

Section 32 report: Livestock access, break-feeding and cultivation

for the Proposed Natural Resources Plan for the Wellington Region



greater WELLINGTON

REGIONAL COUNCIL

Te Pane Matua Taiao



Issues and Evaluation Report



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for the Proposed Natural Resources Plan for the
Wellington Region

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GW/EP-G-15/61
#1392478

July 2015

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1. Overview and purpose

This report is an analysis of the appropriateness of the proposed objectives, policies and other methods for managing livestock access, break-feeding and cultivation in the Proposed Natural Resources Plan for the Wellington Region (the proposed Plan).

The analysis in this report is guided by the requirements of section 32 of the Resource Management Act 1991 (RMA). The analysis also addresses many of the specific comments and concerns that were identified by regional communities, stakeholders and others during the development of the proposed Plan.

In order to fully understand the context and approach for this evaluation it should be read in conjunction with the section 32 reports that are specific to Ki uta ki tai –mountains to the sea, Māori values, water quality, wetlands, aquatic ecosystems and discharges to water.

1.1 Legislative background

Sections 9, 12, 13 and 15 of the RMA impose certain restrictions on the use of land, the coastal marine area, beds of lakes and rivers and on discharges of contaminants. This means that a comprehensive framework for livestock access, break-feeding and cultivation is required in the proposed Plan.

The Regional Policy Statement for the Wellington region (RPS) directs the regional plan to include policies, rules and other methods to protect the aquatic ecological function of water bodies, through a combination of activities beneficial to habitat diversity, such as the protection and reinstatement of riparian habitat and the discouragement of livestock access to surface water.

Other national and regional drivers are discussed in more detail in section 3 of this report.

1.2 Social background

For many people the adverse effects of livestock on water is associated with more than just the disturbance or degradation of the bed or banks of a waterway. The effects of livestock and especially dairy cows on water bodies is now a social issue that has attracted the attention of Parliament.

In a speech titled, “Overhauling the Resource Management Act” (21 January 2015), Nick Smith, Minister for the Environment, noted that national regulation would be used to ban dairy cows from streams and rivers by July 2017:

“Take a simple issue like requiring all dairy farmers to fence their stock out of rivers. It is a policy most New Zealanders would agree with and indeed farmers and Fonterra have developed a Clean Streams Accord to that effect.

To implement such a policy under the existing law, the Government would need to write a national policy and consult extensively on it. When passed, each council would then have to change their regional plans with another process of consultation. After even this the council would not be able to implement the

policy until each individual farmer's resource consent came up for renewal, a process that is likely to take about 30 years. This is ridiculous.

We are proposing a law change that will enable national regulation of these sorts of issues after one round of national consultation and the power to implement immediately backed up by an instant fine regime. Our plan is to have such a rule in place for dairy cows to be banned from streams and rivers by July 2017."

1.3 Report methodology

To fulfil the requirement of section 32(2) of the RMA, the report identifies and assesses the benefits and costs of the environmental, economic, social and cultural effects that are anticipated from the implementation of the provisions.

In accordance with section 32(2), the analysis identifies the opportunities for economic growth that are anticipated to be provided or reduced and the employment that is anticipated to be provided or reduced.

In addition, the analysis, where practicable, quantifies the benefits and costs and assesses the risk of acting or not acting if there is uncertain or insufficient information.

The structure of the report is shown below:

- *Resource management issues*: an outline of the main issues identified by the community (section 2 of this report)
- *Regulatory and policy context*: identification of relevant international, national and regional legislation and policy (section 3 of this report)
- *Appropriateness of proposed objectives*: an evaluation of the extent to which the proposed objectives are the most appropriate way to achieve the purpose of the Act, as required by section 32(1)(a) (section 4 of this report)
- *Efficiency and effectiveness of the proposed policies, rules and other methods*: an assessment of the efficiency and effectiveness of the provisions as to whether they are the most appropriate way to achieve the objectives, in accordance with section 32(1)(b) and section 32(2) (section 5 of this report)

2. Resource management issues

The Wellington Regional Council (WRC) began a region-wide engagement with the community in 2010 to identify the views of the community regarding natural resource management and to help define the issues for the review of the five operative regional plans (Parminter 2011). This involved engagement with iwi partner organisations, the general public, agencies and organisations with interests in resource management, resource users, school children, developers and policy-makers.

From region-wide engagement, two significant issues were identified (GWRC 2014a): adverse effects of livestock access to water bodies; and aquatic

ecosystem health impairment. The proposed Plan addresses these issues, in part, with provisions to manage livestock access to surface water and to require set-backs for cultivation and break-feeding. The relevance and significance of these issues is discussed below.

The explanations provided for these issues below are amended from the preliminary issues report (GWRC 2014a) to be more descriptive and relevant to the assessment in this report.

An issues table summarising the discussion can be found in Table A1, Appendix A.

2.1 Issue 4.8: Adverse effects of livestock access

Stock access to surface water bodies, artificial watercourses, and the coastal marine area increases erosion of banks and beds of lakes and rivers and has adverse effects on water and habitat quality and the health and functioning of ecosystems.

Livestock access to surface water bodies can result in disturbance of stream bank and streambed integrity, and can result in significant inputs of fine sediment, nutrients and pathogens, the process and source of each input discussed in turn below. The adverse effects on water quality and ecosystem health result from discharges of dung and urine, alteration of channel character and from sedimentation due to bed and bank disturbance.

The delivery of nutrients in animal waste to a water body can result in nuisance plant and algae growth that affects aquatic life, blocks drains and reduces the suitability for recreational use. Excessive dung and urine can also result in an immediate reduction in the concentration of dissolved oxygen, resulting in suffocation of fish, koura (freshwater crayfish) and other invertebrates. At high levels, nitrogen in water becomes toxic to aquatic life.

Faecal matter contains a range of bacteria, viruses and other pathogens that can affect animal health, as well as human health, making water unsafe to use or contact. This can directly affect the suitability of water for animal or human drinking supplies or the suitability of water for contact recreation, such as swimming and paddling.

The discharge of sediments as a result of bank erosion and bed disturbance reduces water clarity, blocks the gills and breathing apparatus of aquatic creatures, smothers the substrate, and fills the empty spaces between the bottom gravels reducing habitat for fish and invertebrates. Increased sedimentation also delivers increased sediment-bound phosphorus, which can increase nuisance algae and plant growth. The reduction in water clarity and increased algal growth can reduce the suitability of the site for recreational use. Bacteria and other contaminants can also be released when sediments are deposited or disturbed.

Bank erosion and bed disturbance can also affect channel form and function resulting in increased flooding and reduced habitat quality. Livestock access can also result in grazing and trampling of banks and vegetation used by īnanga

(a whitebait species) for spawning and the loss of overhanging banks that shelter tuna (eels).

Cultural and economic matters are also relevant to the issue of livestock access to water bodies. Culturally, keeping livestock out of water bodies is a part of the expectations of our community and mana whenua. This was noted in the quote from Nick Smith in section 1.2 of this report. The cultural significance is, in part, because livestock in water bodies can adversely affect amenity and recreational values. Livestock in water bodies can also adversely affect the suitability of water for Māori customary uses such as mahinga kai (food gathering) and whakawatea (cleansing).

Economically, New Zealand and the Wellington Region rely on the 'clean green' image to sustain our tourism market and some of our agricultural export market. Keeping livestock out of waterways is one part of that image.

2.2 Issue 4.2: Aquatic ecosystem health impairment

The ecosystem health and function of surface water bodies is being impaired by activities that degrade habitat quality, with some wetland and lowland stream ecosystems coming under particular pressure.

Livestock access can result in adverse effects on aquatic ecosystem health and function, as a result from physical disturbance of the banks and beds, increased erosion and sedimentation and the direct inputs of faecal matter, nitrogen and phosphorus to surface water.

In addition, cultivation and break-feeding are two agricultural practices that expose bare soil, and which following a rainfall event can result in the overland and subsurface flow of contaminants to surface water.

For the purpose of the proposed Plan, cultivation and break-feeding are defined as:

Cultivation – Any process that involves turning over or tilling the soil for the preparation of growing crops, excluding:

- a) strip-tilling
- b) direct drilling
- c) no-till practices
- d) harvesting
- e) forestry

Break-feeding – The feeding of livestock on pasture or forage where feed allocation is controlled by the frequent movement of an electric fence.

Break-feeding is a common farming practice of feeding livestock on a high pasture mass or a fodder crop, and controlling the area to be fed and the density of livestock with moveable electric fencing. Break-feeding is typically used in

the winter months as a way to budget feed and maintain stock health. The area may be replanted into permanent pasture in spring, once it has been completely grazed. Break-feeding is also sometimes referred to as strip-grazing. It is common for vegetation to be grazed down to very low residual levels or even bare ground during break-feeding. It is also common for some break-fed paddocks to be grazed is right up to the edge of or across waterways.

Exposing bare ground as a result of cultivation can leave soils vulnerable to erosion. The compacted soils left in wheel tracks can act as channels for water, and when it rains, water can then undercut and remove the surrounding soil. Where sloping ground is cultivated, it can be tilled along the contour as an alternative to cultivating up and down slopes. During rain, soil washed off ridges is trapped in furrows running across-slope, instead of being carried away through down-slope furrows by runoff.

Runoff of stormwater from soil exposed during cultivation or break-feeding can result in excessive sedimentation and turbidity in surface waters. Sediment can fill up the substrate spaces within gravel and cobble streambeds, which are used as habitat by fish and aquatic invertebrates. Excessive sediment inputs can also fill up pools and smother spawning areas. Surface runoff can also carry nutrients and pathogens into the receiving water bodies.

3. Regulatory and policy context

There are a number of statutes and policy statements, both national and regional, which have relevance to managing livestock access, cultivation and break-feeding. There are also a range of industry standards and guidance documents, which have no legal effect, but which provide useful information in a resource management context.

3.1 National statutory requirements

3.1.1 Resource Management Act 1991

WRC has a responsibility under the RMA to control land use for the purposes of maintaining and enhancing water quality (section 30(1)(c)(ii) of the RMA), and to control discharges onto land or into water (section 30(1)(f) of the RMA) to achieve the purpose of the RMA.

The use of land is controlled by section 9 of the RMA. This section is generally ‘enabling’ in that it generally enables the use of land unless that use is restricted by a national environmental standard (NES), or a rule in a regional or district plan. If a land use is restricted by an NES or rule, resource consent may be sought unless the use is prohibited. This means that if WRC wishes to control any use of land in order to maintain and enhance water quality, it must do so by restricting this use in the regional plan.

Discharges to land and water are controlled by section 15 of the RMA. Section 15 is generally ‘restrictive’ when dealing with discharges to water or to land that may enter water – no person may discharge any contaminant to water or land where it may enter water unless this discharge is expressly permitted by a rule in a plan, an NES or a resource consent has been granted. This means that

if the regional council wishes to permit a discharge, it must expressly be a permitted activity in the plan, otherwise resource consent would be required.

Section 13 of the RMA controls certain activities in the beds of lakes and rivers. Some activities are 'restricted' by section 13 and some are 'enabled'. Of relevance to the topic of livestock access, 'entering or passing across' the bed of a river or lake is 'enabled' by the RMA unless there is a rule in the regional plan restricting this. However, the 'disturbance of the bed' of a river or lake may not occur unless it is expressly permitted by a rule in a plan, NES or resource consent. Livestock crossing water bodies will 'enter or pass across' the bed of a river or lake, and they are also likely to 'disturb the bed' by that passage. This means that in order to expressly allow livestock access to surface water bodies, rules in a regional plan need to clearly allow both the access and the disturbance.

Section 70(1) of the RMA directs that regional councils should not include a permitted activity rule in a regional plan for a discharge that enters water that would cause, after reasonable mixing, any of the following to occur (either as a result of that discharge or in combination with other contaminants):

- The production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials
- Any conspicuous change in the colour or visual clarity
- Any emission of objectionable odour
- The rendering of fresh water unsuitable for consumption by farm animals, or
- Any significant adverse effects on aquatic life

Section 70(2) provides further direction that if a rule for a discharge to water requires 'best practicable option' management to prevent or minimise adverse effects, the regional council should be satisfied that the inclusion of that rule is the most efficient and effective means of preventing or minimising those adverse effects on the environment.

3.1.2 National Policy Statement for Freshwater Management (2014)

A national policy statement is an instrument available under the RMA to help local government decide how competing national benefits and local costs should be balanced.

The National Policy Statement for Freshwater Management (NPS-FM) is of particular relevance as it supports improved freshwater management in New Zealand by directing regional councils to establish objectives and set limits for fresh water in their regional plans. Recent amendments to the NPS-FM give regional councils specific direction on how this should be done.

Objective A1 of the NPS-FM is to safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems, of fresh water and the health of people and communities, at least as affected by secondary contact with fresh water. To achieve this objective, the NPS-FM sets national bottom lines for two compulsory values – ecosystem health and human health for recreation – and minimum acceptable states for

other national values. The NPS-FM also acknowledges iwi and community values by recognising the range of iwi and community interests in fresh water, including environmental, social, economic and cultural values.

