

Proposed Plan Change 1 – Waikato and Waipā River Catchments

Draft s42A Section/Background for Commercial Vegetable Production

Expert Conferencing

This is a discussion document to help frame the Expert Caucusing on the three key Commercial Vegetable Production questions of:

1. How to provide for crop rotation/leasing land/moving commercial vegetable production from site to site while ensuring no increase in losses of the four contaminants?
2. How best to describe nutrient losses, given known issues with Overseer applicability to commercial vegetable production?
3. Should the proposed cap on total area of commercial vegetable production be retained, and if not, what constraints/limits on new commercial vegetable production should apply (if any)?

It is prepared as a draft part of the Section 42A Report. It represents Officer's preliminary views on a number of other matters that are not the subject of expert conferencing. The completion of this part of the Report will be informed by the outcomes of expert conferencing.

Introduction

- 1.1 This topic covers matters related to Commercial Vegetable Production (CVP). Proposed Plan Change 1 (PC1) has proposed a different approach to managing contaminant losses from land used for CVP to reflect the different land use practices that occur. There is significant overlap between matters raised on those provisions specifically relating to CVP and more general issues about the management approach taken in PC1. Where there is overlap, it is noted where there are similar concerns and whether the recommendations made on those matters earlier in this report are applied in a consistent manner or not.

Context

- 1.2 CVP requires deep, free draining soils and a suitable climate. This combination of soils and climate are relatively limited in area across the Auckland and Waikato Region. In the Waikato, CVP is mostly located in the northern Pukekohe and Pukekawa areas. This area of production land is a significant food growing area in New Zealand, but is confined in area – significantly less than 1% of the Waikato River catchment is used for CVP. The pressure on the availability

of land for CVP has increased as a result of areas of Pukekohe being used for urban development, with some CVP becoming more extensive in other parts of the region.

- 1.3 The range of crops grown is diverse, some crops can be grown continuously in the same ground while other crops must be rotated to avoid disease. This requirement for crop rotation results in some CVP growers leasing considerable proportions of the land they use for CVP.
- 1.4 While information is imperfect, there are thought to be up to 200 CVP growers in the region. Many of these are transitory, farmers that respond to market conditions by short-term growing of CVP crops, while in most areas the majority of the growing area and value of CVP production is undertaken by a small number of growers.
- 1.5 As a generalisation, most CVP is high in N losses and high in P and sediment losses, in the absence of adequate mitigations. Microbial contaminants (including *E. Coli*) are largely absent, unless there is incidental grazing. While many submissions to the CVP rules seek additional flexibility for 'low emitters', in reality CVP is generally not a low-loss activity.

Discussions with Submitters

- 1.6 WRC staff have had a number of discussions with submitters specifically related to their PC1 submissions. This has included two meetings with HortNZ, which have included a number of individual growers, the PVGA and Balle Bros. These meetings have been helpful for exploring issues, clarifying submission points, learning more about the practical realities of CVP rotations and farming techniques, and testing potential solutions.
- 1.7 Several other meetings with PC1 submitters addressed CVP issues and rules as an aside to all general discussions.
- 1.8 Notes from these meetings have been made publicly available on the Council's website.
- 1.9 Key conclusions from the meetings are that:
 - there is a need to better enable movement of CVP from site to site;
 - there is clear room for increased uptake of good management practices;
 - there are up to 200 growers in the region who are affected by these rules;
 - overall CVP is a very small proportion of the land area and contaminant losses of the region as a whole, but could be up to 10% of some sub-catchments;
 - Overseer has issues modelling CVP losses that reduce confidence in the tool; and
 - there is displacement of CVP from within the Auckland region, due to urban growth that leads to increased land area demand in the Waikato region.

Overview of provisions

- 1.10 Under PC1 there a number of provisions that specifically relate to CVP. This is because the management approach applied for pastoral farming cannot be easily applied to CVP, due to the nature of the growing activities. The overarching approach of PC1 is for CVP growers to

adopt FEPs, undertake nutrient budgeting, farm at good or best management practice and restrict further expansion of CVP growing areas to reduce overall discharges from CVP.

- 1.11 The objectives of PC1 aim for improvements in water quality while maintaining social, economic and cultural well-being and protecting and restoring tangata whenua values. In relation to CVP, these objectives are to be achieved through implementing a number of policies, but most specifically:

Policy 3: Tailored approach to reducing diffuse discharges from commercial vegetable production systems/Te Kaupapa Here 3: He huarahi ka āta whakahāngaihia hei whakaiti i ngā rukenga roha i ngā pūnaha arumoni hei whakatupu hua wheua.

- 1.12 The above tailored approach to reducing diffuse discharges from CVP systems is to be achieved by:

- a. *Providing flexibility to undertake crop rotations on changing land parcels while reducing average contaminant discharges over time;*
- b. *Establishing then capping the maximum land area utilised for CVP based on production data from 2006-2016;*
- c. *Establishing a nitrogen reference point for each property or enterprise;*
- d. *Achieving a 10% reduction in the diffuse discharge of nitrogen and a tailored reduction in diffuse discharges of phosphorus, sediment and microbial pathogens through the implementation of Best or Good Management Practices;*
- e. *Identifying and implementing mitigation measures within timeframes specified in either a Farm Environment Plan and associated resource consent or in specific requirements established in a Certified Industry Scheme;*
- f. *Enable CVP enterprises that reduce nitrogen, phosphorus, sediment and microbial pathogens; and*
- g. *The degree of reduction in diffuse discharges of nitrogen, phosphorus, sediment and microbial pathogens is proportionate to the amount of current discharge.*

- 1.13 Regional rules and non-statutory methods are proposed to implement the PC1 policies. Rules 3.11.5.5, 3.11.5.6, 3.11.5.7 apply to CVP.

