**File Reference:** A2039080

**Report To:** Lake Rotorua Stakeholder Advisory Group

**Meeting Date:** 17 March 2015

**Report From:** Stephen Lamb, Acting Manager Water Policy

# Allocation and Ranges Recommendations


## Executive Summary

This report seeks to establish the Lake Rotorua Stakeholder Advisory Group's preferred approach to allocating the nitrogen to the pastoral land uses within the Lake Rotorua Catchment to ensure the sustainable lake load as modelled is reached.

This decision requires consideration of two components:

- the primary allocation approach; and
- the ranges that support the allocation method.

The discussion needs to reference the incumbent position that has been developed through substantial debate and discussion. The incumbent position is sector averages with ranges.


## 1 Recommendations

**That the Lake Rotorua Stakeholder Advisory Group:**

**1 Receives the report, *Allocation and Ranges Recommendations.***

**2 Recommends to the Bay of Plenty Regional Council a preferred approach to allocation and ranges.**

**3 Notes the incumbent approach is Sector Averages with adjusted Rule 11 ranges.**

**4 Notes that current Overseer figures will be used to define ranges for the preferred approach.**

## 2 Background to Allocation Discussions and Decisions

The start point for the policy development on allocation is the Bay of Plenty Regional Policy Statement. The two policies that establish the challenge for Lake Rotorua are:

> **Policy WL 3B** that confirms that the total amount of Nitrogen entering Lake Rotorua shall not exceed 435 tonnes per year

**Policy WL 5B** that requires that the capacity of Lake Rotorua to assimilate contaminants be allocated amongst land use activities.

The Regional Policy Statement (RPS) also established a number of principles and considerations for how the allocation should occur. These are:

a. *Equity/Fairness, including intergenerational equity;*
b. *Extent of the immediate impact;*
c. *Public and private benefits and costs;*
d. *Iwi land ownership and its status including any Crown obligation;*
e. *Cultural values;*
f. *Resource use efficiency;*
g. *Existing land use;*
h. *Existing on farm capital investment; and*
i. *Ease of transfer of the allocation.*

StAG considered a number of further principles for use in looking at allocation options. They are:

a) There will be no major windfalls for any sector.
b) Preference will be given to the allocation approach that has the least overall economic impact.
c) Existing investment (including in infrastructure, land value, cash investment and in nutrient loss mitigation) will be recognised.
d) Practices that cause high nitrogen loss, relative to sector norms, will not be rewarded.

## 2.1 StAG Decisions on Allocation

StAG has considered the allocation issue extensively over a long period of time. The following table highlights the decisions and milestones that have informed the allocation and trading discussion:

| **Stakeholder Advisory Group: Key Decisions and Milestones** | |
|---|---|
| **3 Dec 2013** | • confirmed requirement to reduce pastoral N from 526t/yr to 256t/yr |
| **29 Jan 2014** | • discussed different approaches to allocating the 256tN/yr |
| **14 Feb 2014** | • drafted allocation principles |
| **19 Mar 2014** | • assessment of allocation approaches; put some methods of allocation aside as deemed not appropriate for Lake Rotorua's catchment.<br>• broad agreement to analyse sector-average allocation but compare against grandparenting |
| **16 Apr 2014** | • agreed to include Rule 11 data in allocation analysis<br>• considered draft principles for the incentives scheme |

| | |
|---|---|
| **13 May 2013** | • considered Mōtū's draft results from analysis of allocation options |
| **18 June 2013** | • considered policy options for allocating nitrogen and agreed collectively for the Collective to develop an alternative approach |
| **16 July 2013** | • considered Collective proposal and agreed to it as an allocation approach but with caveats |
| **22 Oct 2013** | • Dairy support sector considered |
| **18 Nov 2013** | • NDA range options considered |
| **19 June 2014** | • Nitrogen trading supported |

There are also a number of Regional Council decisions that have been made in response to StAG recommendations. Perhaps the most important of these was the adoption of the Integrated Framework on 17 September 2013.

The allocation discussion originally started on the basis that rules would need to achieve the full reduction amount. This would have meant reductions to an average of 27 kg N/ha/yr for the dairy sector, and 8 kg N/ha/yr for the drystock sector. These were recognised as being at the extreme low end of current nitrogen losses for both sectors. In addition, no dairy support was benchmarked as low as the 8kg N/ha/yr figure. The following table provides a summary of the implications based on the idea of allocating the whole target:

| **Allocation Approach** | **Explanation** | |
|---|---|---|
| Grandparenting | Allocation is based on existing discharges benchmarked under Rule 11. However, to reduce the current pastoral discharge of 526 tN/yr to the required 256 tN/yr a 51% reduction would need to be applied to each benchmark. | |
| Pastoral averaging | This is where the sustainable pastoral load (256 t) is divided by the pastoral catchment (21,175 hectares) to give an average N leaching of 12kg/ha. Every pastoral landowner in the catchment would receive 12 kg/ha. | |
| Sector averaging | This method allocates an averaged level of nutrient discharge rights across specific types of land use or "sectors" e.g. dairy and drystock. | |
| Land use capability | This approach assesses the physical quality of the land, soil and environment. Higher nutrient limits would be allocated to more versatile classes of land, thus improving overall efficiency of land use in the long run. | |
| Input based limits | Focuses on controlling the inputs to land use operations by directly managing the amount of nutrients being applied on land. For example, controlling fertiliser and feed application rates. | |
| Output based limits | Based on the greatest units of output leaving a property (e.g. milk solids, timber, kg of meat). An example would be allocating to a landowner based on how many kg of milk solids or revenue produced per 1 kg of nitrogen leached. | |

A number of these options were discounted – such as the Input and Output options – as not being suitable for the Lake Rotoura Catchment. A key consideration is retaining flexibility for farmers to allow the catchment to adjust to a low n leaching farming environment

Over time the allocation discussion shifted to the approach within the Integrated Framework (see Appendix 1). This is the incumbent approach discussed below.

## 2.2 Overseer Versions

Information has been provided to StAG on the principles to shift between Overseer versions now and into the future. It is recognised that there are issues with the transfer of data between versions but that using eth best science and modelling available has the best chance of delivering robust outcomes for farmers and the lake.

No decision has yet been made on how this issue will be treated within the rules framework. However for allocation the current Overseer version is being used. If issues of materiality on a sector basis are evident between overseer 5 and 6 as a result of the transfer between versions then this may need to be adjusted for. The current view is that the proportionality agreed in the Integrated Framework will be retained.

# 3 Primary Allocation Options Discussion

Any allocation approach is going to have implications for:

- Public and private equity
- Economic viability of various sectors
- Future land use patterns
- Future land and urban development opportunities
- Social, cultural and economic development.

It goes without saying that the key issue for the pastoral sector is how any catchment wide allocation approach is translated into allocation at the individual farm level. The modelling of this however can only go so far as there is a myriad of possible outcomes across the catchment. Some indication is provided by work such as the Farmers Solutions Project.

The allocation approaches that have been considered are:

- Grandparenting
- Pastoral averaging
- Sector averaging
- Sector averaging with ranges
- Land use capability.

The workshop held on 11 December 2014 considered the issue of approaches to allocation. Appendix 2 contains the notes from that workshop. The summary of key points from the workshop discussion is:

- Whatever approach is decided upon, time to transition to it is required: “the longer time you allow to transition, the better off the farmer will be”.
- There is concern around what approach will be fair and equitable in the long-term.
- Minimal social and economic disruption now and in the future is desired.
- Flexibility in land use with minimal cost to transition is desired.
- Keep the approach as simple as possible.
- There is an overall lack of benchmarking data (especially for properties less than 40ha) and data to support specific approaches (like natural capital).
- Ability to trade and how this is provided for is important.
- A durable, long-term solution is required.