Objective A2 is, in part, to protect the significant values of outstanding freshwater bodies and to protect the significant values of wetlands.

Policy C1 of the NPS-FM is clear that the government expects regional councils to manage land use as one of the methods to maintain and improve water quality including, to achieve the national bottom lines, where these are currently not achieved.

WRC is implementing the NPS-FM principally through the whitua process, based on a catchment-specific collaborative process with the community (GWRC 2015b). The provisions in the proposed Plan for livestock access, break-feeding and cultivation will also help implement aspects of the NPS-FM across the Wellington Region. In particular, the provisions will help safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems, of fresh water and the health of people and communities. The provisions for livestock access also specifically protect outstanding freshwater bodies and the significant values of wetlands.

3.1.3 New Zealand Coastal Policy Statement (2010)

The New Zealand Coastal Policy Statement 2010 (NZCPS) acknowledges that diffuse sources of contamination can result in poor and declining coastal water quality. Policy 22 requires that sediment loadings in runoff be reduced by controls on land use activities.

The provisions in the proposed Plan for break-feeding and cultivation include rules that require activities to be set back from surface water bodies as a way to control land use to reduce sediment loadings. The definition of surface water bodies in the proposed Plan includes estuaries, which are within the coastal marine area.

3.1.4 National Environmental Standards for Sources of Human Drinking Water (2007)

The Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007 (NES-Drinking Water) has specific requirements (Regulations 9 and 10) that apply to permitted activity rules that have the potential to affect drinking water sources for registered community drinking water supplies (those supplying populations of 501 or more people for 60 or more days each year).

The NES-Drinking Water requires regional councils to consider the effects of activities on drinking water sources in their decision-making. Specifically, it requires that permitted activities in regional plans will not result in community drinking water supplies being unsafe for human consumption following existing treatment.

The defecation and urination by livestock directly into water can result in pathogens to human health being present in the drinking water supply. Whilst

treatment processes can remove bacteria, viruses and parasites, the risk of these pathogens to human health can be further reduced by restricting the ability of livestock to directly defecate in these drinking water sources.

3.2 Regional statutory requirements

3.2.1 Regional Policy Statement for the Wellington Region

The Regional Policy Statement for the Wellington region 2013 (RPS) contains objectives and policies that the regional plan must give effect to.

Within the RPS, it notes that the ecosystem function of some rivers, lakes and wetlands has been impaired, with some wetland and lowland stream ecosystems coming under particular pressure. Specific activities which the RPS identifies as causing impairment of ecosystem function include, the removal of streamside vegetation and livestock access to river and streambeds, lakebeds and wetlands, and their margins.

The RPS has three objectives of particular relevance to achieving water quality and ecosystem health – Objective 6 (maintain and enhance coastal water quality), Objective 12 (freshwater quality to meet values for water and ecosystem health) and Objective 13 (freshwater bodies support health functioning ecosystems).

In addition, Objective 26 of the RPS states that mauri shall be sustained, particularly in relation to the region's coastal and fresh waters. Objective 27 directs that mahinga kai and natural resources used for customary purposes are maintained and enhanced, and that these resources are healthy and accessible to mana whenua.

Four policies direct how the above objectives are to be achieved. Policy 12 directs regional plans to include policies, rules and/or other methods requiring the aquatic habitat of surface water bodies to be managed for the purpose of safeguarding aquatic ecosystem health and other purposes identified in regional plans.

Policy 18 of the RPS directs the regional plan to include policies, rules and other methods to protect the aquatic ecological function of water bodies, through a combination of activities beneficial to habitat diversity, such as the protection and reinstatement of riparian habitat and the discouragement of livestock access to surface water.

Policy 19 of the RPS requires the regional plan to manage amenity, recreational and indigenous biodiversity values of rivers and lakes.

Policy 37 requires that a plan review give particular regard to safeguarding the life-supporting capacity of coastal and marine ecosystems.

3.2.2 Te Upoko Taiao

Te Upoko Taiao – Natural Resource Management Committee, comprised of Councillors and tangata whenua representatives of the region, was created as an expression of Treaty of Waitangi relationship at a regional level, enabling a

tangata whenua perspective in the resource management policy direction of WRC.

The committee is delegated as the decision-making body for the development of the proposed Plan. The section 32 report, “Introduction to the Resource Management Act 1991 Section 32 reports”, provides an overview of Te Upoko Taiao and the five guiding principles used in the development of the proposed Plan.

3.3 Non-regulatory drivers, industry standards and guidance documents

The Ministry for the Environment (MfE) and the Department of Conservation (DOC) have produced guidance documents that advocate livestock exclusion from surface waters and the use of contour ploughing and riparian set-backs (MfE 2001a, MfE 2001b, DOC 2006).

The Fish and Game Council of New Zealand ran a ‘dirty dairying’ campaign, which began in 2002, which publicised the ecological effects of dairy cows in streams and resulted in a public outcry. Within one year, the Dairying and Clean Streams Accord 2003 was signed, which became a key non-regulatory driver. This was a voluntary agreement between Fonterra, Ministry for the Environment, Ministry of Agriculture and Forestry, and regional councils. This accord has been superseded by the Sustainable Dairying: Water Accord (2013), which has agreed targets for livestock exclusion and riparian management.

Under the accord all dairy cows are to be excluded from permanently flowing streams and drains that are at least 1m wide and 30cm deep. This is to be achieved in the first instance on paddocks used during the milking season (the milking platform) and after 31 May 2017, this will also be required on land beyond the milking platform, such as winter runoff. Exclusion is to be achieved through the use of permanent fencing. In addition, all farms are to have riparian management plans by 2020.

In the Wellington Region, most dairy farms are cooperative members of Fonterra. The Supply Fonterra environment programme (Fonterra 2012) has a set of minimum standards, similar to those in the accord, which must be met by all suppliers. In addition, Supply Fonterra requires that sediment from tracks, sacrifice paddocks and winter forage blocks must not discharge to any waterway.

In 2011, WRC generated *A Guide to Managing Stock Access to Waterways*. The guideline was developed in partnership with Federated Farmers, Fonterra, DairyNZ, Beef + Lamb NZ and the New Zealand Deer Farmers Association (Greater Wellington Regional Council 2011). The guide recommends fencing off areas where it is practicable and where heavier livestock are likely to be grazed.

The industry groups for beef and sheep and for deer have guidelines which generally recommend animals be excluded from water bodies (Beef + Lamb NZ 2014, New Zealand Deer Farmers Association 2012). The industry group

for pig farmers, NZPork, recommends that all water courses should be fenced (MPI 2012).

3.4 Operative regional plans

There are five operative plans for the Wellington Region – Regional Freshwater Plan, Regional Soil Plan, Regional Plan for Discharges to Land, Regional Air Quality Management Plan and Regional Coastal Plan. The two operative plans relevant to this report are the Regional Freshwater Plan for the Wellington Region (Freshwater Plan) and the Regional Soil Plan for the Wellington Region (Soil Plan).

The operative provisions in the Freshwater Plan and the Soil Plan reflect a permissive regulatory approach towards the management of livestock access to surface waters, break-feeding and cultivation.

The operative plans do not exercise WRC’s ability to control land use under section 9 of the RMA, such as cultivation or break-feeding set-backs, for the purpose of maintaining and enhancing water quality. The operative plans also do not specifically contain rules that allow livestock access to disturb the beds and banks of surface waters under section 13 of the RMA, and therefore, all livestock access technically in the current plans requires a discretionary consent.

3.5 Regional Freshwater Plan

The operative Freshwater Plan addresses land-use effects on water quality and quantity under the section that discusses cross boundary issues. The explanatory text in section 12.1.3 of the Freshwater Plan is clear that the regional plans do not make rules on land:

“land use effects on water quality and quantity are raised in Issues 2.5.3, 2.5.4 and 2.6.5. The approach of the Council is to avoid, remedy, or mitigate the adverse effects of land use activities by promoting actions by other agencies and be people to maintain and enhance water quality and to maintain water quantity.

In this context, “promote” does not include making rules on land. This approach towards the effects of land use on fresh water is consistent with the Regional Policy Statement which seeks in the first instance, to avoid or reduce the effects of land use by co-operating with territorial authorities and using the instruments available to these authorities.”

Several policies in the Freshwater Plan address riparian margins including Policies 4.2.9, 4.2.10, 4.2.11, 4.2.12 and 4.2.13. One policy in the Freshwater Plan (Policy 5.2.15) addresses non-point source discharges (such as from agricultural land use).

The Freshwater Plan contains a mix of non-regulatory methods that address riparian management, including, but limited to Methods 8.4.10, 8.4.11, 8.4.12, 8.4.13 and 8.4.14.

3.6 Regional Soil Plan

In the operative Soil Plan, Objective 4.1.11 and Policy 4.2.16 address the use of land management practices to minimise soil disturbance. The explanation for Policy 4.2.16 advocates contour cultivation, direct drilling, the establishment of riparian strips, and protecting areas from grazing animals.

Policy 4.2.14 of the Soil Plan promotes riparian management and the explanation for the policy notes that a riparian management strategy will be prepared as a means of implementing the policies relating to riparian management.

The operative Soil Plan does not have any rules specific to cultivation or riparian management.

WRC manages several non-regulatory programmes through departments such as Land Management, which offers assistance for the development of farm environment plans, fencing and the establishment and maintenance of vegetated riparian margins.

3.6.1 Current plan effectiveness and efficiency

With regard to managing the adverse effects of livestock on surface waters, WRC has relied on the use of non-regulatory management guidelines (GWRC 2011) and a reactive approach of responding to complaints.

Because there are no specific provisions, there is a lack of clarity for livestock owners and the community with regard to the circumstances under which animals are permitted to be in a river, stream or lake. This lack of clarity is inefficient.

WRC enforcement officers responded to 70 incidents regarding livestock access between 1 January 2009 and 31 May 2014. Without specific provisions in the current plan, council officers must rely on sections 13 and 15 of the RMA, rather than on clear rules and policy direction. This is inefficient.

The adverse effects of livestock on surface water under the current lack of specific provisions have resulted in one prosecution (WRC vs C&E Stolte Ltd CRI-2013-035-000437).

Council officers have not specifically investigated the effects of livestock access on surface waters in the Wellington Region. However WRC's state of the environment report (Perrie et al. 2012) noted that some elevated bacterial counts recorded in rural areas were most likely the result of stock access. One example was an elevated *E. coli* count at a monitoring site just downstream from where a herd of dairy cows were crossing (page 38). Livestock access was also noted as a factor in high levels of poor water clarity or suspended sediment (page 108).

Although the effectiveness of the operative plans in managing the effects of livestock access on surface waters has not been assessed directly, there is sufficient national and international information to understand the potential and

actual effects and the risks of acting or not acting. This is discussed in more detail in section 5.2 of this report.

The lack of specific provisions in the operative plans are considered to be an inefficient and ineffective way to achieve the policies in the plans and the requirements of section 13 and section 15 of the RMA.

4. Appropriateness of proposed objectives

Section 32(1)(a) requires that an evaluation report must “examine the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of the Act”.

In order to evaluate the appropriateness of the proposed objectives, four standard criteria are used in this report:

- *Relevance* – is the objective related to addressing a resource management issues? Will it achieve one or more aspects of the purpose and principles of the RMA?
- *Usefulness* – will the objective guide decision-making? Does it meet sound principles for writing objectives?
- *Reasonableness* – what is the extent of the regulatory impact imposed on individuals, businesses or the wider community?
- *Achievability* – can the objective be achieved with tools and resources available, or likely to be available, to the local authority?

A brief description of the two key proposed objectives associated with livestock access, break-feeding and cultivation is provided below. Tables A2 and A3 in the Appendix provide summary evaluations of the appropriateness of the proposed and operative objectives against the four criteria discussed above.

The two key proposed objectives are Objectives 045 and 047. Because the management of livestock access, break-feeding and cultivation will help reduce the adverse effects of land use on the aquatic environment, the provisions are also directly related to a suite of objectives in the proposed Plan associated with mauri and intrinsic values, ecosystem health and mahinga kai, contact recreation and Māori customary use, the health needs of people, natural wetlands, significant sites, trout habitat and indigenous biodiversity. This suite of 13 additional objectives is shown in the tables in sections 5.1.3 and 5.1.4 of this report.

4.1 Objective O45

The adverse effects of livestock access on surface water bodies are reduced.

This objective is about managing livestock access to surface waters to reduce inputs of sediment, nutrients and pathogens. Livestock access can result in disturbance of stream bank and streambed integrity, and can result in significant inputs of fine sediment, nutrients and pathogens. Livestock in

surface water bodies is also a cultural issue, both in terms of community expectations and for mana whenua.

The provisions in the proposed Plan seek to ensure the achievement of the objective through restricting access to stream banks and reducing the inputs of sediment, nutrients and pathogens to fresh and coastal waters.

Proposed Objective 045 is directly relevant to the two issues (Issues 4.2 and 4.8) identified during the development of the proposed Plan, as discussed above in section 2 of this report.