- 1.14 Rule 3.11.5.5 permits the use of land for CVP and the associated diffuse discharge of nitrogen, phosphorus, sediment and microbial pathogens onto or into land until 1 January 2020. From this date, the use of land for existing CVP is a controlled activity provided the following standards and terms are met:

- a. *The property is registered with the Waikato Regional Council in conformance with Schedule A;*
- b. *A Nitrogen Reference Point is produced for the property or enterprise in conformance with Schedule B and provided to the Waikato Regional Council when the application is lodged;*
- c. *Cattle, horses, deer and pigs are excluded from water bodies in conformance with Schedule C;*
- d. *The land use is registered to a Certified Industry Scheme;*
- e. *The areas of land and their locations broken down by sub-catchments, that were used for commercial vegetable production within the property or enterprise each year in the*

- period 1 July 2006 to 30 June 2015, together with the maximum area of land use for commercial vegetable production within that period, shall be provided to the Council;*
- f. The total area of land for which consent is sought for commercial vegetable production must not exceed the maximum land area of the property or enterprise that was used for commercial vegetable production during the period 1 July 2006 to 30 June 2016;*
- g. Where new land is proposed to be used for commercial vegetable production, an equivalent area of land must be removed from commercial vegetable production in order to comply with standard and term f.*
- h. A Farm Environment Plan for the property or enterprise prepared in conformance with Schedule 1 and approved by a Certified Farm Environment Planner is provided to the Waikato Regional Council at the time the application is lodged.*
- 1.15 Where existing CVP land use cannot comply with the standards and terms of Rule 3.11.5.5, , the use of land for CVP and the associated diffuse discharges is classified as a restricted discretionary activity under Rule 3.11.5.6. Any CVP that results in an increase of more than 4.1ha of the area of CVP is a non-complying activity under Rule 3.11.5.7.
- 1.16 In relation to CVP, implementation methods 3.11.4.2 Certified Industry Scheme/Te kaupapa ā-ahumahi kua whai tohu and 3.11.4.3 Farm Environment Plans/Ngā Mahere Taiao ā-Pāmu outline that WRC will develop the process for certifying and monitoring Farm Environment Plans (FEPs) for CVP, and for certifying Certified Industry Schemes.
- 1.17 Schedule B - Nitrogen Reference Point/Te Āpitiwhanga B – Te tohu ā hauota (Schedule B) describes the methodology to calculate the nitrogen reference point (NRP). For CVP, Schedule B directs that the reference period to calculate the NRP is 1 July 2006 to 30 June 2016 and that it is the average annual nitrogen loss during this period.
- 1.18 Schedule 1 – Requirements for Farm Environment Plans/Te Āpitiwhanga 1: Ngā Herenga I ngā Mahere Taiao ā-Pāmu (Schedule 1) describes the provisions for preparing a FEP. For CVP, Schedule 1 specifies minimum standards for addressing different contaminant sources.

Submissions

- 1.19 Over 225 submissions were received on Policy 3 and Rule 3.11.5.5. Not all submission points on these provisions relate to CVP so only those points that relate to CVP have been assessed.
- 1.20 A large number of submissions are lodged on CVP policies and rules that are generic in nature and oppose the core methods of PC1. These submissions are addressed more generally elsewhere in this report, and the recording of these submissions and the analysis is not repeated here. As an example of these kinds of submissions, A. Chick has sought:
- *Remove Rule 3.11.5.5 provisions relating to the nitrogen reference point*
 - *Remove provisions relating to the Overseer model*
 - *Amend to adopt a sub-catchment based approach in conjunction with a farm environment plan*
 - *Amend to remove the stock exclusion fencing requirement for slopes over 15 degrees*

- Amend to provide for a change to the stock exclusion threshold to 12 stock units per hectare
- Amend for stock exclusion the definition of a waterway to align with the definition in the NPS-FM
- Amend to include stock exclusion fencing in farm environment plans and through catchment requirements

1.21 Submissions were received in support of the provisions relating to CVP but many submissions were opposed and sought a number of different amendments. The submissions have been analysed in the following topics:

- Use of Overseer for CVP;
- 10% reduction in nitrogen loss for CVP;
- Nitrogen Reference Point for CVP;
- Maximum Area Cap for CVP;
- Transferring nitrogen losses between properties; and
- Miscellaneous/other matters which include the definition of CVP.

Use of Overseer for Commercial Vegetable Production

Introduction and Provisions

1.22 The use of Overseer as a tool to establish and then report nitrogen losses from land use is a key aspect of the approach to the management of nitrogen adopted in PC1. In relation to CVP, growers are required to determine a NRP for their property or enterprise. The NRP is based on their average annual nitrogen leaching loss for land use activities between 1 July 2006 and 30 June 2016 using Overseer, or any other model approved by the Chief Executive of WRC. Policy 3(c) specifically outlines that nitrogen discharges will be managed and reduced by establishing a NRP for each property or enterprise and Rule 3.11.5.5 requires the determination of the NRP at the time the resource consent application is lodged.