No clear recommendation on allocation was arrived at from the workshop.

Extensive analysis of the allocation options has been presented to StAG and to the Allocation Workshop. This background material is available on–line through the www.rotorualakes.co.nz website.

The following table is a summary of the above options drawn from background material and the Allocation Workshop responses.

| Option | Commentary |
|---|---|
| Grandparenting | • Claw back from current position would penalise low leaching properties, potentially making them uneconomic<br>• Supports status quo, best practice would be worst off<br>• Recognises investment and current farm systems<br>• Can be readily based on Rule 11 benchmarking |
| Pastoral averaging | • Would heavily penalise higher leaching land uses<br>• Would require existing operations to purchase ability to continue<br>• Creates windfall gains<br>• Does not recognise existing mitigation and investment<br>• Creates incentive for innovation<br>• Easy to apply |
| Sector averaging | • Recognises existing land use and investment<br>• Recognises current nitrogen leaching rates and supports good land management practice<br>• Existing mitigation is recognised as easier to meet discharge allowance<br>• Could force high leaching operations into land use change |
| Sector averaging with ranges | • As above<br>• Fine-tuned responses to address property-level differences<br>• Reduces impact |
| Land use capability | • Poor correlation between land use capability and actual land use<br>• Would require a substantial shift in current land use<br>• Does not recognise existing mitigation and investment<br>• Potential policy objective for future |
| | |
| Single Sector | • The idea of having a single sector approach has been raised as a result of the discussion on the potential ranges.<br>• Having a single sector would address the gap between the sectors and would reduce the focus on land use type – shifting it towards N loss. |

### 3.1 Incumbent Allocation Approach

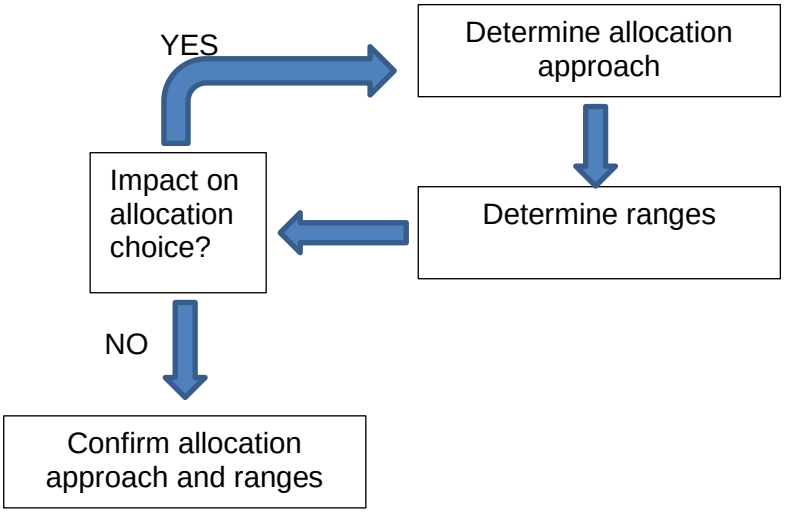
Based on analysis considered by StAG the recommended approach to allocation is **sector averages with ranges adjusted on the basis of Rule 11 benchmarking**. This is the incumbent allocation approach.

Geophysical factors were considered in terms of the adjustment however rainfall and soil type showed poor correlation with Rule 11 data. Rule 11 benchmarking appears to be more related to farm management and systems.

It was noted that this approach was subject to possible adjustment following the economic data analysis. It was also recommended that dairy support did not need to be defined as a separate sector because a suitable drystock NDA range can accommodate dairy support plus intensive beef.

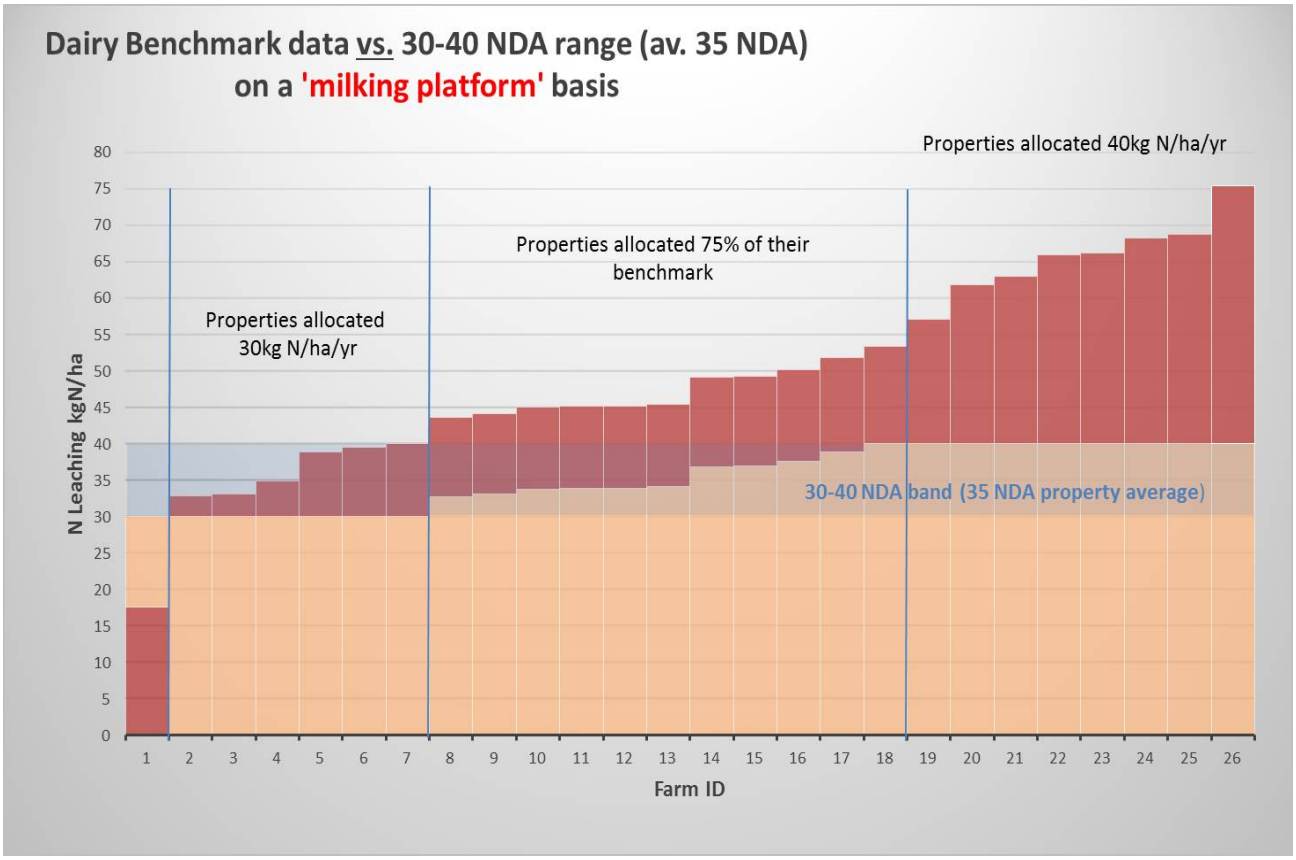
## 4 Ranges Discussion

The ranges again have implications for the pastoral sector and individual farmers but on a more fine-tuned basis. The choice of ranges potentially has an impact on the allocation approach. This is particularly where the adjacent ranges create the need to consider the single sector allocation approach. The discussion on ranges therefore has an iterative nature to it as shown in the diagram below.