As shown in the Appendix, Table A2, the objective is specifically relevant to section 5 and to sections 6(a), 6(c), 6(e), 7(a), 7(aa), 7(c), 7(d), 7(f) and 7(h) of the RMA. It is also relevant to sections 30(1)(c)(ii), 30(1)(c)(iii), 30(1)(d)(iv) and 30(1)(f) of the RMA. The objective is also relevant to Policies 12, 18, 19 and 37 of the RPS.

The objective is useful in that it will effectively guide decision-making and will work with other objectives in the proposed Plan to achieve the sustainable management of natural resources in the Wellington Region.

The objective is achievable. The objective of reducing adverse effects will be achieved over the life of the proposed Plan through policies and rules, and will continue to be achieved over a longer timeframe through the implementation of non-regulatory methods. WRC has statutory functions under section 30 of the RMA to achieve this objective and WRC will work with livestock owners as well as with industry groups, territorial authorities and others to achieve this objective.

The objective is reasonable as it will have greater environmental benefits than the costs necessary to achieve it. The majority of the capital costs will be borne by livestock owners and a portion of the capital costs will be shared by all rate-payers through an increase in WRC programmes that deliver advice, guidance and incentives.

The objective addresses the shortcomings of the operative provisions, and provides direction for clear and efficient policy tools with which decision-makers and those using the plan can use to assess activities related to livestock access to surface water.

4.2 Objective O47

The amount of sediment laden runoff entering water is reduced.

This objective is related to agricultural land use activities of cultivation, break-feeding and livestock access to surface waters. Activities that expose bare soil or result in stream bank erosion can result in sediment laden runoff entering water. Section 30(1)(c) of the RMA and the NPS-FM specifically require regional councils to control the use of land for the purpose of the maintenance and enhancement of the quality of water and of ecosystems in water bodies and coastal water.

In the operative Soil Plan, Objective 4.1.11 states, “Land management practices are adopted for the effective control of sediment runoff to water bodies.” This objective seeks a similar outcome but is worded with more specificity as to the cause, or management issue.

The proposed objective is more broadly worded than the operative objective. The proposed objective is directly relevant to Issue 4.2 identified during the development of the proposed Plan, as discussed above in section 2.

As shown in Table A3 in the Appendix, the objective is specifically relevant to section 5 and to sections 6(a), 6(c), 6(e), 7(a), 7(aa), 7(c), 7(d), 7(f) and 7(h) of the RMA. It is also relevant to sections 30(1)(c)(ii), 30(1)(c)(iii), 30(1)(d)(iv) and 30(1)(f) of the RMA. In addition, the NPS-FM 2014 requires regional councils to consider and account for the sources of relevant contaminants and to implement methods to assist the improvement of water quality.

Policy 22 of the NZCPS requires the reduction of sediment loadings in runoff through controls on land use activities.

The objective is relevant to Policies 12 and 37 of the RPS which requires regional plans to safeguard aquatic ecosystem health and the life-supporting capacity of coastal and marine ecosystems.

The objective is useful in that it will effectively guide decision-making and will also help guide the whaitua committees’ decision-making.

The objective is achievable. The objective of reducing adverse effects will be achieved over the life of the proposed Plan through policies and rules, and will continue to be achieved over a longer timeframe through the implementation of non-regulatory methods. WRC has statutory functions under section 30 of the RMA to achieve this objective.

The objective is reasonable as it will have greater environmental benefits than the costs necessary to achieve it. The majority of the capital costs will be borne by livestock owners and farmers. A portion of the capital costs will be shared by all rate-payers through an increase in WRC programmes that deliver advice, guidance and incentives.

The objective provides direction for clear and efficient policy tools with which decision-makers and users of the proposed Plan can use to assess activities related to livestock access, break-feeding and cultivation.

5. Efficiency and effectiveness of the proposed policies, rules and methods

An assessment on the efficiency and effectiveness of the proposed policies, rules and methods is provided below.

The proposed policies and methods are assessed in accordance with section 32(1)(b) and section 32(2) of the RMA as to whether they are the most appropriate way to achieve the objectives in the proposed Plan.

In accordance with section 32(1)(b) of the RMA, this report identifies other reasonably practicable options for achieving the objectives, and provides an assessment of the efficiency and effectiveness of the provisions in achieving the objectives.

The following sub-sections assess several matters for livestock access, break-feeding and cultivation. The assessment starts with a description of the community and stakeholder input to the development of the provisions in the proposed Plan. Following this is a discussion on:

- The main options identified for livestock access management and the preferred option that is included in the proposed Plan
- The main options identified for cultivation and break-feeding and the preferred options that are included in the proposed Plan

5.1 Community and stakeholder engagement

In 2012 and 2013 a series of workshops specific to rural land use provisions were held with key stakeholders. Stakeholders expressed a wide range of opinions on how to manage livestock access to water bodies (Parminter and Greenberg 2012). Some felt that all waterways should be fenced, whereas others thought that exclusion should only be required for intensively farmed animals. Some felt that WRC should provide funding. Others thought that forestry contributed more sediment in some areas than livestock, and therefore any provisions for stream bank protection should be site-specific for the purpose of gaining the biggest benefit as opposed to the use of region-wide provisions.

As the meetings progressed, general areas of agreement emerged, such as the need for the proposed Plan to contain some provisions regarding livestock access (as opposed to no specific provisions), a desire for provisions to be prioritised in some way based on the types of water bodies and types of livestock, and an acknowledgement that for some provisions the use of transitional time periods would be the most practicable and reasonable approach.

The draft provisions were also discussed with the Farming Reference Group, an advisory group to WRC, which provides advice, information and recommendations on matters concerning the functions of WRC as they relate to the well-being of the region's farming communities. The Farming Reference Group recommended that the transition time be sufficiently long enough to allow landowners and managers time to comply with the rules. This group also recommended that the rules framework should recognise that the cost to benefit ratio of fencing in the hill country may be greater than for lowland areas due to the difficulty of topography and the size and layout of many hill country blocks.

Stakeholder feedback at the workshops on the provisions around cultivation and break-feeding reflected a general agreement that farmers should be using good management practices, which include the use of set-backs and contour tilling. Disagreement remained on whether the provisions needed to stipulate

the minimum width of required set-backs, or if they did, what set-back width would be most appropriate to achieve the purpose of sediment retention.

Following the release of the draft Natural Resource Plan (draft NRP) in September 2014, a significant amount of feedback was received on the draft provisions for managing livestock access. To explore these comments, WRC facilitated a series of three Focus Group meetings in February/March 2015. In addition to WRC officers, there were 19 participants in the Focus Group from the region including farmers and representatives of iwi, industry, government. Following the Focus Group meetings, three public meetings were held (GWRC 2015a). The feedback and comments from the Focus Group and subsequent public meetings are discussed in the sections which follow.

5.2 Options for livestock access

The potential adverse environmental effects associated with livestock access include inputs of sediments, nutrients and pathogens. These can negatively impact on a range of environmental, economic, cultural and social values.

A commonly cited study in New Zealand observed that dairy cows crossing a stream will preferentially defecate in the stream ford than elsewhere on the raceway (Davies-Colley et al. 2004). These observations on Sherry Creek in the Motueka River catchment indicated that stream-crossing events resulted in large effects on water quality, including sharp spikes in bacterial contamination, plumes of turbid water, and high levels of suspended solids and total nitrogen.

In the Wellington Region, WRC responded to a complaint regarding a herd of dairy cows that were crossing and lingering in small streams. During this incident, the livestock in the stream resulted in eels, small fish and koura being visibly stressed and analysis showed very low dissolved oxygen content in the water, meaning that it was unable to properly sustain aquatic life (WRC vs C&E Stolte Ltd CRI-2013-035-000437).

The effects of direct livestock defecation in surface waters are dependent on a variety of factors, including the volume of stream flow and the downstream values, as well as the density, frequency and duration of livestock access.

A preliminary modelling exercise indicated that fencing in the Ruamāhanga catchment in the Wairarapa could result in a 47% reduction in *E. coli* inputs (Serezat et al. 2014). An observational study of beef cattle in the hill country indicated that direct deposition to the stream or riparian area represents a relatively low percentage, about 4%, of total defecation (Bagshaw 2002).

There have been several studies on the relative input of faecal bacteria to streams from livestock access as compared to from overland flow during heavy rainfall events. A comprehensive literature review for Environment Waikato determined that stock exclusion may not significantly influence annual catchment inputs of faecal bacteria, but that it can make a difference during the most critical times for public exposure to health risks, such as during lower summer flows (Ritchie and Donnison 2010).

Livestock access can result in trampling and overgrazing of stream banks, soil erosion, loss of stream bank stability, sedimentation and warmer water temperatures resulting in reduced habitat quality for many indigenous aquatic species. A recent report notes that livestock exclusion can lead to improved ecosystem health, as indicated by reduced sedimentation and increased macroinvertebrate community index scores (MCI) (Wilcox and Wright-Stow 2012).

The Parliamentary Commissioner for the Environment (PCE) identified keeping livestock out of water by fencing streams and bridging crossings as the first step in preventing diffuse pollution on farms (PCE 2012). These actions avoid the direct release of urine and faeces into water and reduce sediment inputs from bank disturbance.

In the Waikato hill country, catchment studies of before and after livestock exclusion found suspended solids load reductions of 30-90% and 30-65% reductions in *E. coli* (Quinn 2012 as reported in Longhurst and Mackay 2014).

5.2.1 Non-regulatory use of management plans

As discussed in section 3.6.1, a lack of clear rules in the operative plans for livestock access has resulted in an ineffective and inefficient way of achieving the requirements of section 13 and section 15 of the RMA.

Nonetheless, stakeholder feedback and comments on the draft provisions indicated a strong preference for the proposed Plan to manage livestock access through the use of non-regulatory methods. In particular, the Focus Group meetings identified a preference for the rule structure to allow the management of livestock access to be through the use of an approved plan as an alternative to meeting the conditions in the rule for a permitted activity.

The Focus Group identified that an approved plan would allow the farmer, in consultation with iwi, council and industry, to develop a farm-specific or even a catchment-specific management plan. A specific plan would allow the livestock owner to prioritise actions across their property for the purpose of maintaining and enhancing water quality. This prioritisation could result in the need for excluding livestock to the standards required by the conditions of the permitted rule to not being a priority, or to being a lesser priority. For example, a site-specific plan could identify that livestock access does not result in adverse effects at this site, or that the permitted condition timeframe to exclude livestock cannot be met.

The use of a plan as a condition of a permitted activity is possible under section 87A(1) of the RMA. However, a council cannot reserve discretion to approve a plan under a permitted activity. Approval as a condition of a rule is typically used where consent is required for an activity. Therefore, within a rule framework, there is little difference between using a site-specific plan as an alternative to a permitted activity and using a resource consent as an alternative.

Non-regulatory methods, such as advice, guidance and assistance, can however be used within a permitted activity rule framework.

5.2.2 Effects-based only

A rule structure using an effects-based only option for managing livestock access was identified as a result of feedback received on the draft NRP and from discussions in the Focus Group meetings. An effects-based option, in its most complete form, would permit livestock access (under section 13 of the RMA) everywhere as long as the activity did not breach specific effects-based conditions.

The effects-based only conditions could include standards that must be met for: concentrations of nutrients, *E. coli*, suspended solids, dissolved oxygen; measures of habitat quality (substrate, bank stability, shading, riparian vegetation); and the integrity of aspects that maintain values important to mana whenua.

An effects-based only option could be a highly relevant way to achieve the outcomes sought by the objective. However, an effects-based option is similar to the operative provisions, which lack effectiveness and efficiency, especially in the lowlands where it is more productive to graze livestock at higher stocking rates and where livestock have easier access to low-gradient streams.

An effects-based only option does not provide certainty to the livestock owner or the community in regards to under what circumstances the effects-based conditions will be breached. Where adverse effects can be anticipated, it is more effective and efficient to use a clear activity-based rule.

5.2.3 Activity-based only

A rule structure using an activity-based only option would clearly specify when, where, and what livestock were permitted to access surface water (under section 13 of the RMA) with the confidence that the access would not result in any discharges that could breach the permitted conditions specified in section 70 of the RMA.

Given the wide variability in livestock types, farming methods and water types, an activity-based only option would need to capture all activities to be certain that section 70 is not breached. A rule that captures all activities would end up costing much more than environmental benefits and would therefore be highly unreasonable.

5.2.4 Livestock types, stocking density and intensive vs extensive farming

Livestock types – The term “livestock” is defined in the proposed Plan as:

Domestic animals, such as cattle or horses, raised for home use or for profit. For the purpose of this plan livestock does not include horses while they are being used for transportation, or bird species.

The proposed rules are based on livestock types. This reflects that some species of animal are more likely to have adverse effects on surface waters than other types of animals.

Cattle are heavy-bodied animals and their treading or access to the beds and banks of surface waters can cause stream bank erosion, pugging and damage to stream beds. They are also more likely to stand in the water.

