

Assessment of New Zealand's forest codes of practice for erosion and sediment control

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This article is a brief overview of a dissertation submitted in partial fulfilment of the BForSc(Hons) degree at the University of Canterbury

Abstract

New Zealand's forest industry has several codes of practice available for erosion and sediment control. This article reviews conditions required for a code of practice to succeed in protecting the environment. Internal conditions – those conditions which are written into a code and can be assessed by reading the document alone – were used to assess the strengths and weaknesses of six of New Zealand's forest codes of practice. The study found that overall, the codes scored highly for objectives, communication, planning and comprehensiveness. However they did not score well for regulatory approach, monitoring, foundations and review process. Some preliminary recommendations were made about the development of future codes of practice based on these results.

Introduction

Currently there are a number of forest engineering codes and guidelines available in New Zealand. These are published by organisations such as the New Zealand Forest Owner's Association (NZFOA), regulatory authorities such as regional and district councils, and individual forestry corporations. The purpose of this research was to explore the concept of codes of practice and their use in New Zealand forestry, with a focus on erosion and sediment control.

The role of codes of practice was established by a review of international literature. Based on the principles in existing literature, a system for assessing these codes was established. By analysing existing New Zealand codes of practice, the strengths and weaknesses in them can be identified and then adopted or avoided when developing or updating future codes.

What are codes of practice?

Codes of practice are collections of regulations or guidelines developed to help foresters in the selection of practices to follow when conducting forest management and use operations (Dykstra & Heinrich, 1996). They are also a form of forest policy used to promote particular environmental values (Adams, 1996). The underpinning theory is that the desired results of sustainable forest management can be achieved by conforming to the regulations or guidelines outlined in the code.

Law and Martin (2009) define a code of practice as 'a body of rules for practical guidance only, or that sets out professional standards of behaviour, but does not have the force of law.' In the absence of rules and regulations, these codes can be an effective means of communicating best practices to industry.

Despite the functions of guidance and communication, codes of practice are in many cases

legally enforceable when used as part of a wider regulatory system. For example, compliance with these codes may be a condition in a resource consent granted under the Resource Management Act 1991.

Why have codes of practice?

Forestry earthworks operations codes of practice provide a range of best practices which are needed because poorly managed operations have the potential for adverse environmental effects. These operations can increase soil exposure and destabilisation, causing accelerated erosion and excessive levels of sediment discharge into waterways. This decreases water quality, affecting waterway ecology, landscape, community and cultural values (NZFOA, 2007).

Another potential effect is the deposition of forest debris into waterways and downstream areas. Debris slides downhill as the soil erodes, moving from the cutover into the gullies and waterways below. Once the



Erosion of exposed fill slope on a landing in the Waikato



Sediment in a silt trap at an earthworks operation in Canterbury



Debris and sediment in a waterway below a harvested cutover in the Bay of Plenty

debris enters a waterway it continues downstream until obstacles, such as bridges, culverts and farm fences, cause the debris to back up or it is deposited in streams, paddocks, floodplains or beaches (Douglas, et al., 2011).

By causing these problems the industry can incur public criticism, legal prosecution and fines. There are methods available which can be used to avoid these problems, and one of them is forest codes of practice for erosion and sediment control.

What makes a good code?

Previous literature indicates that certain conditions must apply for a code to succeed. We classified these conditions into two groups – external and internal.

External conditions are the factors which influence the success of a code of practice, but are not necessarily included within the written code. These include the broader legal, social and economic contexts within which the code of practice exists. Internal conditions are those which can be assessed looking only at the code of practice as a document – those which are written in the code.

External conditions

The external conditions required for a successful code of practice were identified by analysing three case studies of overseas primary production industries – agriculture in England (Barbayiannis, et al., 2011) and Greece (Posthumus, et al., 2011), and forestry in West Virginia in the United States (Wang, et al., 2004). A summary of these external conditions is outlined below.

Development of regulatory system or code of practice –

- Co-operation between all parties involved in the development of the system
- Policies between different agencies are consistent
- Policies are consistent between different regulatory systems
- Progress made is measured by ensuring the regulatory system is monitored.

Role of the agency responsible for administration and enforcement of the system –

- The agency raises awareness of environmental issues
- The agency conducts adequate monitoring to enable enforcement
- The agency's monitoring methods are sufficient to prove liability
- The regulatory system is well implemented
- The agency offers training to enable compliance by managers
- If applicable, the agency prosecutes offenders.

Perceptions and influence of regulatory system –

- There is a good working relationship between managers and the agency
- The regulatory system is perceived by managers as a useful tool rather than an obstacle
- The system requires minimal paperwork
- Dis-incentives or incentives are sufficient to encourage or discourage certain practices.

The above external conditions were not included in this assessment of the codes of practice, but will be covered in future research.