The current ranges that are being considered are listed below. As discussed it is important that StAG provides direction in which ranges should be recommended to the Bay of Plenty Regional Council for inclusion within the rules framework. The current range associated with the incumbent approach was a pragmatic, mathematical approach to defining ranges that achieved the required reductions. Its downsides have been noted as still to an extent partly rewarding high N loss.

The detail of how each range will be applied is also important to document how individual properties would be treated in relation to their current position. This is to ensure an outcome that is seen as being relatively fair between properties. Essentially the question is on what basis do all properties move into the range? There is a difference between properties which as above, in or below the range. The diagram below shows how the incumbent approach works with a 25% reduction.




The figure is relatively complex, but shows that above a certain benchmark threshold (in this case 53 kgN/ha/yr) a property will be allocated 40 kgN/ha/yr. Properties benchmarked between 40 – 53 kgN/ha/yr will be allocated 75% of their benchmark. Properties benchmarked between 30 – 40 kgN/ha/yr will receive an allocation of 30 kgN/ha/yr. This reflects the 25% reduction within the Integrated Framework.

The current approach to applying ranges is that a reduction is applied proportionally across all properties. If this doesn't bring the property into the range it is reduced further to the range boundary. For example, in the diagram above the farms on the right hand side have a 25% reduction applied and then are reduced further to meet the 40 kgN/ha/yr threshold.

The different ranges have the potential to shift the impacts between sectors and to increase or decrease the impact on individual properties.

**Current range options:**

| Range | Appendix 3 reference |
|---|---|
| Dual sector ranges: Rule 11 ranges, 10-20kg drystock and 30-40kg dairy (incumbent approach, using Overseer5) | Allo 0 |
| Dual with adjoining ranges: stretched drystock range from permitted activity level up to the lower dairy limit | Allo 1 |
| Dual: single average dairy NDA and adjoining dry range | Allo 2 |
| Dual: single low dairy NDA and adjoining dry range | Allo 3 |
| | |
| Combined (single sector): wide range | Allo 4 |
| Combined (single sector): medium range | Allo 5 |
| Combined (single sector): tight range | Allo 6 |

These ranges will be presented and discussed separately in the meeting agenda. Each will be accompanied by graphs to visually show the impact (see Appendix 4).

## 5 Impact on Policy Framework

The key need for recommendations is to inform the rule framework development. Depending on the allocation and ranges recommendation, and in reference to Overseer 6, there may be a need to update the Integrated Framework. This will not change the required target – the sustainable load of 435 tonnes of N entering the lake. It will only be making agreed updates to the technical aspects of the framework. It will however require a consequential Regional Council decision.

It is not unexpected in this complex and evolving environment that the core policy position needs to be updated. It will however be important that the communication of why this is occurring is clear and unambiguous.

Stephen Lamb
**Acting Manager Water Policy**
**Bay of Plenty Regional Council**

**Appendix 1:**

## How the policy on Rotorua nitrogen allocation evolved to sector ranges

### July 2014

In the framework for rules and incentives that was approved by Regional Council on 17 September 2013, the following sector average NDAs were proposed:

- Dairy NDA = 35kg N/ha
- Drystock NDA = 13kg N/ha

It was noted however that these sector averages:

a) Were subject to confirmation by StAG and advice on whether or not "dairy support" should be included as a separate sector, and
b) May be adjusted as ranges to recognise geophysical or farm system characteristics, provided the aggregate for each sector is not exceeded.

Analysis on how to include dairy support in the framework was presented to StAG for consideration at the October and November 2013 meetings (http://www.rotorualakes.co.nz/vdb/document/673 and http://www.rotorualakes.co.nz/vdb/document/520 ).

Analysis on potential NDA ranges that could be considered were also presented to StAG at the November 2013 meeting (See Appendix 1 and Appendix 2 in http://www.rotorualakes.co.nz/vdb/document/546 )

At the December 2013 StAG meeting, staff asked StAG to consider:

1. Including "dairy support" as a separate sector in the rules framework, and amending the NDAs to: Dairy@35kg N/ha; Drystock@12kg N/ha; Dairy support@20kg N/ha.
2. Either: retaining a single NDA for each sector
   Or: including an NDA range for each sector based on:
   - Rainfall and soil-type; or
   - Existing benchmarks as a proxy for geophysical factors and farm system types

The decision paper provided to StAG is available online - see Appendix 1 in http://www.rotorualakes.co.nz/vdb/document/551. Advantages and disadvantages of all approaches are presented, as are potential risks.

Based on the analysis considered, StAG recommended that adjusted Rule 11 ranges are the preferred approach, possibly with further tweaks on the numbers once economic impacts are assessed. StAG also recommended that dairy support did not need to be defined as a separate sector because a suitable drystock NDA range can accommodate dairy support plus intensive beef which can have comparable N loss and profitability.

Caution was noted by StAG on:

- An adjusted grandparenting scheme still has some of the problems discussed a year ago, including that historic high N loss is still partly "rewarded"
- An overlay of soil/rainfall and R11 data showed poor correlation i.e. R11 differences in N loss are largely driven by farm system and management, not soil and rainfall

The minutes of this meeting, including the recommendations made by StAG can be found at: http://www.rotorualakes.co.nz/vdb/document/558

Original document: www.rotorualakes.co.nz/vdb/document/758

## Appendix 2:

# Allocation Workshop Notes

# 11 December 2014

**INTRODUCTION**

A workshop was held on 11 December 2014 to review and re-assess possible allocation approaches for the Lake Rotorua catchment. Six allocation approaches were presented in the pre-circulated workshop reading material. The approaches were: Grandparenting; Land Use Capability; Pastoral Averaging; Sector Averaging; Input-Based Allocation; and Output-Based Allocation.

Workshop participants were asked to complete two different worksheets that assessed the following five allocation approaches: Grandparenting with clawback; Pastoral Averaging; Sector Averaging; Sector Averaging with Ranges; and Natural Capital (Land Use Capability). Participants were asked to identify the positives and negatives with each approach, and to list key points and questions they had.

**ALLOCATION APPROACHES and PRINCIPLES**

It should first be acknowledged that any allocation approach will have implications for: land owner and municipal equity; economic viability of various sectors; future land use patterns; future land and urban development opportunities; and social, cultural and economic development. The responses below should be considered in light of these potential impacts, realising that there is concern within the community about the future impacts of each approach.

Workshop participants were asked to consider the allocation approaches in light of the principles of nutrient allocation, which are stated in Policy WL 5B of the Regional Policy Statement (RPS) and those identified by the Stakeholder Advisory Group (StAG).