Dairy cows are generally stocked at a more intensive level than other cattle and during the milking season they are regularly moved around the farm, and so are likely to cross waterways more often than other cattle in other enterprises.

Deer and pigs like to wallow and create mud holes along the banks and in wet areas.

Sheep are generally less intensively farmed, avoid getting their feet wet and are less likely to enter waterways.

Horses are also heavy-bodied animals like cattle but they are unlikely to be grazed intensively in this region.

Stocking density – Some comments on the draft provisions sought provisions that did not restrict livestock access for animals grazed at lowing stocking rates, or conversely that rules excluding livestock should only apply to high stocking densities.

In general, confining animals at a high density results in more disturbance, more defecation and more urine. However, there is no magic number of animals per hectare that results in no adverse effects.

There are two ways currently in use of defining high stocking densities – stock units per hectare and livestock farming operations.

Exclusion based on stocking density is used in a new rule for Hawke's Bay Regional Council. The decision version of Plan Change 6 for the Tukituki (June 2014) uses a rule that exempts livestock exclusion from waterways in hill country areas where animals are not grazed at a high stocking density. Note that there is no such exemption for paddocks that are not steep.¹ For all areas, sheep are exempt from the rules.

High stocking density in Plan Change 6 is based on 18 stock units per hectare. Stock unit is a term that is based on the energy requirements for one breeding ewe. Each livestock type is compared against this standard. For Plan Change 6, 18 stock units/ha equates to 4 beef cows/ha or 3 dairy cows/ha or 3 bulls/ha or 9 yearlings/ha or 6 heifers/ha or 9 deer/ha. In a 10ha paddock this is 40 beef cows, 30 dairy cows, 30 bulls, 90 yearlings, 60 heifers or 90 deer.

The option of basing a rule on livestock stock density was explored with a Focus Group and was rejected based on the following reasons:

- Stocking density based on stocking units can change seasonally and depending on the size of paddock currently being grazed, making compliance difficult or based on record keeping

¹ On land that is less than 15 degrees in slope, the Hawke's Bay rule requires all livestock (other than sheep) to be excluded from lakes, wetlands and flowing rivers (whether they are intermittent or permanent) and their margins by 31 May 2020.

- The effects of a stocking density in a paddock with a long water's edge can be different from the effects of the same stocking density in a paddock with a narrow water's edge
- Stocking density does not consider cumulative densities among adjoining or nearby paddocks on the same or separate properties along the same surface water body
- High stocking density in the hill country is uncommon and can be managed with an effect-based rule
- Defining how many stock units are “high density” or which farming operations are “intensive” is subjective

During the public meeting in Carterton, support was raised for a rule structure for the valley floor (lowlands) which exempted low livestock density activities from needing to be restricted from water bodies and water races.

Similar to the complexities for defining “high” stocking density, it is also difficult to define “low” stocking density.

Intensive vs extensive farming – An alternative to defining livestock density is the use of defined intensive versus extensive livestock grazing operations. This is similar to the proposed rules based on livestock types, given that the livestock type of “dairy cows” are generally grazed intensively. Identification of other types of livestock that are generally grazed intensively would capture intensive types of non-dairy cattle operations, such as some bull-beef operations. The drawback to this option is that:

- Defining which farming operations are “intensive” is subjective and risks being not inclusive of uncommon or new operations that use high stock densities

Rules for Environment Canterbury use a definition for “intensively farmed stock”, which relies heavily on their region’s use of irrigated pasture.² Note that non-intensively farmed stock must meet effects-based conditions except for in specified significant sites where they are prohibited.

The reliance on irrigated pasture to define intensively farmed stock assumes that irrigated pasture is used to support higher stocking densities. This may work well for Canterbury, but does not necessarily reflect farming operations in parts of the Wellington Region that receive sufficient rainfall or have high enough groundwater tables to not need irrigation.

The different scenarios possible with differing livestock types, livestock stocking densities and intensive versus extensive farming operations makes it difficult in a regulatory situation to have a rule that suits all scenarios. As shown in the subsections which follow, the number of different scenarios increases given the potential options around surface water types, significant sites and hill country versus lowland areas.

² Intensively farmed stock means cattle or deer grazed on irrigated land or contained for break-feeding of winter feed crops; dairy cattle, including cows, whether dry or milking, and whether on irrigated land or not; and farmed pigs.

The proposed rules take a pragmatic approach that recognises that cattle, farmed deer and farmed pigs are likely to have adverse effects where they are grazed at a relatively high stocking rate. As discussed in the sections which follow, this is most likely to be in the fertile Wairarapa valley and other lowland areas. In addition, dairy cows are typically grazed at a relatively high stocking rate regardless of their location in the region.

5.2.5 Surface water body types

The definitions of rivers and wetlands in the RMA are quite general and therefore any provisions that refer to “rivers” or “wetlands” would capture a large number of systems.

The proposed Plan defines a surface water body as:

A river, lake, wetland, estuary, open drain or water race, and its bed. For the purpose of this plan, surface water body includes intermittent and permanent rivers and does not include ephemeral flow paths and bodies of water designed, installed and maintained for any of the following purposes:

- (a) *water storage ponds for*
 - (i) *fire fighting or*
 - (ii) *irrigation, or*
 - (iii) *stock watering or*

- (b) *water treatment ponds for*
 - (i) *wastewater, or*
 - (ii) *stormwater, or*
 - (iii) *nutrient attenuation, or*
 - (iv) *sediment control, or*
 - (v) *animal effluent, or*
 - (vi) *operating sumps, quarries and gravel pits.*

This definition is used for many provisions in the proposed Plan related to section 15 discharges to water.

The proposed rule structure for livestock access contains permitted activity-based conditions that apply to specific surface water bodies, defined as Category 1 and Category 2 surface water bodies. Category 1 surface water bodies are significant sites and are discussed in the following subsection. The definition for Category 2 surface water bodies in the proposed Plan is:

Category 2 surface water body includes, and is limited to:

- (a) *estuaries other than those identified in Schedule F4 (coastal sites), and*
- (b) *within the mapped lowland areas shown on Map 29, rivers that have an active bed width of 1 metre or wider, and drains greater than 1m wide, and water races, and*
- (c) *rivers and streams important to trout spawning habitat identified in Schedule I (trout habitat), and*

(d) *natural lakes,*

but excludes any surface water body that meets the definition of a Category 1 surface water body.

Intermittent vs permanently flowing – The RMA definition of river is broad and includes continually or intermittently flowing waters. As shown above, the proposed Plan also includes intermittent waters in the definition of surface water body. The inclusion of intermittent rivers in the livestock access provisions received a lot of comment, both pro and con, during the development of the proposed Plan.

For example, many people requested that the proposed Plan use the same definitions as used in the livestock access requirements in the Sustainable Dairying: Water Accord and Supply Fonterra. These industry standards are specific to permanently flowing waters that are at least 1m wide and 30cm deep.

However, in the Wellington Region, even some relatively large streams and rivers are not permanently flowing. The need to distinguish permanently flowing waters for an activity-based condition could lead to uncertainty for everyone involved, especially during extreme wet or dry weather periods.

In order to provide certainty, the provisions do not distinguish between permanent and intermittent waters. The provisions are based, instead, on the active bed width, and whether there is water in the active bed at the time and location of the livestock access.

In addition to providing certainty, a similar management of permanently and intermittently flowing streams and rivers also provides a more effective way to protect the values of intermittently flowing waters. WRC's annual summary of freshwater quality monitoring (Perrie and Cockram 2010) notes that intermittently flowing streams are commonly overlooked and undervalued and as such are "at risk from being filled in and piped during land development and in rural areas can be degraded by stock access." The annual report summarises the findings of a report commissioned from NIWA (Storey 2010) which identified the unique, distinct and high conservation interest of aquatic invertebrate communities in the study streams, and highlights the need for their protection.

Water races and drains – The inclusion of water races and drains in the livestock access provisions also received a lot of comment, both pro and con, during the development of the proposed Plan.

The water races in the Wairarapa were set up primarily to supply drinking water for livestock. Established as early as the 1890s, the races deliver water to the Wairarapa plains through a series of channels. The water flows by gravity, with intakes on the Ruamāhanga, Waingawa, Waiohine and Tauherenikau Rivers. There are six water races systems in the region: Moroa, Longwood, Taratahi, Carrington, Te Ore Ore and Opaki.

The water race channels were designed to return the unused water back to rivers and streams further downstream. Although the majority of the water race system is comprised of artificial channels, the water race networks incorporate sections of natural streams, springs and wetlands.

A “drain” and a “river” are two entirely separate classes of water body in the definitions in the RMA. Water races and drains which are wholly artificial channels are not included in the definition of river. For these channels, section 13 of the RMA (restriction on certain uses of beds of lakes and rivers) does not apply.

However, any waterbody that was once a river, or has natural connections to a natural river system has been found by the courts to be a “river” for the purposes of the RMA, no matter its degree of modification.

In the Wellington Region many streams have been highly modified, and therefore the difference between a drain, a water race and a stream is often not obvious, or relevant. What are considered to be “drains” from a pragmatic viewpoint on a farm property are in fact usually a mixture of artificial drains and highly modified watercourses. The two classes can look exactly the same and have been managed with periodic mechanical maintenance in the same way for decades. For a landowner to know which “drain” or section of “water race” fell into the artificial or river category on their property, they would need to look at the whole catchment to ascertain whether the channel had any connections to natural watercourses, or had a natural head water. This would potentially require a review of historical aerial photographs to ascertain whether a natural watercourse had existed in that location at any point in time.

Regardless of whether it is a river, a water race or a drain, WRC has an obligation under section 15 to manage the discharge of contaminants to water (other than water in a pipe, tank or cistern). This includes water in water races and water in open drains. Given that these channels discharge to water bodies, WRC also has obligations under sections 9 and 30 to control the use of land (including the channel of the water race and channel of the drain) for the maintenance and enhancement of water quality and ecosystems.

It is important to note that agricultural industries, such as dairy, Beef + Lamb NZ (2014) and NZPork (MPI 2012) recommend livestock exclusion from most surface waters and they are actively developing good management practices, as recommended in the third report of the Land and Water Forum (LAWF 2012). In particular, the Fonterra Supply does not make an exception for water races.

Some district council water race bylaws prohibit livestock from accessing water in the water race. However it is clear that these particular bylaws have not historically been enforced, and more reliance has been placed on codes of practice, which encourage fencing of water races to restrict livestock access.

The proposed Plan includes a method (Method M13) that identifies the need for WRC to work with the district councils, industry and landowners to investigate and rationalise many of the matters related to the management of water races.

5.2.6 Significant sites

The policy and rules in the proposed Plan refer to conditions specific for significant sites which are defined as Category 1 surface water bodies:

Category 1 surface water body includes, and is limited to:

- (a) sites with significant mana whenua value identified in Schedule C (mana whenua), and*
- (b) īnanga spawning habitat identified in Schedule F1b (īnanga spawning habitats), and*
- (c) habitats for indigenous birds in rivers identified in Schedule F2a (birds-rivers), and*
- (d) estuaries identified in Schedule F4 (coastal sites), and*
- (e) significant natural wetlands greater than 0.1ha identified in Schedule F3 (significant wetlands), and*
- (f) outstanding water bodies identified in Schedule A (outstanding water bodies), and*
- (g) within 1,000m upstream of a surface water abstraction site for a community drinking water supply shown on Map 30.*

The definition of Category 1 surface water bodies is used in an activity-based rule for livestock access. The definition includes many significant sites, but it does not include all sites identified as significant in the proposed Plan.

Feedback on the draft provisions specifically noted that part (b) of the definition is specific to īnanga spawning habitat and does not include rivers or lakes with habitat for six or more migratory indigenous fish species as listed in Schedule F1.

The identification of habitat for six or more migratory indigenous fish species is catchment-based rather than site- or reach-specific. This means that streams identified as providing habitat for six or more migratory indigenous fish species are identified in the proposed Plan as that stream and all of its tributaries.

It is not considered to be efficient or effective to have an activity-based rule for an identified site that includes all of its tributaries. Therefore the definition of Category 1 surface water bodies is restricted to significant sites suitable for an activity-based rule. That said, livestock access to streams and tributaries listed as significant in Schedule F1 for providing habitat for six or more migratory indigenous fish species can be managed with an effects-based rule as discussed in section 5 of this report.

Significant mana whenua value – The proposed Plan identifies approximately 165 sites (Schedule C) of significance to mana whenua. The schedule includes a list of values held by mana whenua for each site. Please see the report, “Section 32 report: Māori values”, for more information.

The values associated with each of the scheduled sites was found to vary and were not necessarily adversely affected by livestock access or by all livestock types, densities, durations and frequencies of livestock access. Consideration

was given to splitting out the values by those that are affected by livestock access and those that are not, so that the proposed provisions could be more specific. To this end, this approach was not pursued as it would be difficult to craft a rule that is specific to all potential values at all locations.