1.23 Of the 112 submissions on Policy 3, nine specifically mention the use of Overseer in establishing the NRP and of the 170 submissions on Rule 3.11.5.5, 42 submissions relate to the use of Overseer. Submitters included representative organisations such as HortNZ and PVGA as well as many individual submitters. The submissions received are predominantly in opposition and seek:

- Deletion of the use of Overseer and establishment of a NRP; and
- The substitution of Overseer for an alternative tool or method and extending timeframes to allow for alternatives to be developed.

While there are many that mention Overseer or seek its deletion, the majority of submission points are aimed at PC1 as a whole, and do not appear particularly targeted at Rule 3.11.5.5.

Deletion of the use of Overseer and establishment of nitrogen reference point

- 1.24 This issue is raised in a very large number of submissions on PC1 as a whole. These submissions are discussed in the Overseer section of this report. Only submissions relevant to CVP are discussed here.

Submissions

- 1.25 A number of submissions raise concerns regarding the accuracy of Overseer in relation to CVP, citing a lack of calibration and specificity for the nature of how land is used for CVP. In particular, submitters including Jivan Produce Ltd, Balle Bros Group and Save Karapiro Inc, have raised concerns about the margin of error with Overseer results and the inability to model a number of mitigations. Submitters identify that the short growth cycle of some CVP crops, crop rotations, and the timing, type and application methods for some CVP fertilisers lead to particular difficulties with Overseer modelling of CVP activities. Concerns are also raised, as with a number of other sectors, that updates to the Overseer model lead to revised loss estimates and can 'shift the goal posts'.

Analysis

- 1.26 Overseer is a model that estimates nutrient flows in farming systems. The model relies on data inputs for climate, soils, topography and information on the way in which land is managed such as irrigation, cropping types, fertiliser applied, and effluent applied. While Overseer has been applied to CVP systems, there are some difficulties in being able to accurately enter data that reflects the short cropping cycles and fertiliser applications involved.
- 1.27 Overseer Limited, the Foundation for Arable Research and the Vegetable Research and Innovation Board sponsored a project to test Overseer nitrogen loss estimates from cropping systems.¹ The investigation aimed to identify discrepancies between Overseer and the model Agricultural Production Systems Simulator (APSIM). The study found that OVERSEER estimated greater drainage and less irrigation than APSIM and concluded that there was a need to evaluate the consistency of the model across locations and to refine the water and N balance in Overseer. Broader testing was also recommended to improve the confidence in the model's ability to predict leaching in cropping systems.
- 1.28 The section 32 report acknowledges that confidence in Overseer for CVP is lower because of the nature of crop rotation, but that research is underway to improve the accuracy for horticulture and compare Overseer with other models such as APSIM.
- 1.29 While there are well recognised difficulties in the use of Overseer for cropping systems, further research is underway to improve the accuracy of the results. Officers note that challenges are faced with the release of new versions of Overseer which change the nitrogen loss outputs.
- 1.30 Overseer is a fundamental component of PC1 which is suitable for pastoral uses. As is discussed more fully in the Overseer section, removing the use of Overseer as a tool to

¹ Khaembah, E., and Brown, H., Horticulture New Zealand, OVERSEER Limited and The Foundation of Arable Research (2016), *OVERSEER crop module testing-end of project report*.

measure nitrogen losses completely from PC1 is not desirable as it is beneficial in aiding landowners to understand losses and implement measures to reduce them.

- 1.31 For CVP, Officers understand there have been discussions between WRC and HortNZ about the use of an Overseer proxy tool², similar to the Environment Canterbury “N-Check” tool
- 1.32 Officers agree that there are difficulties in using Overseer to model leaching from CVP, particularly for crops where leaching is not well researched, where different fertiliser regimes are used for different crops, where crop types are often changed, and where crops can be farmed on new areas of land for short periods. There may be alternative management regimes for CVP that could manage leaching without the need for accurate modelling of leaching. However, if there is a need to model leaching from CVP, the question remains:

How best to describe nutrient losses, given known issues with Overseer applicability to commercial vegetable production?

Use of alternative tools

Submissions

- 1.33 Many submitters support Policy 3 and Rule 3.11.5.5, including the establishment of the NRP, but seek the use of an alternative model or tool. A number of alternative approaches have been suggested.
- 1.34 R Boom submits that given the inaccuracies with Overseer, the Land Utilisation Capability Indicator (LUCI) can be much more accurate and is preferred when setting catchment limits. Eru Nikorima Trust and Glenshee Trust submit that *“while Overseer remains the best tool to measure and manage nutrient losses, it is imperative that the tool is used within its bound”*, particularly pertaining to the margin of error in the results.
- 1.35 HortNZ submits that APSIM and SPASMO should be specifically referenced in the PC1 rules and definitions, as alternative models to Overseer for the calculation of NRPs.
- 1.36 HortNZ also seeks the active provision for and development of an alternative method or model to determine losses from CVP. HortNZ contends that practical application of Overseer to CVP systems has demonstrated that it is unsuitable for modelling nitrogen losses from complex cropping systems. HortNZ specifically notes that Overseer is currently not capable of modelling the frequency of cropping rotations, cropping and cultivation options and overlapping cropping sequences. HortNZ have explained that an Overseer ‘proxy’ system should be used, with standardised and representative CVP systems, similar to the “N-Check” system used in Canterbury. Such a system, that is applicable to Waikato CVP, soils and climate, does not yet exist.