<u>Policy WL 5B</u>

*Policy WL 5B Allocate among land use activities the capacity of Rotorua Te Arawa Lakes and other water bodies in catchments at risk to assimilate nutrient discharges contaminants within the discharge limits established under in accordance with Policy WL 3B having regard to the following principles and considerations.*

*(a) Equity/Fairness, including intergenerational equity;*
*(b) Extent of the immediate impact;*
*(c) Public and private benefits and costs;*
*(d) Future vision for landscape;*
*(e) Iwi land ownership and its status including any Crown obligation;*
*(f) Cultural values;*
*(g) Resource use efficiency;*
*(h) Existing land use; and*
*(i) Existing on farm capital investment; and*
*(j) Ease of transfer of the allocation.*

<u>Stakeholder Advisory Group principles and guidelines:</u>

1. There will be no major windfalls for any sector
2. Preference will be given to the allocation approach that has the least overall economic impact

3. Existing investment will be recognised (including that in infrastructure, land value, cash investment and in nutrient loss mitigation).
4. Practices that cause high nitrogen loss, relative to sector norms, will not be rewarded

**WORKSHOP RESPONSES**

A summary of the five allocation approaches that the workshop participants were asked to comment on are listed below. A brief explanation of each approach is provided to assist with interpreting the comments.

**1. Grandparenting with clawback**

Explanation: Allocation is based on existing discharges; every landowner would receive an allocation equal to their current discharge with a required reduction of approximately 50% to meet the target of 435t/N/yr.

Workshop participants generally did not support this approach and one person stated that dairy farmers would not survive under the severity of the required clawback. The approach rewards high leaching land uses and penalises low leaching land uses, which does not align with the principles of equity/fairness and this is important to those who may be affected. A potential issue exists whereby drystock farmers with less than 40ha are not benchmarked against Rule 11 and therefore would have nothing to 'clawback' on. The approach was also noted by someone as not relating to N leaching.

The approach was also perceived by someone as not addressing the issue in the long-term; only providing a solution in the short-term. It was acknowledged however, that the approach is simple to administer and fair within a sector.

Two proposed suggestions to this approach were: 'Clawback from Rule 11 with no sector difference – just set ceiling and floor OR drystock grandparenting and clawback with floor and dairy average with range based on geophysical differences'.

**2. Pastoral averaging**

Explanation: This is where the sustainable pastoral load (256 t) is divided by the pastoral catchment (21, 175 ha) to give an average N leaching of 12kgN/ha/yr. Every pastoral farmer in the catchment would receive 12kgN/ha/yr.

The approach was viewed by workshop participants as being fair, simple and inclusive. It should be recognised however, that pastoral averaging will heavily penalise higher leaching land uses and higher leaching environments. The main concern seems to be the economic and time costs to dairy farmers who may be forced to transition to an alternative land use if the existing land use become unviable due to the averaging method. Participants also noted that the approach would not recognise the environmental work already undertaken by farmers.

Uncertainty about what land is included under this method was expressed. E.g. is it pasture, pasture and pines, or pasture and pines and bush? Is dairy included?

One person believed this approach would be more likely than others to survive the Environment Court.

**3. Sector averaging**

Explanation: This approach allocates an averaged level of nutrient discharge right across specific types of land use e.g. dairy, sheep and beef, deer and forestry.

This approach was perceived by some participants as being unfair and penalises good land management. One respondent stated that it would be difficult for drystock farmers in particular because of the limited ability to mitigate nitrogen loss. Respondents also recognised that land could be provided an allocation that may not actually be used. Others noted that the approach limits future options and does not account for natural capital.

Respondents did acknowledge that the approach recognises current land use and investment and is easy to regulate. One response stated that it has been used elsewhere and works.

Flexibility and fairness were principles identified as being both positives and negatives of this approach. For example, positives were noted as 'flexible around land use' and 'recognises current land use – no one is being penalised more than any other'. However negatives also included 'no flexibility' and 'not fair – same land as neighbour but locked to different NDA'. This suggests there is perhaps some misunderstanding about how this approach would work in practice.

A couple of responses recommended redefining the sectors and perhaps even defining the meaning of 'sector', suggesting that the following may be appropriate: dairy, sheep and beef, dairy support, deer, horses, and lifestyle, for example. They also suggested having a range for geophysical differences in land as well.

Questions included: What are leaching, use and economics of properties less than 40ha; should there be a stocking rate cut-off for permitted activity less than 10ha; and within dairy support, should winter grazing be OK. Another question was: "but how do we manage the Māori land issue? Is it an exceptions basis?"

**4. Sector averaging with ranges**

Explanation: The intent of using ranges rather than a fixed NDA is to make allowances for those properties where geophysical properties or farm system parameters may cause mitigation to be more difficult and the NDA more difficult to achieve or conversely for other properties, more readily achieved. In this case NDA ranges based on Rule 11 benchmarks has been considered, noting that differences in benchmarked nitrogen losses are largely driven by farm system and management, not soil and rainfall.

It is more flexible than the sector averaging alone, and the ranges recognise the system difference between farms. However, some responses noted that it is not related to N leaching. There is a perceived lack of data for benchmarking and the range has to be tied only to geophysical factors, not the farm management system.

In terms of windfalls, someone stated that dairy farmers might benefit from windfall advantages in cases where they temporarily change land use to beef, lease our surplus N and change back to dairy when prices reverse. Another respondent also believed windfalls could exist within sectors like sheep and beef, but another stated that no windfalls could occur.

One question related to the broad range for dairy, asking: if someone was operating at mid-range, why should they be able to go higher? Other questions included whether or not the 13/35 combination is rational or fair compared with other combinations? Someone acknowledged that there was 'some misunderstanding of 'range' – e.g. you get given a number in that range'.

It was also noted that this approach may fail at the Environment Court because there is no precedent.

**5. Natural Capital (Land Use Capability)**

Explanation: The land use capability class approach assesses the physical quality of the land, soil and environment. Basing an allocation on this system means that higher nutrient limits would be allocated to more versatile classes of land, thus improving overall efficiency of land use in the long run.

Participants were positive about the fact the approach reflects the best use of land, based on productivity. It promotes the efficient use of land and is useful for future planning. The approach has a lot of promise, it's fair and also allows flexibility in the future – it does not lock anyone into historical land use.

From the responses received, it is evident that this approach is ideal on paper but perhaps a difficult one to transition to in practice. For example, comments included: 'In an ideal world it would work, but in reality we don't optimise the land' and 'LUC is the perfect solution but equates to huge disruption'.

Concerns include the time and cost to transition to such an approach, especially where the ideal land use is not the current land use. Time would be required to adapt to this approach and BOPRC would need to be flexible in terms of land use. The ability to trade N would also naturally support a move to a natural capital approach.

One participant stated that the approach is against the principles of StAG and another noted that it is not directly related to N leaching. Someone also believed it would be difficult to determine whether this approach is the most fair and equitable solution until more analysis is done, and more data is required for this.

It was recognised that the approach cannot take into account those properties which are not currently benchmarked and land could be allocated more N than what is required – leading to potential windfalls for those people.

Questions included: how long can the transition be extended and how to expedite data collection?

Overall, this method seems the most acceptable and 'ideal' – but there are significant questions about its feasibility and the transition time required to implement it.

**SUMMARY OF KEY POINTS**

- Whatever approach is decided upon, time to transition to it is required: "the longer time you allow to transition, the better off the farmer will be".
- There is concern around what approach will be fair and equitable in the long-term.
- Minimal social and economic disruption now and in the future is desired.
- Flexibility in land use with minimal cost to transition is desired.
- Keep the approach as simple as possible.
- There is an overall lack of benchmarking data (especially for properties less than 40ha) and data to support specific approaches (like natural capital).
- Ability to trade and how this is provided for is important.
- A durable, long-term solution is required.