Internal conditions

Eight internal conditions which influence the success of a code were identified and these are outlined below. Prescriptive codes are those which prescribe methods for forest operations. Outcome-based codes define the environmental results required of forest operations such as maximum levels for water clarity in forest streams.

Objective

Codes of practice should include a 'well-defined and clearly stated' aim or purpose (Resource Assessment Commission, 1991). The objective helps answer an

important, if not the most important, question which forest managers might ask: Why should we follow this code of practice? By setting an objective, the code is given a purpose, which justifies why it exists and provides direction to those writing it.

Regulatory approach

The Resource Assessment Commission recommended in 1991 that a code should apply to all land tenure types – state forest, Crown land, freehold land and leasehold land. It should also set a minimum standard for states, with the option to add additional standards for specific areas. This refers to the Australian system of state and territorial governments, but states can be translated to regional councils to fit the New Zealand context.

Hawkes (1999) suggests that codes should be enforceable by regulation. The Resource Assessment Commission said that this should be done vigorously, and that penalties should be substantial. These penalties should be outlined in the code, as well as who can be held accountable and the provisions for appeal (Dykstra & Heinrich, 1996).

Plans should be prepared for forestry operations, and these should be submitted to a formal approval and monitoring process.

Planning

Codes of practice should help forest managers in the selection of operational practices. They also should describe the potential effects of poor practices and detail recommended practices.

Comprehensiveness

The Resource Assessment Commission states that codes of practice should be comprehensive, and lists a number of aspects for which they should set standards, at a minimum. Two of the aspects on this list relate to earthworks –

... soil erosion, slope restrictions and erosion mitigation requirements;

- roading, snigging tracks [skid trails] and log landings, their placement, construction, width, drainage and treatment post-harvesting ...

Monitoring

The type of monitoring to be carried out and the manner in which the results will be reported should be detailed in a code. Regardless of whether a code is prescriptive or outcome-based, compliance with the defined prescriptions or results needs to be monitored. If monitoring is not carried out, the code cannot be enforced by the agency.

Foundation

A code of practice should be based on the policy of the agency and have a solid foundation of research. Before setting standards in these codes, an agency

should be able to justify those standards by providing evidence that following the standards will achieve the objectives of the code. Without this evidence, its validity can easily be called into question.

The preparation of a code should involve appropriate stakeholders such as government forestry officials, forest industry representatives, loggers, the local community, nongovernmental organisations, and technical experts from research institutes or universities. Relevant legislation should be listed in the references for the and the relationship between the code and legislation should be clear.

Communication

A code of practice must be easily understood. The wording must be clear, and the language style should be appropriate for the intended audience.

Review process

Codes of practice should be subjected to regular review. Scrutiny and discussion of codes should be encouraged to keep them up-to-date with progress in understanding, technology and priorities. A good code of practice should be flexible enough to be amended as new information becomes available, and any amendments should be made in consultation with stakeholders.

Assessment of codes of practice

Six widely-used Australasian codes of engineering and forestry practice were assessed against a set of criteria which reflect the eight requirements for 'internal' conditions – those conditions which can be assessed by reading the code – as outlined above. The six assessed codes of practice were –

- *NZ Forest Code of Practice* (Vaughan, et al., 1993)
- *The NZ Environmental Code of Practice for Plantation Forestry* (NZFOA, 2007)
- *Unsealed Roads Manual: Guidelines to Good Practice* (Giumarra, 2009)
- *Forestry Operations in the Auckland Region: A Guideline for Erosion and Sediment Control, Technical Publication 223* (Dunphy, Bryant, & Handyside, 2007)
- *Erosion & Sediment Control, Guidelines for Soil Disturbing Activities, Environment Waikato Technical Report No. 2009/02* (Waikato Regional Council, 2009)
- *New Zealand Forest Road Engineering Manual* (Gilmore, et al., 2011).

For the six codes of practice each of the eight conditions were scored out of 100, where zero meant the code did not meet the condition to any degree and 100 indicated that it completely met the condition. Each of the numbers in this table was calculated by assessing each code against several criteria under each condition, which were marked either for presence or

Assessment scores out of 100 for the internal conditions of the reviewed New Zealand codes of practice

Internal Condition	NZ Forest Code of Practice, 2nd edition	NZ Environmental Code of Practice for Plantation Forestry	Unsealed Roads Manual, 3rd edition	Auckland Regional Council TP223	Environment Waikato TP No. 2009/02	NZ Forest Road Engineering Manual
Objective	100	100	100	100	100	100
Regulatory approach	0	40	0	75	75	20
Planning	100	80	100	80	60	60
Comprehensiveness	63	60	67	81	75	82
Monitoring	0	0	33	0	0	66
Foundation	64	64	40	73	45	64
Communication	100	100	100	100	100	100
Review process	0	0	50	50	0	0

absence. These numbers are expressed as percentages for easy comparison.