² In this report there is reference in several places to this concept of a ‘proxy tool’. The officers understand such a tool to be a spreadsheet or web-site-based tool that could identify nitrogen leaching rates for different types of vegetable growing, under particular soil and climate conditions, using a range of standardised farming systems, to simplify the Overseer inputs.

- 1.37 J Craig and T Dunlop also seek alternatives to Overseer and submit that timeframes need to be extended to allow alternative programs to be developed that have less margin of error and cater for different scenarios.

Analysis

- 1.38 While Overseer is the most widely used tool to simulate nitrogen losses from land use activities in New Zealand, alternatives do exist. The provisions of PC1 currently allow an alternative model to be used if approved by the Chief Executive of WRC. The section 32 report outlines that while alternatives should be considered, there are benefits in using one modelling system as this enables comparisons between land use activities and the aggregation of sub-catchment nutrient loads. If multiple models are used, these comparisons would be difficult, if not impossible, and sub-catchment loads may not be able to be determined.
- 1.39 Although other models can be approved under Schedule B, submitters have sought that alternatives are included in PC1 alongside Overseer, including MENUs, LUCI, APSIM and SPASMO.
- 1.40 MENU's were developed by WRC and are designed to help farmers improve nutrient management and reduce impacts on water quality. Three MENUs have been developed for dairy farms, drystock farms and cropping land that list farm practices that can reduce contaminant discharges. The MENUs are very helpful for informing on-farm practices but do not provide a mechanism to estimate nutrient losses. It is therefore the Officers' view that this is not a suitable alternative.
- 1.41 LUCI assesses the capability of a 'landscape' to provide ecosystem services and enables a comparison of current land uses to its potential capability. LUCI can be used to identify areas where change might be beneficial or the maintenance of the status quo is desirable. LUCI can predict contaminant losses including erosion and sediment loss. Ravensdown is currently working on a bespoke option of LUCI to enable farmers and catchment groups to identify critical source areas and how they may be managed.
- 1.42 APSIM is an internationally recognised simulator of agricultural systems capable of simulating a diverse range of farming systems. Testing undertaken in New Zealand indicates that the model is suitable for the intended purpose and uses a daily time step which is better suited to CVP short cropping rotations. A comparison between APSIM and Overseer has shown differences in model outputs for the same farming systems.
- 1.43 The Soil Plant Atmosphere System Model (SPASMO) allows for the modelling of losses from the soil profile on a single paddock basis. This allows the model to be quite specific to a particular area if the necessary climate and soil information is known. The specificity can provide advantages over more simplistic models, but costs can be higher due to the information required.
- 1.44 With respect to CVP, officers consider that there is currently insufficient information presented to determine whether the alternative models suggested by the submitters are a suitable substitute for, and provide some equivalency to, Overseer. PC1 already provides a pathway for WRC to approve alternative models, but there is currently no guidance for plan

users or WRC on matters to consider when assessing alternate models. This is addressed more fully in the Overseer section of this report.

- 1.45 The ability to approve an alternative model will enable the development, approval and use of a Waikato-specific, Overseer proxy model, as has been suggested by HortNZ. As discussed above, HortNZ have requested various changes to methods, and have indicated that such a model will be developed.

10% Reduction in Nitrogen Loss for Commercial Vegetable Production

Introduction and Provisions

- 1.46 Using Overseer, PC1 requires landowners to develop a NRP for each property or enterprise. For CVP, Policy 3(d) requires a 10% reduction in the diffuse discharge of nitrogen and a tailored reduction in the diffuse discharge of phosphorus, sediment and microbial pathogens across the sector to be achieved through the implementation of Best or Good Management Practice.

Submissions

- 1.47 Approximately eleven submissions were received on Policy 3 and Rule 3.11.5.5 that relate to the proposed reductions required by the CVP sector to reduce their contaminant discharges. Concerns raised were specifically in relation to the fairness of the proposed 10% reduction in nitrogen discharges, clarification as to when reductions were necessary and the benefits that would result from the required reductions.
- 1.48 Balle Bros Group have sought the deletion of Policy 3(d), in part as they do not support the use of Overseer to derive the NRP or measure nitrogen losses for CVP due to inaccuracies in the modelling.
- 1.49 Federated Farmers have also sought amendments to Policy 3(d) to delete the 10% reduction in nitrogen discharges. Federated Farmers state that it is not possible to provide for the well-being of New Zealand people without allowing CVP to expand to meet the needs of the growing population. In addition, Federated Farmers state that the land used for CVP is small and likely to remain so and CVP is already subject to industry management practices designed to reduce environmental impacts.
- 1.50 HortNZ seek an amendment to Policy 3(d). to remove the requirement for a 10% reduction in nitrogen discharges, instead suggesting there should be:

A tailored reduction of no more than 5% through the implementation of Best or Good Management Practices in the diffuse discharge of nitrogen, phosphorus, and sediment is achieved across the sector through the while recognising:

- *The absent or low risk of discharges of microbial pathogens from commercial vegetable production;*
- *The need to preserve aspects of commercial vegetable production required to maintain domestic supply of vegetables;*

- *The pressure on and scarcity of land suitable for commercial vegetable production. This pressure has recently increased as a result of greenfields expansion onto versatile land in the Auckland region.*

- 1.51 HortNZ commissioned a technical report from Jacobs. This report discusses the water quality modelling prepared by Doole (2016)³ that informed PC1 and compares the costs between CVP growers and dairy farmers of required nitrogen reductions and the relative benefits in terms of improvements to water quality. HortNZ outline that the 10% reduction proposed in Policy 3(d) is based on economic information from the report by Agribusiness Group (2014)⁴ where a 10% reduction in the nitrogen load was considered feasible, but would have a substantial economic impact on CVP growers due to lower yields.
- 1.52 HortNZ also state CVP contributes less than 3% of the total nitrogen load to the Waikato River while the Dairy sector contributes 62%. A 10% reduction in the nitrogen load from CVP would result in less than a 0.3% reduction in the total nitrogen load. The management of dairy farms to the 75th percentile nitrogen loss is estimated to require a 4-6% reduction in nitrogen leaching from farms on a per property basis and the total nitrogen load reduction is equivalent to the total nitrogen load from CVP. HortNZ consider that the reductions required per farm by dairy farmers are unlikely to affect their profits.
- 1.53 PLUG supports Policy 3 but seeks amendments to delete part d. This is on the basis that PLUG does not support the use of Overseer or a NRP due to the inaccuracy of model outputs.
- 1.54 Charion Investment Trust, FANZ, Fletcher Trust, Fonterra, Ravensdown and Wairakei Pastoral Ltd all seek clarification in Policy 3 to clarify when the 10% reduction in nitrogen discharges needs to be achieved and that it applies relative to the NRP across all growers.

Analysis

- 1.55 As discussed in Section C of the S42A Report, the use of Overseer is an important aspect in the proposed management of nitrogen discharges under PC1. This ability to record and account for N losses is critical to whether a 10% reduction for CVP is a viable goal – if it can't be measured, there would appear to be little point in a numeric target. Certainly, a 10% improvement in overall water quality for a sub-catchment could be measured, but that would not necessarily be related to reductions by CVP.
- 1.56 In response to Federated Farmers concerns regarding the 10% reduction required in nitrogen losses across the sector where there is likely to be the demand to increase land used for CVP, the Officers consider that this is a significant issue for the catchment and the sector, and is discussed further below under the following section.
- 1.57 It is important that all landowners within the Waikato Catchment play their part in achieving the water quality attribute targets in Table 3.11-1 as this gives effect to the objectives in the Vision and Strategy. This means that CVP growers need to ensure that they operate at Good or Best Management Practice to reduce their contribution of contaminants. However,

³ Doole, G. J. 2016. *Simulation of the proposed policy mix for the Healthy Rivers Wai Ora process*. Department of Economics, Waikato Management School, University of Waikato.

⁴ Agribusiness Group, 2015. *Nutrient performance and financial analysis of Lower Waikato horticulture growers*. Agribusiness Group, Christchurch.

specifying a 10% reduction raises a number of issues. These include how it is to be apportioned across individuals, what the timeframe is to achieve it, what the start-point is (and whether that is known with any precision) and whether it is realistic in the face of pressure for additional CVP in the Waikato Region.

- 1.58 Overall, Officers hesitantly prefer the removal of the numeric 10% decrease in Policy 3, in favour of strengthened reliance on faster uptake of Best and Good Management Practices for all CVP. When read in conjunction with Policy 3(g), for which substantial adjustment is not recommended, it is evident that individual reductions required per property or enterprise will differ between higher and lower dischargers, those further from good practice will need to do more than those who are already closer. This, in combination with other recommendations, will ensure fairness within and between sectors, but remove a potentially distracting element of the policy.

Nitrogen Reference Point for Commercial Vegetable Production

Introduction and Provisions

- 1.59 As is indicated earlier, wider issues with the use of the NRP within PC1 have been addressed earlier in Section C of this report.
- 1.60 The methodology for the calculation of the NRP for CVP is set out in Schedule B, and is intertwined with the calculation methodology for other farming activities. The key difference for CVP is that the NRP is calculated by using an average, over 10 years of data. This differs from the methodology used for other farming activities, which is the highest year out of two specified financial years. It is understood that this greater period was due to the more highly variable nature of CVP production – both in terms of year-to-year variation in the same location, and shifting locations for CVP.
- 1.61 The most relevant provisions from Schedule B are:

The Nitrogen Reference Point shall be the highest annual nitrogen leaching loss that occurred during a single year (being 12 consecutive months) within the reference period specified in clause f), except for commercial vegetable production in which case the Nitrogen Reference Point shall be the average annual nitrogen leaching loss during the reference period.

...

The reference period is the two financial years covering 2014/2015 and 2015/2016, except for commercial vegetable production in which case the reference period is 1 July 2006 to 30 June 2016.

Submissions

- 1.62 Approximately eight submitters have provided comments in relation to the methodology for determining the NRP for CVP. These submissions have been received on either Policy 3, Rule 3.11.5.5 or Schedule B.