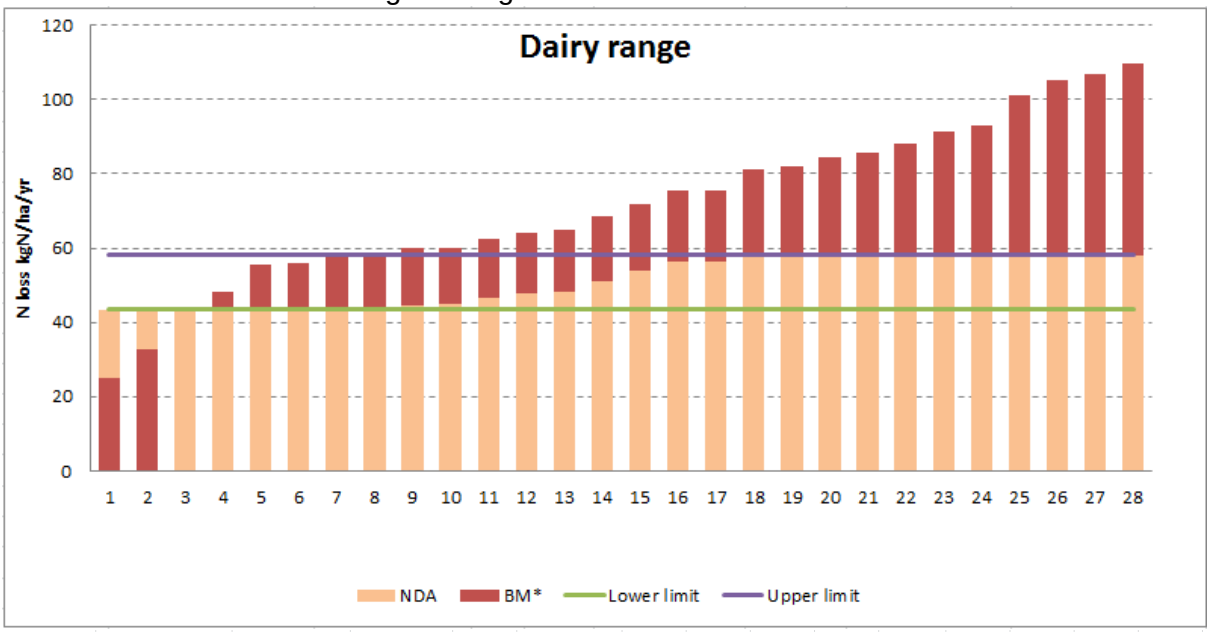
## Appendix 3: Summary of ranges

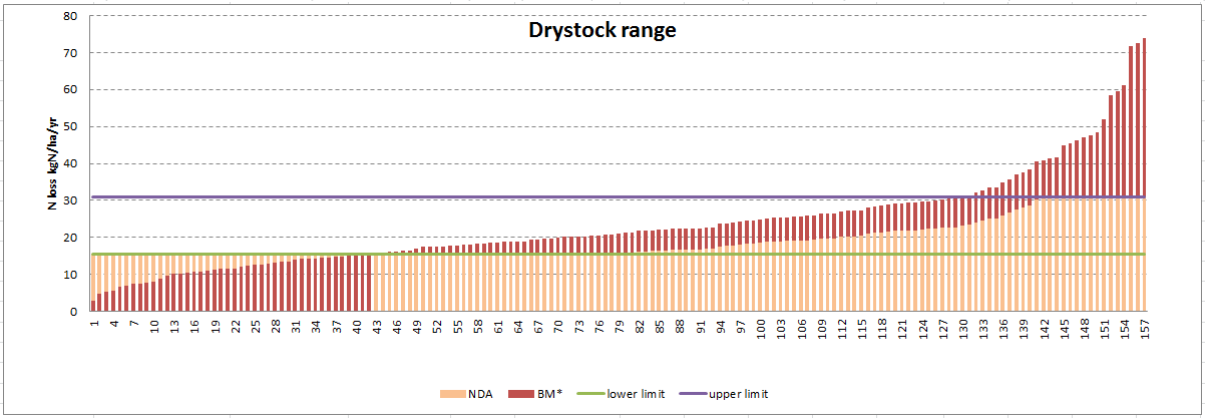
| **Allocation ranges results summary** | | | **Allo 0** | **Allo 1** | **Allo 2** |
|---|---|---|---|---|---|
| | | *"Original" dual range, V5* | Dual based on original ranges | Dual with adjoining ranges | Dual: single average dairy NDA + adjoining dry range |
| **Dairy** | Low (range) | *30.0* | 43.5 | 43.5 | 46.6 |
| | High (range) | *40.0* | 58.0 | 58.0 | 46.6 |
| | Reduction (clawback) | *25.0%* | 25.4% | 42.5% | 0.0% |
| | Sector reduction Vs ROTAN | *35.3%* | 28.8% | 35.3% | 35.3% |
| | Sector average NDA, kgN/ha/yr | *~35* | 51.3 | 46.6 | 46.6 |
| | Windfall if any, tN | | 1.9 | 1.9 | 3.1 |
| **Dry stock** | Low (range) | *10* | 15.5 | 15.5 | 15.5 |
| | High (range) | *20* | 31.0 | 43.5 | 46.6 |
| | Reduction (clawback) | *25%* | 25.4% | 20.6% | 21.0% |
| | Sector reduction Vs ROTAN | *17.2%* | 22.9% | 17.2% | 17.2% |
| | Sector average NDA, kgN/ha/yr | *~13* | 19.0 | 20.3 | 20.4 |
| | Windfall if any, tN | *~35* | 9.7 | 9.7 | 9.7 |
| **Description** | | The original dual range as presented to StAG was based on pragmatic and "round number" range limits, combined with an equal 25% clawback across both sectors. The main rationale was to show pragmatically how the 140 tN reduction could be achieved. | The original dairy and drystock range limits are increased by 1.45 and 1.55 respectively, to reflect dairy/dry v5 to v6 average increases. The clawback was kept the same for both sectors but increased slightly from 25% to 25.4%. | The same range as Allo 0 (i.e. derived from original 30-40) but with a stretched drystock range from the permitted activity threshold up to the lower dairy limit i.e. no gap between ranges. The % clawbacks for each sector were adjusted to give the same overall sector reductions as in the integrated framework. | A single dairy NDA in combination with a wide drystock range has been suggested at StAG, based on the greater similarity of dairy systems Vs drystock diversity. By setting the dairy NDA=46.6 at the "average", sector relativity with the integrated framework is maintained i.e. 35.3% reduction Vs ROTAN. |