Īnanga spawning habitat – Īnanga are the adult life stage of the most abundant whitebait species, *Galaxias maculatus*. Īnanga spawn gregariously on spring tide events during late summer and early autumn amongst tidally influenced riparian vegetation. Adults swim downstream until they sense the saltwater intrusion, and then seek suitable vegetation such as flax, raupo, and native rushes. In pastoralised areas, ungrazed pasture grasses including tall fescue, Yorkshire fog, and creeping bent provide suitable spawning habitat. Excluding livestock from Īnanga spawning habitat scheduled in the proposed Plan will reduce adverse effects on Īnanga habitat by reducing stream bank erosion, preventing grazing of vegetation used for spawning, and preventing trampling of Īnanga eggs and larvae.

Riverine bird habitat – The areas of riverbed scheduled as significant bird habitat in the proposed Plan are on the region's largest braided rivers, where indigenous birds nest on the river gravels. Livestock can adversely impact the value of these sites of indigenous habitat by disturbing the habitat so that it is no longer suitable for nesting habitat, and they can disturb the birds, their nests and eggs during critical breeding periods. The degree of impact from livestock will vary from site to site depending on the frequency of flood events relative to the breeding season, the livestock type and the density, duration and frequency of livestock access to the site.

Estuaries – Most of the region's threatened indigenous fish species must migrate through the region's estuaries at least twice during their life cycle. Livestock access to estuaries can increase nutrient levels through inputs of urine and dung, destroy soil structure through pugging and compaction, increase soil erosion, destroy estuarine plants and disturb estuarine fauna, and increase weed dispersal. Therefore, livestock access to estuarine areas can reduce the viability of estuarine health and habitat integrity and adversely impact on indigenous fish species.

Significant wetlands – The National Institute of Water and Atmospheric Research (NIWA) undertook a review of literature on the effects of livestock grazing in wetlands. Their review suggests that in most cases grazing of wetlands in New Zealand is undertaken to provide food for livestock rather than for any conservation benefit (NIWA 2004). Nonetheless, the NIWA report suggests that livestock grazing can offer conservation value by preventing succession to woody vegetation and assisting with keeping invasive weed species under control, although grazing can also have negative impacts on wetland ecology and the values supported by a wetland. They also noted that sheep grazing can assist with maintaining a short turf that provides for native vegetation species diversity. The NIWA review concludes that the effects of grazing are so variable that grazing decisions should be based on conservation objectives specific to each site.

Outstanding water bodies – The NPS-FM has an objective to maintain or improve the significant values of outstanding freshwater bodies. Outstanding water bodies are identified and scheduled in the proposed Plan. Some of these sites are estuaries or wetlands, as discussed above. Others are lakes or rivers. As mentioned previously, the livestock access can negatively affect the values which make water bodies significant.

1,000m upstream of a surface water abstraction site for a community drinking water supply – Included in the definition of Category 1 surface water bodies are locations within 1,000m upstream of a surface water abstraction site for a community drinking water supply. These abstraction sites are registered drinking water supplies for more than 500 people and are scheduled in the proposed Plan. A report on these sites (Thompson 2015) noted there are 15 abstraction sites within 14 catchments. Of these, only three (on the Waikanae, Ōtaki and Huangarua Rivers) have catchments that are not entirely within the conservation estate. For these three sites, livestock access and deposition of faeces directly into the water or onto the river bed within private property can result in increased levels of parasites, bacteria and viruses in the water supply source.

The use of 1,000m for the upstream livestock exclusion zone is relatively arbitrary. The report by Thompson (2015) recommended a protection zone of 12-16 kilometres upstream of the abstraction sites for these rivers. Note that the proposed provisions have an activity-based condition for the area within 1,000m (1 kilometre) upstream of these sites, as well as an effects-based condition for the entire river channel network.

5.2.7 Hill country vs lowlands

The effectiveness of excluding livestock in the hill country on reducing inputs of sediments and associated contaminants is generally agreed to be lower than the effectiveness in the lowlands. This is because, on a region-wide basis, many streams in the hill country are adversely affected by mass erosion that is on a much larger scale than the more temporary erosion caused by livestock.

This, however, is a generalisation and in some locations stream bank trampling can have a greater effect on sedimentation than mass wasting, as shown in study completed for the Bay of Plenty (Hughes and Hoyle 2014).

Nonetheless, the benefits of livestock exclusion in the hill country need to be weighed up against the costs of fencing in difficult terrain, the typical lower stocking densities, and the lower return on investment for most hill country livestock operations.

The identification of hill country may be intuitive for those of us who are walking up a steep paddock, but how should a rule define hill country? Options include definitions based on slope, land class, elevation or geographical area (such as specific regions or ranges).

For the livestock provisions in the proposed Plan, rules refer to Category 2 surface water bodies, which are defined, in part on a geographical area that excludes hill country.

The definition of Category 2 surface water bodies refers to a map which is based in the first instance on the national level New Zealand Land Resource Inventory (NZLRI) slope determinations within the land use capability classifications. Areas with a NZLRI slope of 15 degrees or greater captures most of the hill country area in the region. Other areas captured in the map include narrow valleys and coastal areas primarily surrounded by steeply sloped lands.

Although hill country areas have historically been stocked at low densities due to the lower pasture production, hill country is now commonly used for winter grazing of dairy herds, or dairy support, and in some places intensive beef herds are grazed in the hill country.

As discussed in the previous section on livestock types, stocking density and intensive versus extensive farming, the rule framework is the same for dairy cows regardless of where they are grazed.

5.2.8 Assistance and extension of timeframes for compliance

The operative plan does not have specific rules for livestock access, and therefore these rules are a major change in the regional plan which will have large costs for many livestock managers.

The proposed permitted rules include transitional timeframes, as this was something strongly supported by most of the key stakeholders in the meetings used to develop the draft provisions. In addition, the policy and rule framework provides a consenting pathway for livestock owners who do not meet the conditions for a permitted activity.

WRC has several existing programmes which offer financial assistance and additional assistance is anticipated to incentivise riparian management, including fencing and planting. The proposed provisions promote non-regulatory methods, including proposed Method M12 (Sustainable land management practices), which will result in the improvement and enhancement of riparian margins and wetlands. As part of Method M12, an incentives package and prioritisation plan will coordinate the available money across all departments.

5.2.9 Preferred option for livestock access provisions

The management of livestock access to surface water bodies is the direct subject of proposed Policy P99, which is a specific policy for the implementation of Objective O45 (Livestock access to surface water bodies).

The proposed policy also assists in achieving goals of several other objectives in the proposed Plan, including objectives specific to mauri and intrinsic values, aquatic ecosystem health and mahinga kai, Māori customary use and the health needs of people, natural wetlands, contact recreation, scheduled sites, trout habitat and indigenous biodiversity.

The relationship between proposed Policy P99 and the proposed Plan objectives is shown in Table 1 below, as is the relationship with the proposed rules and methods intended to implement the policy.

Table 1: Provisions related to livestock access to surface water bodies. The most specific provisions are shown in bold.

| | |
|-------------|---|
| Objectives: | <p>O1: Ki uta ki tai O2: Importance of land and water O3: Mauri O4: Intrinsic values O5: Fresh and coastal water O23: Maintain or improve water quality O24: Contact recreation and Māori customary use O25: Aquatic ecosystem health and mahinga kai O27: Riparian margins O28: Extent of wetlands O30: Trout O31: Outstanding water bodies O33: Significant mana whenua values O35: Significant indigenous biodiversity values O45: Livestock access to water bodies O47: Sediment runoff</p> |
| Policies: | <p>P1: Ki uta ki tai and integrated catchment management P10: Contact recreation and Māori customary use P17: Mauri P22: Ecosystem values of estuaries and harbours P23: Restoring Te Awarua-o-Porirua Harbour, Wellington Harbour, and Lake Wairarapa P31: Aquatic ecosystem health and mahinga kai P36: Effects on indigenous bird habitat P39: Adverse effects on outstanding water bodies P40: Ecosystems and habitats with significant indigenous biodiversity values P44: Protection and restoration of sites with significant mana whenua values P65: Minimising effects of nutrient discharges P96 Managing land use P95: Discharges to land P69: Human drinking water supplies P33: Protecting indigenous fish habitat P99: Livestock access to surface water bodies P100: Riparian margins for cultivation and break-feeding P105: Protecting trout habitat</p> |
| Rules: | R97 and R98: Livestock access |
| Methods: | <p>M12: Sustainable land management practices M13: Wairarapa water races M20: Wetlands</p> |

The operative regional plans do not contain specific policies or rules on livestock access. Because there are no operative rules on livestock access, WRC has to refer directly to section 13 (pugging of streambed) and section 15

(discharges to water) of the RMA. In addition, the operative plan does not define reasonable mixing zone, and this has made enforcements difficult. WRC has responded to 70 livestock access incidents since 2009. One of these incidents has resulted in a formal enforcement action.

The proposed Plan contains a more directive policy – Policy P99, as well as rules, other methods and specific definitions that are used to implement Objective O45 (Livestock access to surface water bodies). As can be seen in Table 1 above, the provisions specific to livestock access are designed to work within a comprehensive framework of provisions associated with integrated catchment management and the protection of the values of ecosystem health and mahinga kai, contact recreation and Māori customary use, the health needs of people, natural wetlands, contact recreation, scheduled sites, trout habitat and indigenous biodiversity.

The proposed policy manages the sedimentation, direct discharge of contaminants and the disturbance to the banks and bed of surface water bodies and the coastal marine area resulting from livestock access. The policy directs that aquatic habitat and water quality are to be protected in all locations. The policy also directs that the significant values of Category 1 surface water bodies (as discussed below) are protected. In addition, the policy gives direction that adverse effects of livestock access are to be managed by restricting the types, numbers, density, frequency and duration of access, as well as providing food, water and comfort to livestock in locations outside of the banks and beds.

The proposed rule structure reflects the direction in the policy by prioritising surface water categories and livestock types. A timeframe of between three and seven years, post-plan notification is used in Rule R97. The timeframe acknowledges the capital requirements and period of adjustment required to exclude livestock from surface waters where they are currently not excluded. A three-year timeframe is used to exclude livestock, other than sheep, from the most significant surface water sites and a seven-year timeframe is used for the other sites.

Definitions are included in the proposed Plan that define terms used in the rules, such as, surface water categories, active bed and the zone of reasonable mixing

Proposed Rule R97 relies on sections 9, 12, 13, 15 and 70 of the RMA. The rule is structured to:

- Use *effects-based* conditions to ensure that there is no significant pugging of the bed and banks outside of a defined crossing point based on section 13, and that there is no conspicuous change in colour or clarity based on sections 15 and 70
- Use *activity-based* conditions for livestock access (sections 9, 12 and 13), based on a transitional timeframe, and prioritised by livestock type and stream category, that:

- Exclude all livestock, with the exception of sheep from certain wetlands, from Category 1 surface waters after three years (post notification)
- Exclude cattle, farmed deer and farmed pigs from Category 2 surface waters after seven years. In addition, dairy cow herds must be restricted from all streams that are at least 1m wide

If the conditions of the rule are not met, consent is required for a discretionary activity under Rule R98. Compared to the operative plans, the proposed Plan extends a greater level of regulation, and therefore greater oversight of and protection from the adverse effects of livestock access to surface water bodies.

Rule R97 refers to two categories of surface waters which are defined in section 2 – Interpretation of the proposed Plan. Category 1 surface waters include many of the scheduled sites and specific wetlands. The definition for Category 2 surface water bodies includes streams and drains that are at least 1m wide in the region mapped as lowlands. This definition recognises that the costs of fencing in the hill country can outweigh the benefits. Nonetheless, the effects-specific conditions in the rules for pugging and turbidity must be met in all surface waters.

The proposed Plan provisions are also prioritised based on types of livestock. Cattle are heavier than other stock and are therefore more likely to cause stream bank erosion, pugging and damage to streambeds. They are also more likely to stand in the water. Dairy cattle are generally more intensively stocked than other livestock types and are also moved around the farm more regularly, so are more likely to cross waterways more often. Deer and pigs like to wallow and create mud holes. Sheep are generally less intensively farmed and are less likely to enter waterways.

There are three non-regulatory methods related to livestock access in the proposed Plan. These methods are Method M12 (Sustainable land management practices), Method M13 (Wairarapa water races) and Method M20 (Wetlands). Of most relevance is Method M12 which provides guidance, advice and assistance, including financial assistance related to riparian management and livestock access.

(a) Costs and benefits

Table A4 in the Appendix summarises the costs and benefits to WRC, the resource users and the community.

It is important to recognise that fencing without riparian management is rarely a sustainable solution for the farmer. For example, a fence placed on the very edge of a stream, and therefore without any riparian management, is prone to fail due to erosion. In a similar way, a fence placed some distance from a stream and without some form of riparian management can result in undesirable weed growth that can have adverse effects on the stream channel, the pasture or the fence itself. The non-regulatory Method M12, which supports riparian and wetland management, is designed to work hand-in-hand with the “baseline” permitted conditions for livestock access. Therefore, the

costs and benefits of fencing, riparian management and wetland enhancement should be discussed together.