Consider the example of the monitoring for the *NZ Forest Road Engineering Manual*. The criteria were –

- Describes monitoring methods: Yes
- Describes how results of the monitoring are reported: Yes
- Defines what are deemed acceptable and unacceptable results: No.

The monitoring condition is assessed using these three criteria. As this code met two of the three criteria it gets a 66 for monitoring, which is two thirds of 100. All of the codes of practice have well-defined and clearly stated objectives, and all of them scored highly for communication. These are strengths which should continue to be built upon in future codes.

The codes did not score well for regulatory approach, although those published by regional councils did provide the most information in this area. Most of them did not provide enough information on penalties and liabilities for breaches of the code or the Resource Management Act. This is a weakness which needs to be addressed when writing a national code.

The codes which were published by regional authorities did not include this information, while the NZFOA's voluntary code included an entire section on penalties and liabilities. This information should be included in a code, even if it can be found in other documentation, because it reinforces why it is important to comply with it.

Planning and communication

Overall, the codes of practice scored well for planning. An important weakness in terms of planning was that three of them did not describe methods to predict the severity of potential adverse effects. None of the codes consistently scored highly for comprehensiveness. Roding was the only section to be covered completely by any code of practice. Skid trails and landings were not covered completely by any of them. These shortcomings in comprehensiveness

should be improved to ensure a code provides all the necessary information for all three of these earthworks construction types.

A strength of all of the assessed codes of practice is communication. All the codes are well written and the language styles and visual aids used are appropriate for the target audiences. The documents, which are intended for use by engineers, provide technical detail, whereas those for use by forest managers and contractors are less technical and have good visual aids such as photographs and diagrams.

In terms of ease of use, visual representations were much easier to follow than large bodies of text. For example, Environment Waikato's code made good use of photographs showing good and poor practices to visually reinforce what was said in the text. A national code should draw on these strengths and use visual aids, perhaps even use the best ones from the existing codes.

Monitoring

The most concerning weakness of the codes is the lack of information on monitoring. Four of the six codes fail to describe monitoring methods which can be used by the forest manager or are used by the enforcing agency. Only one of them describes how monitoring results are reported. In this case, the code provides forest managers with an auditing template.

None of them define what constitutes an acceptable or unacceptable result. These shortcomings are concerning because the Resource Management Act is a results-based environmental legislation.

To ensure compliance, a forest manager should know what results to aim for or to avoid, how they or the authorities will monitor them, and how the results of that monitoring should be reported. As such, this weakness must be addressed if a national code was published.

The foundations of all the codes of practice need improvement, with a range of scores between 40 and 73. The low scores for endorsement or involvement in development is a concern, with none scoring above 50. There are up to six stakeholder groups which should

be included in the development process – government forestry officials, forest industry representatives, loggers, the local community, NGOs and technical experts. At least half of the applicable stakeholders have been excluded during the development of these codes.

Another weakness of all of the codes of practice was the review process, or lack of one. Four of the six codes scored zero for this. The two which scored 50 were open to public submission. None of the codes state they will be reviewed on a regular basis. This means that they may not be kept up-to-date with the latest research, innovations or changes in government policy.

Preliminary recommendations

This study only takes account of the internal conditions for a successful code of practice. The external conditions which are vital to a successful code have not been evaluated for New Zealand codes. As such, the recommendations below are only of a preliminary nature, and this topic requires further research before a final recommendation can be made.

When writing a code of practice, previously mentioned eight internal conditions should be used to ensure the code document is all-encompassing and has been fully developed using the correct processes. Forestry codes of practice should cover, at a minimum, roading, landings, skid trails, erosion and sediment control structures associated with these, and slash management. They should be covered in full, with enough information so that the code is a comprehensive stand-alone document.

All relevant stakeholders should be involved in the development of a code of practice. Full consultation is necessary to ensure that it is practicable and acceptable to everyone involved, and to ensure understanding.

As part of writing a comprehensive code, the compliance procedures and monitoring methods should be specified in full detail, so that all are aware of liabilities and responsibilities. Review and updating of the code of practice should be carried out on a scheduled regular basis, and at other times if pertinent. This schedule should be outlined in the code to ensure that forest managers can see if their version of it is up-to-date.

Acknowledgements

The following people and organisations helped with this study John Douglas, Bay of Plenty Regional Council; Kit Richards, Future Forests Research; Peter Weir, NZ Forest Owners Association; Rien Visser, University of Canterbury; the New Zealand School of Forestry, University of Canterbury; the staff and contractors of four forestry corporations who hosted Melissa Pendlly during this study; and the University of Canterbury Summer Scholarship Programme.

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