| Allocation results summary | | Allo 3 | Allo 4 | Allo 5 | Allo 6 |
|---|---|---|---|---|---|
| | | Dual: single low dairy NDA + adjoining dry range | Combined: wide range | Combined: medium range | Combined: tight range |
| **Dairy** | Low (range) | 43.5 | 15.5 | 15.5 | 15.5 |
| | High (range) | 43.5 | 58.0 | 46.6 | 43.5 |
| | Reduction (clawback) | 0.0% | 26.3% | 18.9% | 14.4% |
| | Sector reduction Vs ROTAN | 39.6% | 31.2% | 37.2% | 40.8% |
| | Sector average NDA, kgN/ha/yr | 43.5 | 49.6 | 45.2 | 42.7 |
| | Windfall if any, tN | 1.9 | 0.0 | 0.0 | 0.0 |
| **Dry stock** | Low (range) | 15.5 | 15.5 | 15.5 | 15.5 |
| | High (range) | 43.5 | 58.0 | 46.6 | 43.5 |
| | Reduction (clawback) | 15.7% | 26.3% | 18.9% | 14.4% |
| | Sector reduction Vs ROTAN | 13.5% | 25.1% | 18.8% | 15.0% |
| | Sector average NDA, kgN/ha/yr | 21.3 | 19.5 | 20.7 | 21.5 |
| | Windfall if any, tN | 9.7 | 9.7 | 9.7 | 9.7 |
| **Description** | | This has a lower single dairy NDA of 43.5 to explore shifting the reduction burden towards dairy, while still maintaining an adjacent drystock range down to the permitted activity threshold of 15.5. This allows a lower clawback for drystock at 15.7%. | A combined range avoids having to determine pastoral LU, or discriminate directly on LU. However, LU does influence BM and hence NDA values. The lower limit is the permitted activity threshold, with the 58 upper limit corresponding to the old 40 (V5). This is deemed a "wide" range relative to other combined ranges tested. | This medium combined range allocation uses the average dairy NDA (derived from integrated framework) as the upper bound.<br><br>The "medium" range shifts the burden towards dairy, relative to integrated framework. | This tight combined range uses an upper bound (similar to Allo 3) of 43.5, equivalent to 30 in V5.<br><br>This tight range shifts the burden even more to dairy, thus allowing a lower % clawback. The clawback is almost irrelevant to dairy as the upper bound constrains almost all dairy farms. |

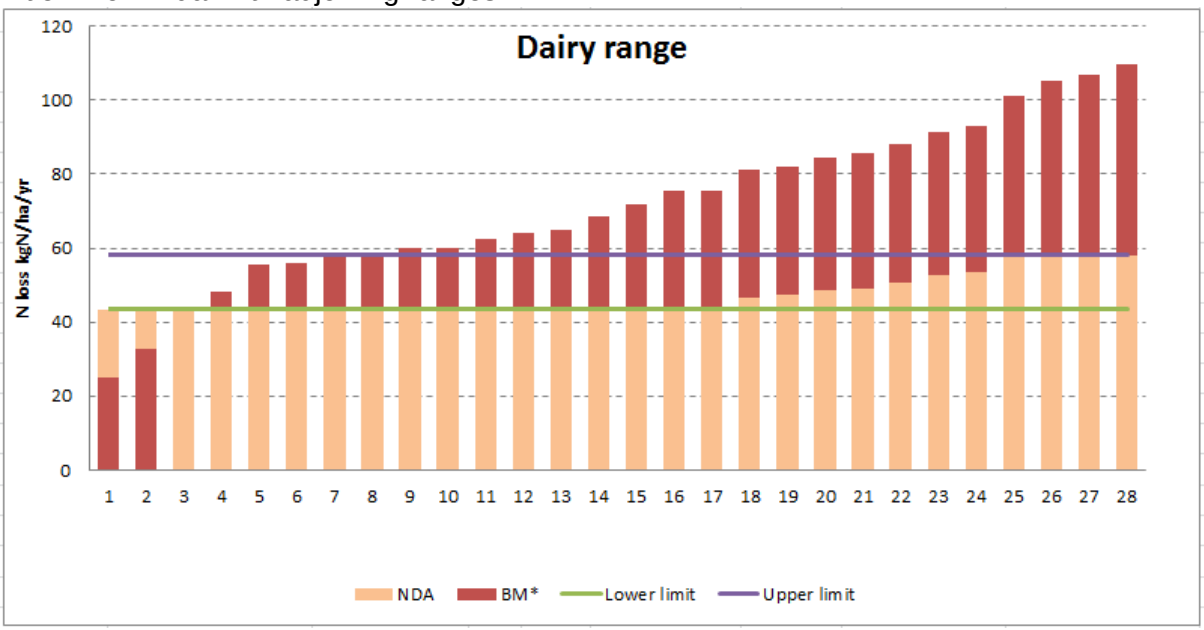
## Appendix 4: Range graphs

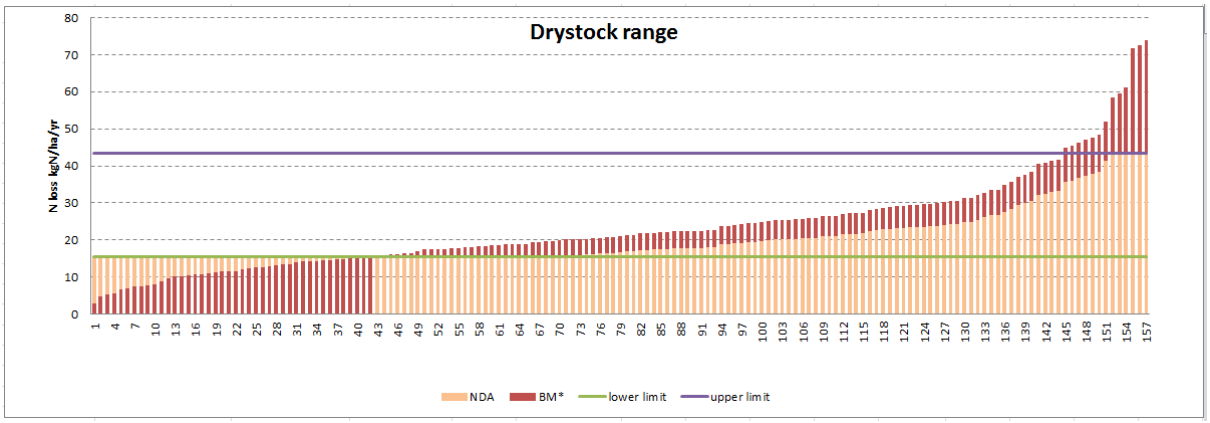
Title: Allo 0 Dual based on original ranges