- 1.63 Balle Bros Group does not support the use of the NRP as a regulatory tool and have sought that Schedule B is deleted from PC1 entirely. In their submission on Var1, Balle Bros Group have requested that the date by which the NRP is required is extended to March 2022 to align with the consenting timeframes. This provides the CVP industry as much time as possible to provide correct and accurate data.
- 1.64 J Craig and T Dunlop have raised concerns that it is currently unclear how the NRP for CVP will be determined where there has been mixed land use on the same block.
- 1.65 Hort NZ seeks that the NRP for CVP is developed in accordance with Schedule B or the use of a proxy farm system. As stated above, Hort NZ have been involved in developing proxy measures for vegetable cropping based on researched rotation data in Canterbury which has allowed for the development of a tool as an alternative to Overseer. Hort NZ supports the inclusion of an alternative tool based on property level or enterprise level proxies for a nitrogen reference point. Hort NZ seek that Schedule B is rewritten to provide for an alternative method for the arable and CVP sectors.
- 1.66 Ravensdown submits in support of Policy 3 but notes that it may be difficult to obtain and verify data from the previous 10 years for CVP systems and that it will be difficult to achieve consistency over this time period resulting in the nitrogen loss number being unreliable. Ravensdown have also requested an amendment to Schedule B to state the reference period for all land uses is the average loss over the 'baseline period' of 2012/13 to 2015/16.
- 1.67 Pukerimu Farms Limited and Strang and Strang Limited have submitted on the ten-year averaging period for CVP and state that this will result in a fragmented allocation of nutrients across the Waikato if the "right" to nitrogen losses sits with the land rather than a lessee.
- 1.68 Waikato Regional Council has submitted on Schedule B (f) to seek an amendment to specify that where land is used for CVP during only part of the 2006-2016 period, it is only when land is used for CVP that is included when calculating the NRP.

Analysis

- 1.69 Submitters raise a number of practical issues with the calculation of the NRP for CVP. Much of this centres around of the highly variable nature of CVP, such that drawing together 10 years of data is likely to be problematic, and that the use of averaging is also likely to lead to highly variable outcomes between growers. Several submitters have highlighted that they do not hold 10 years of data that would fulfil the detail and quality requirements for Overseer inputs.
- 1.70 There is also a practical difficulty in the use of leased land, where if only a single paddock is used for CVP for a single year, the property could become subject to the 10 year averaging framework with the inherent costs and complexity for the landowner.
- 1.71 The particular difficulties for CVP growers, in terms of the predominance of leased land and movement from site to site, with respect to the property based NRP and land use rules are discussed in the following section. Some of the issues discussed are interrelated with the calculation of the NRP.

- 1.72 In order for the CVP NRP to be functional, it is clear that a shorter dataset is required, along with the ability to recognise greater year by year fluctuation between sites and within growing operations, such that an average is not always representative of current growing activity. As noted earlier, using Overseer for CVP creates difficulties. There appears to be some justification for removal of the Overseer-based NRP requirement altogether for CVP. Further discussion is needed on this matter. If an Overseer-based NRP requirement is removed for CVP, there still needs to be confidence that this would not compromise the achievement of the objectives. The discussion needs to consider alternative means of managing leaching from CVP and could include a greater focus on GFP.

Maximum Area Cap for CVP

Introduction and Provisions

- 1.73 The direction, in terms of a maximum area in the region utilised for CVP comes from Policy 3:
- b. Establishing then capping the maximum land area utilised for CVP based on production data from 2006-2016;*

- 1.74 This is then referenced in several of the standards and terms of controlled activity Rule 3.11.5.5 (for existing CVP) and through the non-complying activity rule:

Rule 3.11.5.7 - Non-Complying Activity Rule – Land Use Change

Notwithstanding any other rule in this Plan, any of the following changes in the use of land from that which was occurring at 22 October 2016 within a property or enterprise located in the Waikato and Waipa catchments, where prior to 1 July 2026 the change exceeds a total of 4.1 hectares:

- 1. ...*
- 4. Any land use to commercial vegetable production except as provided for under standard and term g. of Rule 3.11.5.5*
is a non-complying activity (requiring resource consent) until 1 July 2026.

- 1.75 Standard and term (g) of Rule 3.11.5.5 is intended to enable the use of a 'new' area of land for CVP, provided an equivalent area ceases being used for CVP.

Submissions

- 1.76 There are approximately 22 submissions on this part of Rule 3.11.5.5 and many more on the relevant part of non-complying activity Rule 3.11.5.7. These are approximate numbers, particularly in relation to the non-complying activity rule, as the majority of the submitters oppose the rule in its entirety or the non-complying activity status.
- 1.77 Several submitters, such as B Chapman, seek that the rule framework be retained.
- 1.78 Other submitters are more fundamentally opposed to the inclusion of CVP in the non-complying activity rule (such as Balle Bros and PVGA), or seek the addition of a new restricted

discretionary activity rule that enables the use of land for new and additional CVP where the applicant demonstrate that there will be a decrease in the discharges of N, P, sediment or microbial pathogens as a result of the land use change. Hort NZ and others have sought 'credit' for reduction in one contaminant (such as microbial contaminants) that may be used to justify increases in other contaminants, such as N. FANZ considers land area to be a crude measure, in that it takes no account of loss rates and is not effects based.

