disturbance. "This is because the machine moves around and fells trees, placing them in a position where they can be picked up by the cable-operated grapple and pulled upslope without the tree digging into the soil. This method reduces the ground disturbance caused on ridges, which is a big contributor to bare soil and sediment. Also, the machine can be much more exact about how and where a tree falls, avoiding waterways with accuracy. How the crew operates on the landing is also an important factor; for example, taking care to direct muddy water towards the cutover and not towards channels that connect to streams. We have a responsibility to make sure that water getting to streams is clear and managed correctly."



ABOVE Hayden Barnes of Endurance Logging with the Tractionline machine.

Photo supplied

LEFT NML's Estate Value Manager Andy Karalus examines a site in the Golden Downs forest. Photo: Ishna Jacobs

[*Nelson Management Ltd. is the management company for Nelson Forests' 78,000 hectares of forest in the Nelson, Tasman and Marlborough regions. More than 600 people are employed across the Nelson business, and the company harvests 1.1 million m³ of timber sales annually. Seventy percent of the logs harvested are processed by local mills into products for the domestic and export markets.]



Endurance Logging at work harvesting, using the fully mechanised Tractionline system. Photo supplied

Contact

nelsonforests.co.nz