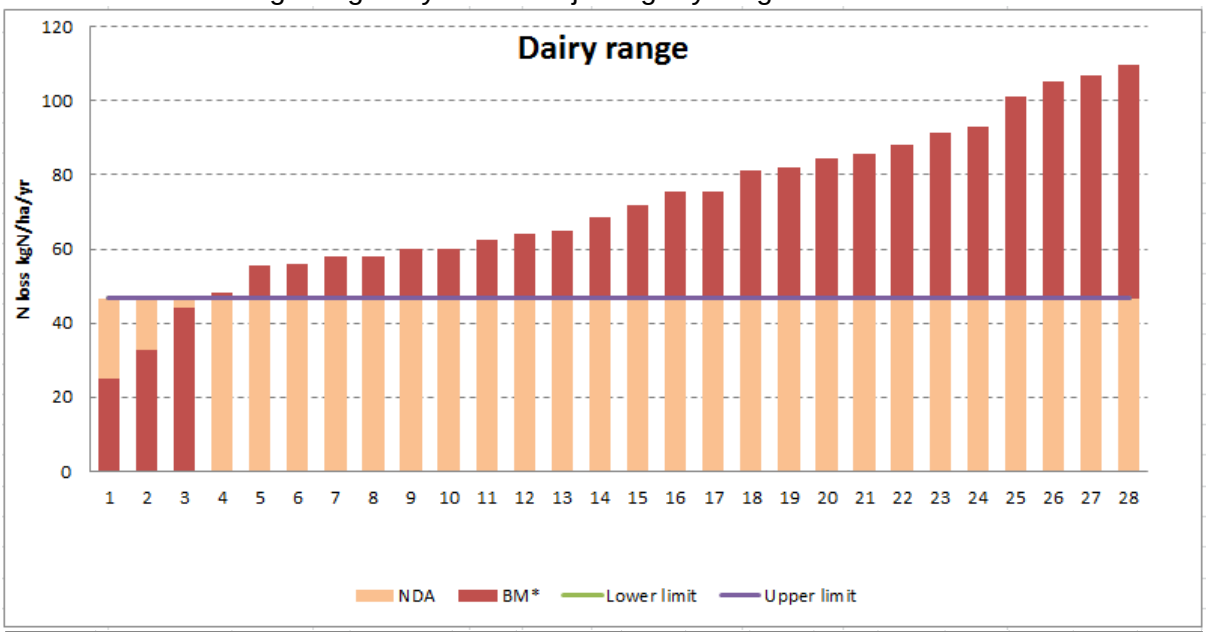



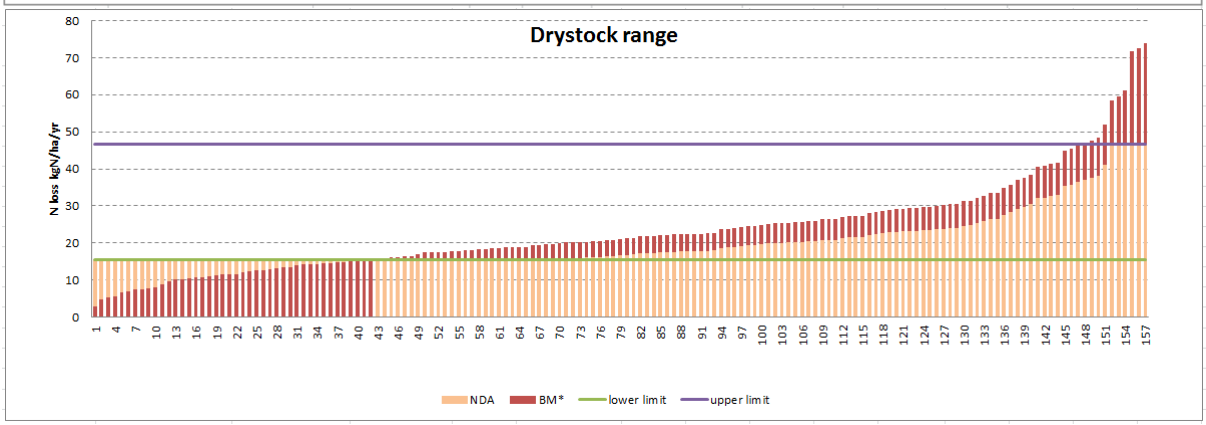

Title: Allo 1 Dual with adjoining ranges



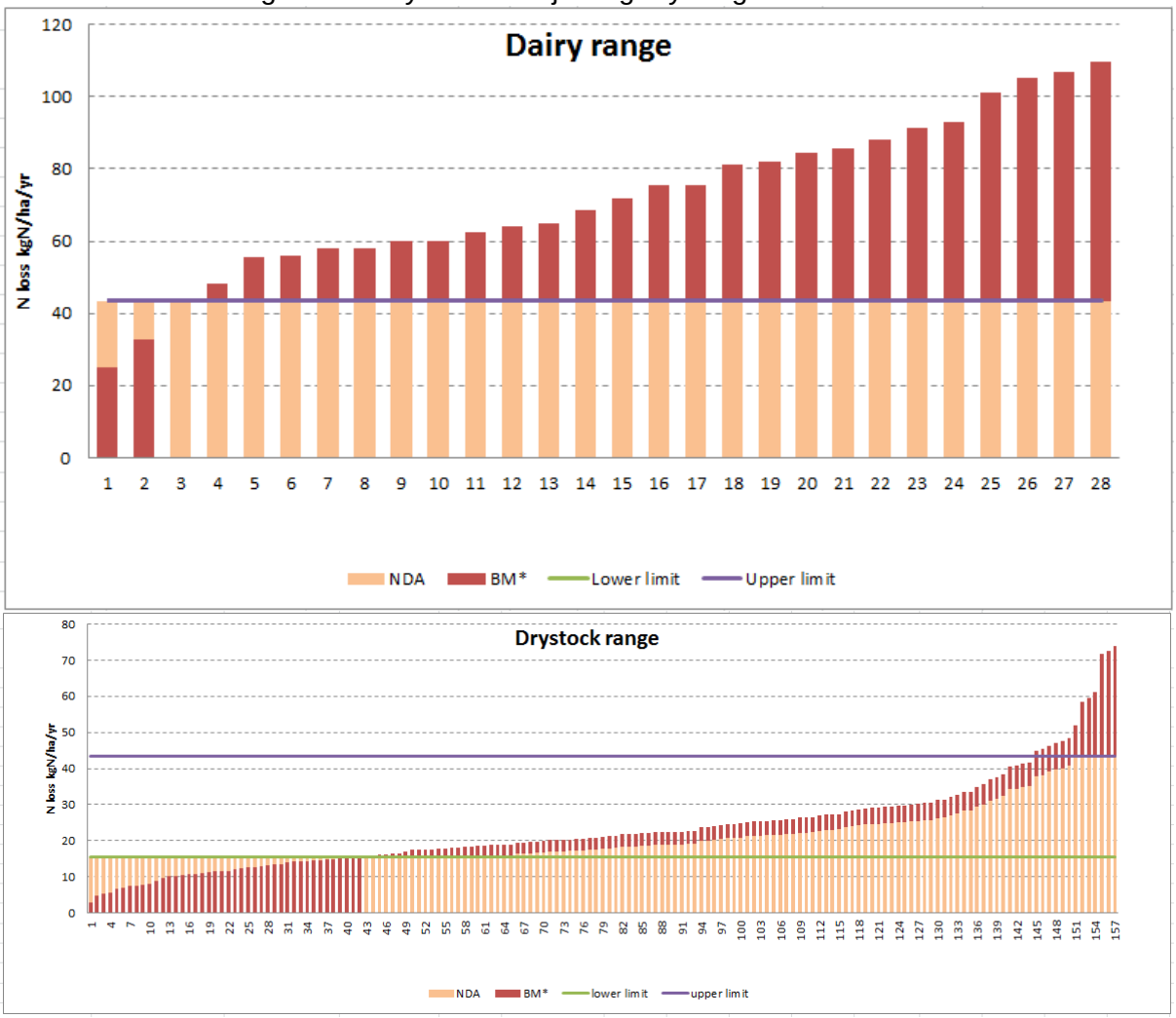



Title: Allo 2 Dual: single avg dairy NDA + adjoining dry range



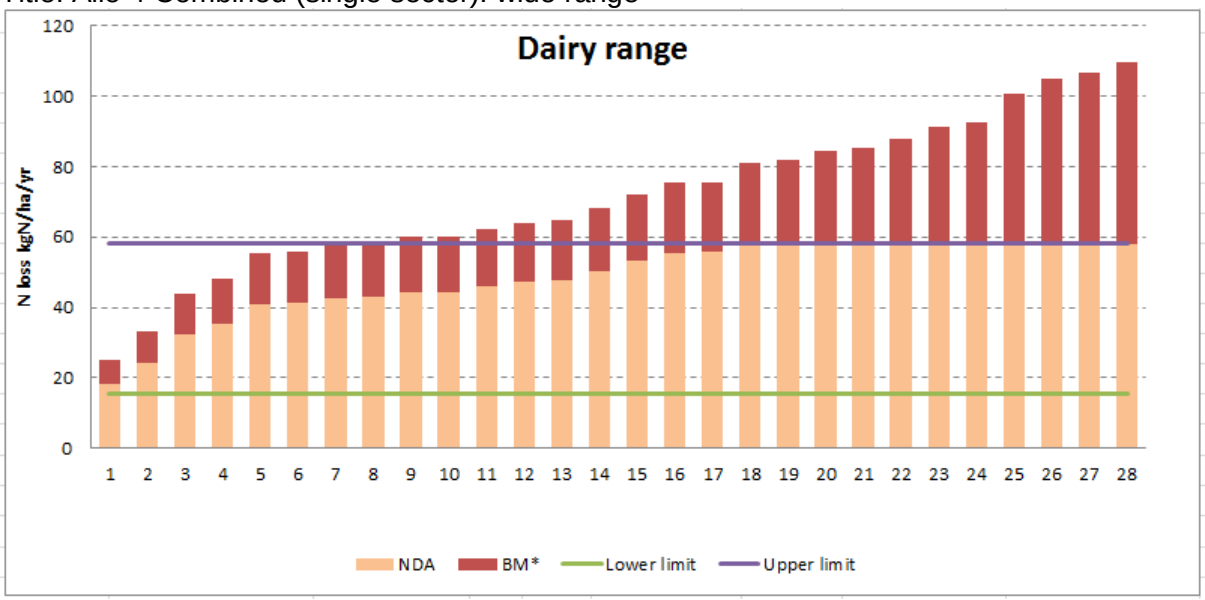
Title: Allo 3 Dual: single low dairy NDA + adjoining dry range