- 1.79 G Anderson and B Das and Sons identify that as the population increases there will be increasing pressure on supply and the country must be able to supply adequate vegetables to the population. In addition, the submitters consider there is a need to develop new vegetable land in the Waikato as growers are forced out of Auckland.

Analysis

- 1.80 This issue is difficult to resolve in the face of competing interests – there are strong public benefits to accessible fresh fruit and vegetables. However, contaminant losses from this sector are often high. Further, the requirement to 'surrender' an equivalent area of CVP when any new CVP is established has the effect of preventing any new entrants into the sector.

- 1.81 Therefore, a key question remains:

Should the proposed cap on total area of commercial vegetable production be retained, and if not, what constraints/limits on new commercial vegetable production should apply (if any)?

- 1.82 In considering this question, the following points should be noted:
- It is clear that establishing an Overseer-based NRP for CVP is problematic;
 - If some kind of nitrogen leaching cap is not viable, an area cap would seem to be the next best option;
 - If no leaching or area cap is imposed, there is a risk of not achieving the objectives of PC1, or the Vision and Strategy, at least in some sub-catchments; and
 - The question of whether there should be an area cap needs to be considered alongside other proposals to improve the way PC1 manages CVP leaching.

Transferring nitrogen losses between properties

Introduction and Provisions

- 1.83 The PC1 provisions are intended to enable the movement of CVP land uses to new areas of land, through standard and term (f) and (g) to Rule 3.11.5.5:
- f. The total area of land for which consent is sought for commercial vegetable production must not exceed the maximum land area of the property or enterprise that was used for commercial vegetable production during the period 1 July 2006 to 30 June 2016; and*
 - g. Where new land is proposed to be used for commercial vegetable production, an equivalent area of land must be removed from commercial vegetable production in order to comply with standard and term f; and*

Submissions

- 1.84 Approximately 24 submissions were received on Rule 3.11.5.5 relevant to the issue of transferring nitrogen losses between properties.
- 1.85 HortNZ in their submission on Variation 1 and PC1 have requested that catchment collectives are established in PC1. HortNZ have described how a catchment collective might work which can be summarised as follows:
- A sub-catchment load is established based on the science provided by the Technical Working Group. The sub-catchment loads enables the management of contaminant discharges at a sub-catchment scale rather than at an individual property scale.
 - A minimum of 20% of land area would need to join a catchment collective to utilise this approach. The sub-catchment load could then be divided proportionately.
 - The catchment collective would need to create a legal entity and those working under the collective would need to enter into a contract under civil law outlining the rights and responsibilities of each party.
 - Funding for the catchment collective will be required as the legal entity will need to establish tools and methods to track progress and develop an integrated catchment management plan. Funding would be required through civil contracts between landowners and the legal entity.
 - A decision support tool will be required. This tool is to be used to predict the effectiveness of mitigation to achieve the 10 year sub-catchment load. At a minimum the decision support tool must be able to assess the outcome across all four contaminants, provide evidence that support mitigation outlined in the integrated catchment management plan and be scientifically robust.
 - The legal entity will use the decision support tool and integrated catchment management plan to apply for a resource consent covering the land specified in civil contracts between the legal entity and participating parties.
 - The legal entity would be required to monitor and report on progress under the integrated catchment management plan and Council could take enforcement action against the legal entity or participating parties that have breached conditions of the contract.
- 1.86 Waikato Regional Council submit that where a property is part of an enterprise it is not clear who owns the NRP and that it cannot attach to both a landowner and a lessee. The NRP is not a transferable discharge right and is associated with the use of specific land. There is no mechanisms in PC1 to allow nitrogen transfer, consequently the concept of allowing an enterprise to hold a NRP raises practicality issues. Also, there is nothing within the standard or term (g) that requires a piece of land that is removed from CVP to be within the same sub-catchment. Waikato Regional Council have sought that Rule 3.11.5.5 is amended to remove the ability for an enterprise to hold a NRP and restrict the NRP to exist only with a particular piece of land.
- 1.87 Waipa DC and other territorial authorities identify that there is a need to ensure the rule framework accommodates changes in property boundaries, and lease arrangements, and for enterprises working over multiple properties. The territorial authorities also seek provision for off-setting mitigation.

- 1.88 Wai Shing Ltd seek provisions that enable crop rotation across new and existing land parcels
- 1.89 Balle Bros Group seek clarification as to how the rule will relate to the rotational nature of horticulture. Balle Bros Group state that if the NRP is tied to land, there will be implications for leased land and if it is a transferable right, retired land must be considered part of this right. Balle Bros Group have sought the deletion of standard and terms (f) and (g) of Rule 3.11.5.5.
- 1.90 Jivan Produce Ltd, PLUG and PVGA have submitted seeking certainty how CVP can move around land to enable crop rotation and also question how the NRP will be applied, whether it will sit with the CVP grower or if it is tied to the land itself. Jivan Produce Ltd oppose Rule 3.11.5.5 as a land use consent and seek that it is a discharge consent. PLUG state that a land use consent framework will not allow a CVP to move from land parcels which will affect crop rotation capability and undermine best practice. PLUG support a sub-catchment approach which will mean the capping of land area will not be required and provide CVP growers flexibility to move rotations across sub-catchments.
- 1.91 Pukerimu Farms Ltd, Strang and Strang Limited and Waiawa Farms submit that it is currently unclear whether the right to CVP is assigned to a land owner or lessee for leased land. The submitters seek that Rule 3.11.5.5 is replaced with a Best Practice Management Approach.