(i) Costs

Costs of compliance are typically discussed in terms of the cost of installing and maintaining fences to exclude livestock. However, there are several other costs associated with excluding livestock and these can include:

- Materials, labour and, in some cases, electricity for fencing
- Plants and labour for riparian revegetation
- Loss of pasture previously available for grazing
- Fence, weed and pest maintenance
- Provision of alternate sources of drinking water
- Culverts or bridges at stock crossing points

Assessments by the Waikato Regional Council and the Upper Waikato Primary Sector Partnership (2013a, 2013b) noted that the costs to the farmer range from low for the use of temporary electric fencing during grazing periods to high where bridges and other improvements to farm infrastructure are needed.

Regarding the loss of pasture, a recent report for Waikato on mitigation options for dairy support operations concluded that for the 11 farms investigated in the upper Waikato, additional fencing would remove an average of 1% of the farm area (range from 0.1% to 2.2%) used for grazing (Perrin Ag Consultants 2015).

Fencing off of waterways used for stock water supplies can result in a cost for the provision of reticulated water system of \$100-\$200/ha (Charlton and Weir 2001 as reported in Longhurst and Mackay 2014).

A conservative estimate of the length of fencing that may be needed to exclude livestock from Category 1 surface water bodies in the Wellington Region is 335km of stream and an additional estimated 223km of fencing may be needed to exclude livestock from significant wetlands (Streat and Greenberg 2014b).

Based on these numbers, the worse-case scenario length of fencing potentially needed to exclude livestock from Category 1 waters could range from 558km to 1,116km of fence, for fencing on one or both sides, respectively.

The definition of Category 2 surface waters has been modified between the release of the draft and proposed provisions. For the draft provisions, which also included streams at least 3m wide in the hill country regions, a desktop assessment was made using estimated stream width obtained from modelled mean flow widths (NIWA 2012) and geographical information on agricultural land use through the AgriBase® 2012 GIS layer (Appendix B in Streat and Greenberg 2014a). AgriBase® is a database comprised of 5 components

developed and owned byASUREQuality New Zealand that provides a central index of farm type, ownership, location and management in New Zealand.

Based on this desktop assessment, there is an estimated 2,600km of streams at least 1m wide in lowlands in land used for livestock grazing other than dairy, and 965km in land used for dairy. Water races add up to approximately 490km in the Wairarapa. It is unknown how many drains at least 1m wide exist, although a rough estimate for the area surrounding Wairarapa Moana, which has extensive drains, indicates there are over 900km of drains in this area. In addition, fencing would likely be needed for areas of dairy support in the hill country under the proposed rule.

The original estimate based on the draft rules was that almost 6,000 kilometres of stream, water race and drain would require some type of livestock exclusion. However, many farms already exclude livestock from surface waters and therefore some of this estimated length has already been fenced.

For the Tukituki Plan Change 6, Hawke's Bay Regional Council estimated, based on aerial photography, that between 13 to 57 percent of stream reaches in the Tukituki were fenced. First estimates for the Wellington Region are that 57 percent of the stream reaches are fenced. In some areas, such as on the dairy platforms, the percentage of fencing is much higher. A closer look, based on aerial photography and mapped fenced lines, for the Whareama River catchment in eastern Wairarapa, indicated that this was a reasonable estimate (Streat and Greenberg 2014b).

Although the proposed rules do not specify that fences must be used to exclude livestock, in the majority of cases, fences will be the most practicable method. Fencing costs can range from \$1.65/m for a single strand electric fence which may be sufficient for dairy cows to \$6.2/m for a five-wire fence, which may be suitable for beef cattle, to \$16/m for an eight-wire post and batten.

Based on the previously released draft rules, preliminary cost estimates were upwards of \$23 million that would be needed for fencing to comply with the conditions for the permitted activity rules (Streat and Greenberg 2014b).³ Additional costs would be associated with providing bridges or culverts for stream crossings, installing and maintaining reticulated water supplies and riparian management, including plants and maintenance.

Proposed Method M12 (Sustainable land management practices) was developed, in part, to assist landowners and managers with the cost of complying with these new provisions. Method M12 would also help improve the sustainability of any fencing efforts, through advice and guidance and assistance with riparian management planning and implementation.

Proposed Method M13 (Wairarapa water races) identifies the need for WRC to work with the district councils, industry and landowners to investigate and rationalise many of the matters related to the management of water races. This

³ This estimate is based on the draft rules as opposed to the proposed rules. The difference is assumed to be negligible.

method includes investigating the option of a potential plan change or variation in regards to livestock access to the water race systems.

Incentives and assistance would also be available through proposed Method M20 (Wetlands) for works related to the management of wetlands, including the management or exclusion of livestock.

(ii) Benefits

One of the more obvious benefits to the farmer is that the need to exclude livestock from surface waters to meet regulatory requirements can be used as an opportunity to rationalise fence lines. Fencing livestock out of gullies and unproductive pastures can allow farmers to focus investment on areas of the farm where the biggest gains in productivity for effort can be made.

The benefits of livestock exclusion and riparian management include:

- Increased livestock health and productivity resulting from cleaner water supply, improved pasture management and provision of shade and shelter
- Reduced erosion of stream banks, sedimentation of streambeds and instream weed growth resulting in reduced need for stream maintenance
- Decreased inputs of sediment and nutrients, and decreased water temperatures resulting in improved habitat quality for trout and indigenous species
- Increased amount of riparian vegetation resulting in increased amount of habitat for indigenous terrestrial and aquatic plants and animals
- Improved ecosystem health and mahinga kai
- Improved water quality for human health and contact recreation

Riparian management can even reduce pasture damage from geese and swan grazing flocks, as the vegetated edges deter these water birds from wandering onto the pasture, thereby preserving grass meant for livestock (Wairarapa News 6 August 2014).

Assessments by the Waikato Regional Council and the Upper Waikato Primary Sector Partnership (2013a, 2013b) note that excluding livestock from waterways on drystock and dairy farms results in:

- High value mitigation for reducing the input of micro-organisms to surface water (estimated reduction of more than 50%)
- Medium value mitigation for phosphorus (estimated reductions from 20% to 50%)
- Low value mitigation for nitrogen (estimated reductions less than 5%)
- A range from low to high value mitigation for sediment

Although there have been relatively few studies in New Zealand, research has shown that cattle are sensitive to the taste of water, they prefer to drink clean water without contamination and water intake is closely related to feed intake and animal productivity (Schütz 2012).

Industry guidance in New Zealand stresses that cattle prefer to drink from a clean water trough rather than a stream (Beef + Lamb NZ 2014). The economic benefits of clean drinking water for livestock include increased milk production and increased weight gain. For dairy cows, bacterial infections can result in infertility and aborted foetuses.

The provision of reticulated water supply, greater paddock subdivision and grazing management can result in more efficient pasture utilisation resulting in greater animal production (Charlton and Weir 2001 as reported in Longhurst and Mackay 2014).

Water contaminated with animal faecal matter can also be contaminated with pathogens, such as *Campylobacter*, *Cryptosporidium* and *Salmonella*. These bacteria are of concern to human health and reducing their occurrence in drinking water supplies has an economic benefit of decreased health care and increased productivity.

There have been some recent assessments in New Zealand on the economic benefits of improved water quality, including those found in evidence presented on the Horizons One Plan. For example, Marsh (2012) noted in his conclusions that studies have shown New Zealand households are willing to pay \$50-60 a year for improved water quality and that the sale price of houses are increased in areas with cleaner water.

(b) Risk of acting vs non acting

The NPS-FM requires regional councils to manage land use to meet freshwater objectives and the Land and Water Forum recommends that, at a minimum, farmers should be using good management practices.

The PCE identified keeping livestock out of water by fencing streams and bridging crossings as the first step in preventing diffuse pollution in farm catchments.

In January 2015, the Minister for the Environment stated in his speech about overhauling the RMA that national regulation would be used to ban dairy cows from streams and rivers by July 2017.

Policies in the RPS require WRC to discourage livestock access and the risks from livestock access to the values of fresh and coastal waters are well documented in the national and international literature.

The risk of not acting, given the certainty of information is a greater risk than acting.

5.3 Options for cultivation and break-feeding

The potential adverse environmental effects that can be associated with cultivation and break-feeding include inputs of sediments, nutrients and pathogens to fresh and coastal water. These contaminants can negatively impact on values for which the proposed Plan manages.

Sediment contamination of streams on cropping and horticultural land is most pronounced where cultivation occurs close to the edge of streams and drains, and where depressions that serve as temporary drainage channels during rain are cultivated and left exposed to surface runoff (MfE 2001b).

The proposed policy and rules for cultivation and break-feeding address the reduction of the delivery of contaminants to surface water only through the management of overland flow. Cultivation and grazing, including break-feeding, can also result in the loss of nitrogen in subsurface drainage. The management of nutrient leaching to groundwater and surface water, which can result from these agricultural practices, is addressed through proposed Policy P65 (Minimising effects of nutrient discharges), non-statutory Method M12 (Sustainable land management practices) and catchment-specific recommendations from the whitua committee process.

The proposed Plan specifically manages overland flow of contaminants from cultivation and break-feeding through the use of set-backs from surface water bodies.

A review of the literature (Ritchie and Donnison 2010) found that vegetated set-backs, or riparian buffers can:

- Prevent deposition on the banks as well as the beds of waterways
- Physically filter runoff by rank vegetation
- Slow runoff velocities due to roughness of vegetation, promoting entrapment and settling, infiltration and filtering effects

This same review reports that trials with 5m grass filter strips in New Zealand resulted in rates of 27% to 95% entrapment.

The effectiveness of set-backs to mitigate the overland flow of contaminants to surface water is dependent on a number of factors including the porosity of the soil, the intensity of the rainfall event, the slope of the exposed land, the presence or absence of preferred flow paths, the width of the set-back, and the vegetation type and cover within the set-back (McDowell et al. 2013; NIWA 2006). A review prepared for Environment Waikato reports that the first 5m of a vegetated set-back (filter strips) is the most effective at sediment retention and that sediment efficiency did not increase much beyond 10m-wide filter strips (Gibbs 2007). A review of studies comparing multiple width buffers in the same location indicate that sediment and total phosphorus removal rates (between 53% and 98%) increase with increasing buffer width (4.6m to 27m) (Parkyn 2004). Where overland flow towards a grass buffer strip is uniform and channelised flow does not occur, 5m-wide set-backs have been shown to

remove much of the larger particles, but finer particles may require 10m (Gharabaghi et al. 2002 as reported in Parkyn 2004). Regardless of the width, vegetated set-backs are not efficient for small size particles that stay in suspension and do not settle out.

Grazing, such as break-feeding, can increase the overland flow of contaminants during heavy rainfall events. The treading action of grazing animals on land can cause soil compaction and pugging resulting in decreased infiltration and increased overland flow. The animals on this land also deposit faeces and urine which contribute to the source of contaminants in the overland flow and, where there are no set-backs from surface water, the animals can deposit urine and faeces directly into the water.

DairyNZ's guidance publication on grazing management of winter forage crops provides more detailed recommendations on buffer widths and grazing within the buffer (DairyNZ 2014).

Environment Southland commissioned a technical review of contaminant loss from overland flow, including from break-feeding (Ryder Consulting 2013). Their review indicated that phosphorus and sediment are the main contaminants in overland flow during winter forage crop grazing. An earlier report (Monaghan 2012) indicated that overland flow can be significantly reduced by grazing when there is at least 2mm of soil water deficit, grazing an area for only three hours and grazing in a pattern that moves towards a waterway rather than away from it. This work and the work of Orchiston et al. (2013) has been used to guide WRC's non-regulatory guidance document on strategic grazing, "Reducing the impacts of winter grazing on soil and water quality" (GWRC 2014b).

Excluding livestock from the riparian areas also reduces the amount of faecal matter directly deposited and vegetated riparian areas can reduce overland flow thereby aiding infiltration and promoting the entrapment of faecal matter (Parkyn 2004; Collins et al. 2007).

The code of practice for commercial vegetable growing prepared by HortNZ for the Horizons Regional Council One Plan (Barber and Wharfe 2010) acknowledges the benefits of set-backs from surface water and the use of contour cultivation.

5.3.1 Set-back width

Comments on the draft provisions included requests that the buffer set-back for break-feeding be reduced from 5m to 3m wide.

As discussed above, 5m to 10m wide set-backs have been shown to reduce the amount of contaminants in surface runoff.

It is also worth noting that the proposed 5m-wide set-back is required only while break-feeding is occurring. After a paddock has been used for break-feeding, and ideally once the soil conditions are suitable, the riparian set-back that was retained can be grazed. At this point, the permitted conditions for livestock access to the streambed would need to be complied with, including

the requirement for access to not result in significant pugging of the bed and banks.

Comments on the draft provisions included requests that set-backs from cultivation are not included in the rule structure. They noted that there are a range of mechanisms for managing potential adverse effects from cultivation, and that requiring riparian margins is not supported.