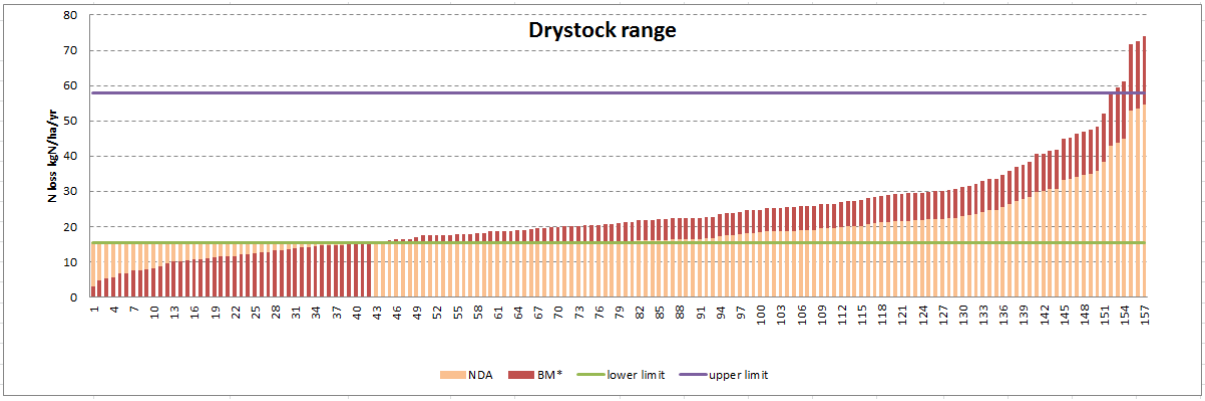




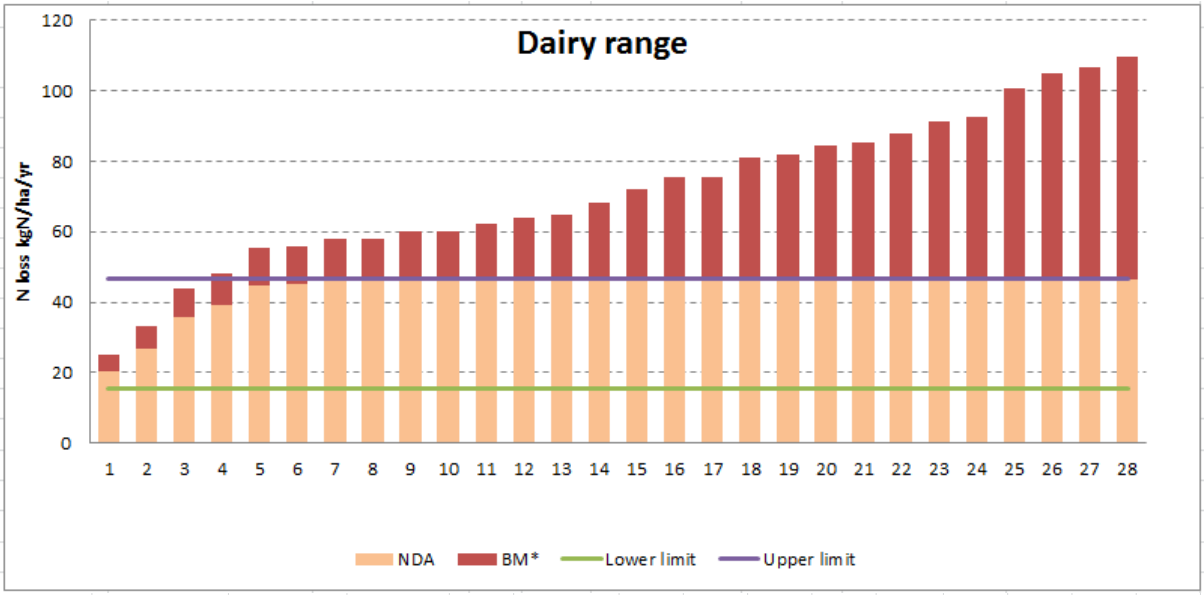


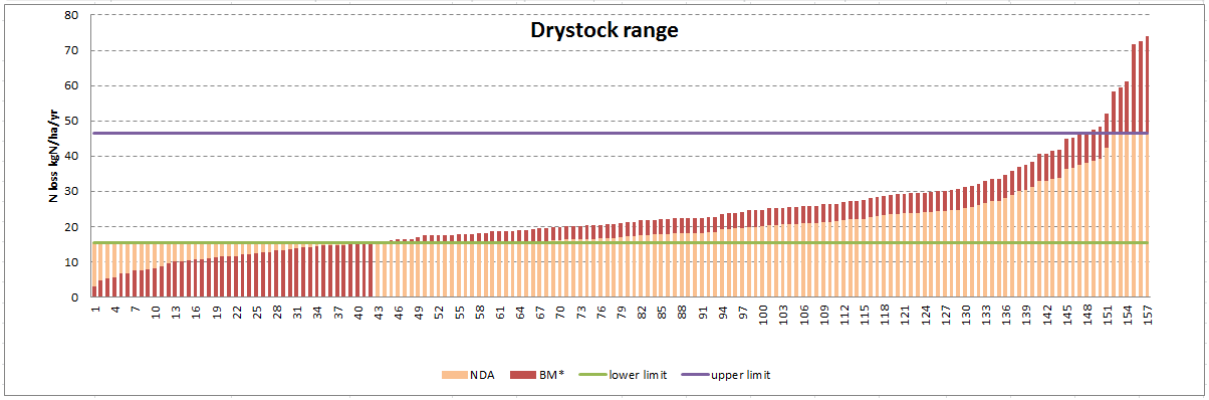
Title: Allo 4 Combined (single sector): wide range






Title: Allo 5 Combined (single sector): medium range



Title: Allo 6 Combined (single sector): tight range