Analysis

- 1.92 As the Officers understand it, the ability to move from site to site is a key aspect of CVP. How to enable this, while maintaining some degree of integrity of a diffuse discharge management framework is a key remaining question:

How to provide for crop rotation/leasing land/moving commercial vegetable production from site to site while ensuring no increase in losses of the four contaminants?

- 1.93 In considering this question, the following points should be noted:
- There needs to be an ability to move CVP to new land areas for certain periods
 - A consent process could be used to enable movement, but this would appear to be an excessively cumbersome process
 - A land use consent applies to a particular area of land
 - A CVP discharge consent could be moved to different area of land

Definition of commercial vegetable production

Introduction and Provisions

- 1.94 The definition of Commercial Vegetable Production (CVP) is

Commercial vegetable production: means the following vegetables grown in New Zealand for commercial purposes:

- i. artichokes, Asian vegetables, beans, beetroot, boxthorn, broccoflower, broccoli, broccolini, Brussels sprouts, burdock, cabbage, capsicums, carrots, cauliflower, celeriac, celery, chilli peppers, chokos, courgettes, cucumbers, eggplant, Florence fennel, garland

chrysanthemum, garlic, gherkins, herbs, Indian vegetables, kohlrabi, kumara, leeks, lettuces, marrows, melons, okra, parsnips, peas, puha, pumpkin, purslane, radishes, rakkyo, rhubarb, salad leaves, salsify, scallopini, scorzonera, shallots, silverbeet, spinach, spring onions, sprouted beans and seeds, squash, swedes, sweetcorn, taro, turnips, ulluco, watercress, witloof, yakon, yams, zucchinis, potatoes, tomatoes, asparagus, onions; and

ii. *the hybrids of the vegetables listed in subparagraph i.*

Submissions

- 1.95 Gourmet Mokai Ltd requests the exclusion of vegetables grown in glass houses or otherwise under cover, as the contaminant losses can be better managed.
- 1.96 Several submitters, including A Rickman and HortNZ request the removal of asparagus, as it is a perennial plant, which tends not to involve cultivation and other practices that lead to comparable contaminant losses. A Rickman suggests that it is more akin to pip fruit and kiwifruit production.
- 1.97 J Allen suggests a minimum area threshold, to avoid capturing very small growers, and suggests a minimum of 1000 m² of land in production at any one time.
- 1.98 Forest and Bird seeks changes so that the definition is inclusive, so the listed vegetables are examples, not a definitive list.
- 1.99 Waiawa Farms and others highlight what they consider to be an arbitrary delineation between different forms of cropping that have very similar effects, such that some crops are grown for feed purposes, but would be treated differently.

Analysis

- 1.100 The submissions on the definition of CVP are relatively diverse. Officers agree that the definition should exclude produce grown in glasshouses, as soil, if used at all, is generally highly modified and these systems are not subject to typical rainfall and nutrient losses.
- 1.101 While officers agree that there is potential for arbitrary delineation between different cropping types and for very small growers to be captured by the definition, there is a requirement that the produce be grown for commercial purposes, the outcomes sought by the submitters may be at least partially accommodated. In the Officer's experience, when listing specific activities in a definition and applying a specific set of rules, it is difficult to avoid some unintended capture of activities.
- 1.102 The Forest and Bird submission highlights that the list of vegetables and produce is very specific, and if another vegetable or similar crop was introduced or grown over the life of the Plan, it would not be addressed by the CVP rules. Officers are supportive of a definition with an inclusive list, but consider that it would require the beginning section of the definition to be adjusted to describe what the list includes. The submitter has not made a particular suggestion for wording. An example, such as "vegetables grown for primarily human consumption" would not capture all of the varieties in the list. The submitter is welcome to bring a solution to this issue to the hearing the submitter is invited to provide a solution to

this issue in the evidence. In the interim, no change is recommended, but for the purposes of discussion, a descriptive definition could be:

Commercial vegetable production means the growing of any plant for commercial purposes, where the fruit, seeds, roots, tubers, bulbs, stems, leaves, or flower parts are used as food for human consumption, but does not include asparagus, vegetables grown in glass houses (or otherwise under cover) or arable crops.

1.103 Several submitters have suggested the deletion of asparagus from the definition. As the officer understands it, asparagus:

1. is a non-rotational vegetable, which means it is not subject to the same degree of cultivation as other rotational vegetables. Cultivation is a primary contributor to N leaching from vegetables, as a result of mineralization of native organic matter;
2. Asparagus tends to be grown on flat reasonably free draining land meaning the risk of soil loss (and therefore phosphorus and sediment loss) is low;
3. It is not grazed, so there is no faecal pathogen source associated with growing asparagus; and
4. I am advised that asparagus generally has a similar N loss to low intensity drystock farming.

1.104 On this basis, it would appear reasonable to delete asparagus from the definition and CVP management regime.

1.105 In assessing these submissions, Officers have noted the difficulty in reading the list of crops, as there are some items not in alphabetical order. If the list is to be retained, officers recommend revising to alphabetical order, which makes no difference to content, but makes the list more accessible.