5.3.2 Definition of cultivation

In addition to a set-back width, the proposed Plan addresses two other mechanisms for reducing sediment runoff from cultivation – using cultivation practices that reduce the amount of bare soil, and the use of contour ploughing. Specifically, the definition of cultivation used in the proposed Plan restricts the rule to only tilling or ploughing the soil, and does not require set-backs for direct drilling and no-till practices.

A comment was received on the draft NRP that requested that the definition of cultivation be amended to exclude “strip-tilling”. Strip-tilling is a technique where only the width of the planting strip is tilled and the soil between rows is left undisturbed. Strip-tilling is half-way between direct drilling and full cultivation, and is used as a soil conservation method. Therefore, strip-tilling is excluded in the definition of cultivation in the proposed Plan.

5.3.3 Preferred option for cultivation and break-feeding

Managing the adverse effects of the overland flow of contaminants to surface water bodies from cultivation and break-feeding is the subject of proposed Policy P100. This policy will assist in the achievement of Objectives O45 (Livestock access to water bodies) and O47 (Sediment runoff).

Similar to the proposed policy for livestock access discussed in the section above, this policy works in an integrated manner to assist in the achievement of proposed objectives specific to mauri, intrinsic values, aquatic ecosystem health and mahinga kai, contact recreation and Māori customary use, and human drinking-water supplies.

The policy is implemented through two permitted rules that require the use of 5m set-backs from surface water bodies. Surface water bodies are defined in the proposed Plan. The definition is inclusive and does not use the prioritisation of surface water categories, which is used in the livestock access provisions.

The relationship between proposed Policy P100 and the proposed Plan objectives is shown in Table 2 below, as is the relationship with the proposed rules and methods intended to implement the policy.

Table 2: Provisions related to cultivation and break-feeding. The most specific provisions are shown in bold.

| | |
|-------------|--|
| Objectives: | <p>O1: Ki uta ki tai O2: Importance of land and water O3: Mauri O4: Intrinsic values O5: Fresh and coastal water O23: Maintain or improve water quality O24: Contact recreation and Māori customary use O25: Aquatic ecosystem health and mahinga kai O27: Riparian margins O28: Extent of wetlands O30: Trout O31: Outstanding water bodies O33: Significant mana whenua values O35: Significant indigenous biodiversity values O45: Livestock access to water bodies O47: Sediment runoff</p> |
| Policies: | <p>P1: Ki uta ki tai and integrated catchment management P10: Contact recreation and Māori customary use P17: Mauri P22: Ecosystem values of estuaries and harbours P23: Restoring Te Awarua-o-Porirua Harbour, Wellington Harbour, and Lake Wairarapa P31: Aquatic ecosystem health and mahinga kai P36: Effects on indigenous bird habitat P39: Adverse effects on outstanding water bodies P40: Ecosystems and habitats with significant indigenous biodiversity values P44: Protection and restoration of sites with significant mana whenua values P65: Minimising effects of nutrient discharges P96 Managing land use P96 Managing land use P95: Discharges to land P69: Human drinking water supplies P33: Protecting indigenous fish habitat P99: Livestock access to surface water bodies P100: Riparian margins for cultivation and break-feeding P105: Protecting trout habitat</p> |
| Rules: | <p>R94: Cultivation or tilling of land R95: Break-feeding R96: Cultivation and break-feeding</p> |
| Methods: | <p>M12: Sustainable land management practices</p> |

Although the operative Freshwater Plan and the operative Soil Plan contain several policies that address the management of sediment runoff, there are no specific policies or rules on the management of overland flow of sediment

resulting from cultivation or break-feeding. In particular, the explanation for Policy 5.2.15 in the operative Freshwater Plan clarifies that the promotion of mitigation and facilitation of riparian management practices does not include making rules on land. In addition, the operative plans do not have any objectives specific to management of livestock.

A more directive policy, proposed Policy P100 clarifies that the overland flow of contaminants to surface water bodies from the use of land for cultivation and break-feeding shall be minimised through the use of riparian set-backs and good management practices.

This policy is achieved through two rules, proposed Rules R94 and R95, which rely on sections 9 and 15 of the RMA. The rules require that the activities do not occur within a specified distance (set-back) of surface water bodies and do not result in discharges of sediment-laden water flowing overland to surface water bodies. For cultivation, conditions require the use of contour ploughing. If the permitted conditions are not met, a consent for a discretionary activity is required under Rule R96.

The non-regulatory Method M12 (Sustainable land management practices) is used in the proposed Plan to promote other good management practices, such as grazing management, maintaining optimum Olsen P levels (Olsen P is the standard method in New Zealand to assess phosphorus availability to plants) and reducing nitrogen leaching. An example of this promotion includes WRC's non-regulatory guidance document, "Reducing the impacts of winter grazing on soil and water quality" (GWRC 2014b).

Compared to the operative plan, the proposed Plan extends a greater level of regulation, and therefore greater oversight of, and protection from, the adverse effects to surface water bodies resulting from sediment runoff from cultivation and break-feeding.

Policy P100 and Rules R94-R96 support effective decision-making and will assist in the implementation of Objective O47 (Sediment runoff) and a suite of other objectives for integrated management and the protection ecosystem health and mahinga kai, contact recreation and Māori customary use and a variety of other freshwater and coastal values as shown in Table 2 above.

(a) Costs and benefits

Table A5 in the Appendix summarises the costs and benefits to WRC, the resource users and the community in regards to the proposed policies, rules and methods for cultivation and break-feeding.

The provisions for cultivation and break-feeding are in accordance with good management practices (Barber and Wharfe 2010; DairyNZ 2014) and therefore, are effective at achieving the desired farm performance while providing for desired environmental outcomes. This definition of good management practice implies that costs are balanced with benefits.

(i) Costs

An assessment by the Waikato Regional Council and the Upper Waikato Primary Sector Partnership (2013c) notes that:

- Cultivating along contours rather than up and down the were a low cost to farmer time and expenditure
- Grass buffer strips of 2m width or more from cultivated land are a moderate cost to time and expenditure

Additional costs for the farmer to comply with the proposed permitted conditions include:

- Loss of land for cultivation or grazing
- For break-feeding, the potential cost of establishing and maintaining a reticulated water supply

Strategic grazing involves some costs for additional management, although financial costs are typically minimal.

There are also some anticipated costs to WRC and the community, including costs associated with the provision of advice and guidance. It is unknown if these services would be achieved with new rates or through the redistribution of existing costs for current programmes.

(ii) Benefits

The Waikato Regional Council and the Upper Waikato Primary Sector Partnership (2013c) assessment noted that:

- Cultivating along contours rather than up and down results in high value mitigation (benefit) for phosphorus and sediment (estimated reductions of more than 50%)
- Grass buffer strips of 2m width or more from cultivated land are moderately effective mitigations (benefits) for phosphorus and sediment (estimated reductions from 20 to 50%)

Additional benefits from improved soil retention as a result of contour ploughing and set-backs include:

- Reduced erosion of stream banks, sedimentation of streambeds and instream weed growth resulting in reduced need for stream maintenance
- Improved habitat quality for trout and indigenous species as a result of decreased inputs of sediment, and nutrients, and decreased water temperatures
- Increased amount of riparian vegetation resulting in increased amount of habitat for indigenous terrestrial and aquatic plants and animals

- Improved ecosystem health and mahinga kai
- Improved water quality for animal and human health and for contact recreation
- Reduced sedimentation to drains and therefore less need for drain maintenance and clearance activities

Strategic grazing during break-feeding that considers soil conditions, slope, grazing pattern, critical source areas and riparian set-backs can result in a high benefit for reductions in nutrient and sediment inputs.

Additional benefits, shown in Table A5, include increased partnerships and relationship building, increased expertise within the farming community.

(b) Risk of acting vs not acting

The NPS-FM requires regional councils to manage land use to meet freshwater objectives and the proposed Plan recommends that, at a minimum, farmers should be using good management practices.

The risks from inappropriately managed cultivation and break-feeding activities to the values of fresh and coastal waters are well documented in the national and international literature.

The risk of not acting, given the certainty of information is a greater risk than acting.

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Appendix

Table A1: Issues summary for livestock access, cultivation and break-feeding

| Issue | Significance | Need to be in proposed Plan | Different from operative plan? | Information sources | Appropriate level of information? |
|---|--|--|---|--|-----------------------------------|
| Stock access to surface water bodies, artificial watercourses, and the coastal marine area increases erosion of banks and beds of lakes and rivers and has adverse effects on water and habitat quality and the health and functioning of ecosystems. | Clear direction from the RMA, NPS-FM, and RPS. | Demonstrates WRC leadership on issue, provides clear foundation for objectives and policies, and reflects concerns regarding potential and actual effects of livestock access to surface water bodies. | The issue is similar, but the proposed Plan seeks to rationalise the policy framework to make it more efficient, easier to use, and easier to administer. | Local, regional and national information and data, including local monitoring data related to the implementation of the operative RFP. | Yes. |
| The ecosystem health and function of surface water bodies is being impaired by activities that degrade habitat quality, with some wetland and lowland stream ecosystems coming under particular pressure. | Clear direction from the RMA, NPS-FM, and RPS. | Demonstrates WRC leadership on issue, and accords with the direction of the RPS. | Issue recognised in operative plan, but the proposed Plan seeks to rationalise the policy and rules framework, and ensure alignment with integrated management and values based approach. | Local, regional and national information and data, including local monitoring data related to the implementation of the operative RFP | Yes. |

Table A2: Objective O45 Livestock access

| Objective: O45 | The adverse effects of livestock access on surface water bodies are reduced |
|--|---|
| Relevance | |
| Directly related to resource management issue? | Yes, this objective addresses Issues 4.2 and 4.8. |
| Will achieve one or more aspects of the purpose and principles of the RMA? | Yes, directly related to section 5 and to sections 6(a), 6(c), 6(e), 7(a), 7(c), 7(d), 7(f) and 7(h). |

| | |
|--|--|
| Relevant to Māori environmental issues? (sections 6(e),6(g),7(a),8) | See above |
| Relevant to statutory functions or to give effect to another plan or policy (i.e. NPS, RPS)? | Relevant to sections 30(1)(c)(ii), 30(1)(c)(iia), 30(1)(d)(iv) and 30(1)(f) of the RMA. Relevant to Policies 12, 18, 19 and 37 of the RPS. |
| Usefulness | |
| Will effectively guide decision-making? | Yes. |
| Meets sound principles for writing objectives? (specific; state what is to be achieved where and when; relate to the issue; able to be assessed) | This objective is a clear and complete sentence related to an issue. This objective is not time-bound as it aims to deliver benefits over time. |
| Consistent with other objectives? | Yes, all the objectives have been assessed, and work together to achieve the sustainable management of natural resources in the Wellington Region. |
| Achievability | |
| Will it be clear when the objective has been achieved in the future? Is the objective measurable and how would its achievement be measured? | Yes, the achievement of this objective will become clear in the future through <ul style="list-style-type: none"> • State of the environment monitoring, better water quality can be expected. • Monitoring/reporting the effectiveness and efficiency of this plan |
| Is it expected that the objective will be achieved within the life of the proposed Plan or is it an aspirational objective that will be achieved sometime in the future? | This objective of reducing adverse effects will be achieved over the life of the plan through policies and rules, and will continue to be achieved over a longer timeframe through the implementation of non-regulatory other methods. |
| Does the Council have the functions, powers, and policy tools to ensure that they can be achieved? Can you describe them? | The Council has the functions to achieve this objective, specifically sections 30(1)(c)(ii), 30(1)(c)(iia), 30(1)(d)(iv) and 30(1)(f) of the RMA. Policy 18 in the RPS requires the regional plan to discourage livestock access to rivers, lakes and wetlands. This objective will be achieved through the policies, rules, and other methods in the proposed Plan. |
| What other parties can the Council realistically expect to influence to contribute to this outcome? | Partnership and collaboration with Sustainable Dairying: Water Accord, farmer, agricultural industry groups and territorial authorities. |
| What risks have been identified in respect of outcomes? | Economic costs of achieving livestock exclusion (fencing, water reticulation, etc.) |

| | |
|--|---|
| Reasonableness | |
| Does the objective seek an outcome that would have greater benefits environmentally, economically or socially compared with the costs necessary to achieve it? | Yes – this objective will have greater environmental benefits than the costs necessary to achieve it. |
| Who is likely to be most affected by achieving the objective and what are the implications for them? | Livestock farmers and horse owners. |
| Existing objectives | |
| Are the existing objectives still relevant or useful? | The existing objectives are as not relevant or useful as the proposed objective. |

Table A3: Objective O47 Sediment-laden runoff

| | |
|---|--|
| Objective: O47 | The amount of sediment-laden runoff entering water is reduced |
| Relevance | |
| Directly related to resource management issue? | Yes, this objective addresses issue 4.8. |
| Will achieve one or more aspects of the purpose and principles of the RMA? | Yes, directly related to section 5 and to sections 6(a), 6(c), 6(e), 7(a), 7(c), 7(d), 7(f) and 7(h). |
| Relevant to Māori environmental issues? (sections 6(e),6(g),7(a),8) | See above. |
| Relevant to statutory functions or to give effect to another plan or policy (e.g. section 30, and any relevant NPS, NES, NZCPS, RPS)? | Relevant to sections 30(1)(c)(ii), 30(1)(c)(iia), 30(1)(d)(iv), 30(1)(f) of the RMA. The NPS-FM requires regional councils to consider and account for the sources of relevant contaminants and to implement methods to assist the improvement of water quality. Policy 22 of the NZCPS requires the reduction of sediment loadings in runoff through controls on land use activities. Policy 12 of the RPS requires the regional plan to safeguard aquatic ecosystem health. Policy 37 requires particular regard be given to safeguarding the life-supporting capacity of coastal and marine ecosystems. |
| Usefulness | |
| Will effectively guide decision-making? | Yes, the objective guides resource consenting processes, and also guides the whaitua committees decision-making. |

| | |
|---|--|
| Meets sound principles for writing objectives? (specific; state what is to be achieved where and when; relate to the issue; able to be assessed) | This objective is a clear and complete sentence related to an issue. This objective is not time-bound as it aims to deliver benefits over time. |
| Consistent with other objectives? | Yes, all the objectives have been assessed, and work together to achieve the sustainable management of natural resources in the Wellington Region. |
| Achievability | |
| Will it be clear when the objective has been achieved in the future? Is the objective measurable and how would its achievement be measured? | Yes, the achievement of this objective will become clear in the future through <ul style="list-style-type: none"> • Implementation of the NPS-FM through the whaitua committee process resulting in plan changes to implement accounting and allocation of contaminants. • State of the environment monitoring, better water quality can be expected. • Monitoring and reporting the effectiveness and efficiency of this plan. |
| Is it expected that the objective will be achieved within the life of the Plan or is it an aspirational objective that will be achieved sometime in the future? | This objective will be achieved over a longer timeframe than the life of the plan. |
| Does the Council have the functions, powers, and policy tools to ensure that they can be achieved? Can you describe them? | The Council has the functions to achieve this objective, specifically sections 30(1)(c)(ii), 30(1)(c)(iia), 30(1)(d)(iv), 30(1)(f) of the RMA. This objective will be achieved through the policies, rules, and other methods in the plan. |
| What other parties can the Council realistically expect to influence to contribute to this outcome? | Partnership and collaboration with Sustainable Dairying: Water Accord, farmer, agricultural industry groups and territorial authorities. |
| What risks have been identified in respect of outcomes? | The risk to water quality will be reduced through the achievement of this objective. |
| Reasonableness | |
| Does the objective seek an outcome that would have greater benefits environmentally, economically or socially compared with the costs necessary to achieve it? | Yes – this objective will have greater environmental benefits than the costs necessary to achieve it. |
| Who is likely to be most affected by achieving the objective and what are the implications for them? | Arable farmers and livestock farmers. |
| Existing objectives | |
| Are the existing objectives still relevant or useful? | The operative objective is similar to the proposed objective and is still relevant and useful. |

Table A4. Assessment of policies and methods (rules and other methods) for livestock access

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for livestock access |
|--|---|--|---|
| Costs (of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions) | Council | <p>Low costs associated with producing education materials and providing advice.</p> <p>Ongoing costs to support existing Council programmes for biodiversity, and farm environment plans.</p> <p>The lack of specific provisions in the operative plans results in uncertainty about what is permitted. WRC must respond to numerous complaints from the public about livestock in streams, and then can refer only to high level requirements under the RMA.</p> | <p>It is unlikely that WRC would contribute financial assistance for fencing that only achieves the conditions of the permitted rules. Financial assistance may be available however, to achieve outcomes beyond the bottom line of the permitted conditions, including livestock exclusion combined with riparian management.</p> <p>Preliminary estimates are that \$9.5m of WRC money could be spent (Streat and Greenberg 2014b). The source of this money would be from a shift in existing programmes, new rates or a combination of both.</p> <p>Some additional costs are expected for enforcement.</p> |
| | Resource user (consent applicant or permitted use) | <p>The lack of specific provisions in the operative plans results in uncertainty about what is permitted. This results in confrontation with WRC and the public.</p> <p>The lack of specific provisions can result in adverse effects to downstream water users from upstream livestock access.</p> <p>Continued poor water quality in surface waters continue to reduce livestock health and productivity.</p> | <p>Preliminary estimates are that landowners and managers would need \$23m for fencing to comply with the rules as they were in the draft NRP (Streat and Greenberg 2014b). Although the proposed rules are modified from the draft rules, this is still a reasonable estimate of cost given the assumptions built into the estimate.</p> <p>Increased spending on mitigation measures could negatively impact the relative competitiveness of the agricultural industry (Rabobank Food & Agribusiness Research and Advisory 2014).</p> <p>Additional estimated costs of at least \$15m would be needed for non-regulatory riparian planting, associated with livestock exclusion efforts.</p> <p>Additional costs are associated with</p> <ul style="list-style-type: none"> • loss of pasture previous available for grazing, • fence, weed and pest maintenance • Provision of alternate sources of drinking water • Culverts or bridges at stock crossing points. |

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for livestock access |
|--|---|--|--|
| | Community costs (environmental, social, economic, cultural) | <p>The lack of specific provisions in the operative plans results in uncertainty about what is permitted, which results in confusion and conflict with the WRC and neighbours.</p> <p>The environmental costs of livestock access are nutrient enriched rivers and lakes and the resulting changes to biodiversity.</p> <p>Social and cultural costs results from excessive periphyton growth and unsafe bacteria levels at swimming sites.</p> <p>Economic costs are loss of tourist dollars.</p> | <p>Increased costs to agricultural industries may be passed on to the local consumers.</p> <p>If the agricultural industries cannot compete with the additional costs needed to meet environmental regulations, local jobs and spending could be reduced.</p> <p>The financial assistance under Method M12 will be paid for through rates.</p> |
| Benefits (of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions) | Council | Low expenditure and effort | <p>Increased partnership with farmers resulting from provision of advice and guidance on good management practices.</p> <p>Collaborative relationship building, increased expertise within the farming community; more efficient use of enforcement and monitoring resources.</p> |
| | Resource user (consent applicant or permitted use) | Ease of access to drinking water supplies for livestock, no costs associated with fences, crossings, reticulation or maintenance. | <p>Increased livestock health and productivity resulting from cleaner water supply, improved pasture management and provision of shade and shelter.</p> <p>Reduced erosion of stream banks, sedimentation of streambeds and instream weed growth resulting in reduced need for stream maintenance.</p> <p>Contribution to improved water quality for ecosystem health and mahinga kai and for contact recreation and tangata whenua use.</p> |

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for livestock access |
|---|--|--|---|
| | Community benefits (environmental, social, economic, cultural) | Lack of economic input required for fencing, stream crossings and maintenance may result in less costly agricultural products on the domestic market. | <p>Decreased inputs of sediment and nutrients, and decreased water temperatures resulting in improved habitat quality for trout and indigenous species.</p> <p>Increased amount of riparian vegetation resulting in increased amount of habitat for indigenous terrestrial and aquatic plants and animals.</p> <p>Improved ecosystem health and mahinga kai.</p> <p>Improved water quality for contact recreation.</p> <p>Increased fencing and planting may provide jobs for the community.</p> |
| Efficiency (costs vs benefits) and effectiveness (will the provisions achieve the objective?) | | The operative plan takes a low cost, low benefit approach by simply encouraging livestock exclusion and riparian management. While this may be efficient in terms of resources, it is not effective at improving water quality and aquatic ecosystem health and does not deliver on WRC's requirements under the NPS-FM. | <p>The rule framework is effective in that it will achieve Objective O45 and result in improved ecosystem health and mahinga kai and improved recreational contact and tangata whenua use.</p> <p>The proposed Plan will be more efficient as the rules provide certainty for resource users and WRC. The rules also promote efficiency in the use of a prioritisation of surface water categories and livestock types. The use of a transitional period for compliance also aids efficiency.</p> <p>Incentives associated with Method M12.</p> |

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for livestock access |
|---------------------------------|--|---|---|
| Risks (of acting or not acting) | | Option 1 does not result in management practices that help achieve the requirements of the NPS-FM or the objectives in the proposed Plan. | <p>The LAWf recommends that, at a minimum, farmers should be using good management practices. The NPS-FM requires regional councils to manage land use to meet freshwater objectives. The PCE identified keeping livestock out of water by fencing streams and bridging crossings as the first step in preventing diffuse pollution in farm catchments.</p> <p>Policies 18 and 19 in the RPS require the regional plan to discourage livestock access.</p> <p>Livestock access to surface water is not culturally or socially acceptable.</p> <p>There is sufficient information to provide for greater certainty over the risks to the values of fresh and coastal water from livestock access to surface waters. The risk of not acting given the certainty of information is a greater risk.</p> |
| Appropriateness | | This option is not appropriate | The new provisions are appropriate given the high level of efficiency and effectiveness. |
| Conclusions | | | The new provisions to protect fresh and coastal water from the effects of livestock access are the most efficient and effective for meeting the purpose of the NPS-FM, the RPS and the objectives of the proposed Plan. |

Table A5. Assessment of policies and methods (rules and other methods) for cultivation and break-feeding

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for cultivation and break-feeding |
|---|--|---|--|
| Costs (of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions) | Council | Low costs associated with producing education materials and providing advice. | Some additional costs are expected for enforcement and additional or shifted costs are required to provide advice and guidance on good management practices for permitted activities. |
| | Resource user (consent applicant or permitted use) | Reduced natural capacity as a result of soil erosion. Poor water quality resulting in reduced livestock health and productivity. | Additional costs associated with cultivation: <ul style="list-style-type: none"> • Loss of land previous available for cultivation Additional costs associated with break-feeding: <ul style="list-style-type: none"> • Loss of pasture previous available for grazing • Provision of alternate sources of drinking water |
| | Community costs (environmental, social, economic, cultural) | The environmental costs are sedimentation and nutrient enriched rivers and lakes and the resulting changes to biodiversity. Social and cultural costs result from excessive periphyton growth and unsafe bacteria levels at swimming sites. Economic costs include the loss of tourist dollars associated with not maintaining New Zealand's clean-green image. | New or shifted rates are needed for advice and guidance on good management practices for permitted activities. |
| Benefits (of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions) | Council | Low expenditure and effort | Increased partnership with farmers resulting from provision of advice and guidance on good management practices. Collaborative relationship building, increased expertise within the farming community; more efficient use of enforcement and monitoring resources. |

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for cultivation and break-feeding |
|--|--|---|--|
| | Resource user (consent applicant or permitted use) | Low expenditure and effort | Reduced erosion of stream banks, sedimentation of streambeds and instream weed growth resulting in reduced need for stream and drain maintenance. Increased livestock health and productivity resulting from cleaner water supply and improved pasture management. Improved use of good management practices will result in achieving desired farm performance. |
| | Community benefits (environmental, social, economic, cultural) | Low costs to farmers for cultivation and grazing practices may result in less costly agricultural products on the domestic market. | Decreased inputs of sediment and nutrients, and decreased water temperatures resulting in improved habitat quality for trout and indigenous species. Improved ecosystem health and mahinga kai. Improved water quality for contact recreation. |
| Efficiency (costs vs benefits) and effectiveness (will the provisions achieve the objective) | | The operative plan does not have any rules that specifically address cultivation or break-feeding set-backs. Policy 4.2.16 in the Soil Plan promotes good management practices that include contour cultivation, direct drilling and the establishment of riparian strips. | The rule framework is effective in that it will help achieve Objectives O45 and O47 and will assist to achieve the suite of objectives related to mauri, intrinsic values, aquatic ecosystem health and mahinga kai, recreational and Māori customary use and other values of fresh and coastal waters. The proposed approach is efficient as the rules provide certainty for resource users and council. |
| Risks (of acting or not acting) | | Option 1 does not result in management practices that help achieve the requirements of the NPS-FM or the objectives in the proposed Plan. | The LAWF recommends that, at a minimum, farmers should be using good management practices. The NPS-FM requires regional councils to manage land use to meet freshwater objectives. There is sufficient information to provide for greater certainty over the risks to the values of fresh and coastal water from sediment runoff from cultivation and break-feeding to surface waters. The risk of not acting given the certainty of information is a greater risk. |

| | | Option 1 – Status quo (no change from operative plan) | Option 2 – Rule framework for cultivation and break-feeding |
|-----------------|--|--|---|
| Appropriateness | | This option is not appropriate | The new provisions are appropriate given the high level of efficiency and effectiveness. |
| Conclusions | | | The new provisions to protect fresh and coastal water from the effects of excessive sedimentation are the most efficient and effective for meeting the purpose of the NPS-FM and the objectives of the proposed Plan. |

The Greater Wellington Regional Council's purpose is to enrich life in the Wellington Region by building resilient, connected and prosperous communities, protecting and enhancing our natural assets, and inspiring pride in what makes us unique

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July 2015
GW/EP-G-15/61



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