DRAFT Assessment of Possible Allocation Approaches

This assessment has been prepared by Bay of Plenty Regional Council staff. It is draft only and does not represent official views.

Purpose and scope

The focus of this paper is to:

- Identify any allocation approaches that can be excluded from further consideration for the Rotorua Lake Catchment and document the reasons why.
- Identify the possible allocation approaches that should be considered for more in-depth analysis.

The paper outlines an assessment of a number of allocation approaches against a pre-defined set of criteria.

The tools (rules including trading and incentives) and technical information (Overseer, NZ Farm etc.) that may be required to compliment and implement the allocation approaches have not been considered in this paper.

Available allocation approaches

The following allocation approaches (including examples from national and international literature as well as regional experiences) have been considered by staff and the Stakeholder Advisory Group:

- Grandparenting
- Pastoral averaging
- Sector averaging
- Land use capability
- Input based limit
- Output based limits

Definitions of these approaches are provided in the assessments.

Assessment of approaches

Two sets of criteria were used to undertake an initial assessment of the proposed allocation approaches. These criteria are outlined in detail in Appendix 1.

The full assessment for each allocation approach is provided at Appendix 2.

Discounted Options

The assessment identified the following allocation approaches as not feasible as stand-alone allocation options[1] for the Lake Rotorua Catchment:

- Grandparenting (including grandparenting with a proportionate/clawback reduction)
- Land use capability
- Pastoral averaging
- Input based

[1] As we continue our options analysis on possible allocation approaches, we may wish to revisit some of the approaches we have excluded earlier. That is ok. This assessment simply documents our reasoning to date.

- Output based

However, aspects of these approaches have merits that could be explored further in any hybrid allocation scenarios:

- Recognises existing land use
- Recognises existing investment
- Considers current nitrogen loss
- Encourages resource use efficiency

Aspects deemed to be missing or inadequate in the discussed allocation approaches include:

- Consideration of agreed good practice and land management practices that mitigate nitrogen loss
- Recognition of farm variability within and between sectors
- Nitrogen leaching rates

Hybrid allocation approach(es)

The assessment supports a hybrid allocation approach that is tailored to the Lake Rotorua Catchment. Sector averaging is still considered a feasible option and could be the basis of a hybrid allocation approach.

The Stakeholder Advisory Group supported the option of a hybrid allocation approach at their meeting on 29 January 2013.

Benefits of a hybrid allocation approach

Different combinations of allocation mechanisms can be used to balance out burdens according to community values so that people's willingness to accept certain outcomes can be balanced.

Using hybrid allocation approaches also allows for variations to be made for environmental reasons. For instance, a smaller allowance may be given for areas within a catchment where the receiving environment is particularly sensitive.

Possible hybrid options

Some possible hybrid allocation methods to consider for more detailed analysis include:

1 Sector averaging that takes into account:

   - Meeting the target
   - Good management practice
   - Soil leakiness/natural leaching rates
   - Farm type (taking into account farm size, imported supplements, N fertiliser usage, stocking rates and milk solids production).

2 Grandparenting each sectors' *proportion* of the total load (e.g. dairy makes up approximately 52% of the current 526t pastoral load and so would be allocated 52% of the target 256t pastoral load), and apply sector averaging within this proportional allocation.

3 Any others?

Appendix 1: Criteria for assessing allocation approaches

Any allocation approach is going to have implications for:

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

Therefore, the allocation approach(es) chosen and specific implementation methods need to be aligned to the characteristics of the Lake Rotorua Catchment and its community.

Policy WL 5B in the Proposed Regional Policy Statement (RPS) provides principles for nutrient allocation for Lake Rotorua and other water bodies as follows:

> *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*
>
> *(ha) Existing on farm capital investment; and*
>
> *(i) Ease of transfer of the allocation.*[2]

To ensure the allocation approach also achieves the stated nutrient target for Lake Rotorua lakes, an additional criterion has been included. Staff have developed some explanatory text for what these criteria mean and how the criteria could be applied consistently (see Table 1).

The Stakeholder Advisory Group (StAG) have also considered draft nutrient allocation principles and guidelines that are additional to RPS allocation principles. These are:

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

[2] It is important to note these criteria may change through resolution of Regional Policy Statement appeals.

Table 1: Suggested explanatory text for the principles identified in Policy WL 5B of the Proposed Regional Policy Statement (*note these are staff suggestions not official views*).

Equity/Fairness, including intergenerational equity
An allocation process seeking an equitable and fair solution that recognises • history of the issue • contribution of different land uses to the economy • investment An equitable and fair solution will not result in big windfall gains or losses and does not reward poor practice.
Extent of the immediate impact
This criterion focuses on negative impacts. For example: • immediate changes to land use and land management that may be required, and consideration of whether or not landowners have the capacity to make those changes in the short, medium or long term • economic impacts, including those on the lake's community (e.g. farming, tourism, recreation) Positive environmental, cultural and social impacts will occur over time when the allocation approach is implemented.
Public and private benefits and costs
Public benefits relate primarily to the values the community derives from improved water quality. This is more relevant to implementation of allocation, rather than the allocation method itself. Public costs relate to compliance and transaction costs. These costs affect the ratepayer. Other public costs include social disruption and flow-on economic impacts. Private costs and benefits relate to landowners affected by allocation. Private benefits include certainty for land users, and opportunities for development, land use intensification and improved efficiencies. Private costs consist of cost of implementing changes imposed, initial reductions, mitigation costs, and limits on future land use flexibility.
Future vision for landscape
This considers whether the approach is future proofed and allows a transition towards a catchment where land is used efficiently and sustainably for an on-going prosperous community.
Iwi land ownership and its status including any Crown obligation
Implications of the approach on Māori owned land recognising the complexities of multiple owned land and how allocation may impact on the ability of Māori to plan for the strategic development of their land. Recognition of obligations under Treaty settlements.
Cultural values
Cultural values will be derived from improved water quality which relates to implementation of allocation. The allocation approach allows landowners to use the concept of kaitiakitanga and stewardship.
Resource use efficiency
Considers whether the allocation approach: • supports efficient use of land and resources • enables land use appropriate to the lands' natural capacity • supports sustainable land uses (sustainability tends to support resource efficiency)
Existing land use
Recognition of the way land is currently used, including current good management practices in place and mitigation measures already undertaken. Also considers the large variability within and between land uses, land use practices and nitrogen leaching rates.
Existing on farm capital investment
Recognition of investment in on-farm infrastructure (including nutrient management and mitigation measures).
Ease of transfer of the allocation
The ease of implementation of allocation and transition to that allocation approach including: • Degree of difficulty, time and cost involved in implementing the change required • Recognition of obstacles (including landowner buy-in)

Appendix 2: Detailed assessment of allocation approaches

Assumptions

Generic assumptions have been made in the following assessment of allocation approaches:

- Our community wants a catchment where land is used efficiently and sustainably for an on-going prosperous community.
- Allocation of nitrogen loss and measures landowners take to meet their nitrogen loss entitlement won't further increase phosphorous losses.
- All allocation methods can be staged with transitional periods. An initial period would allow farmers time to adapt their systems, trade allowances or exit the catchment before compliance monitoring begins.
- For all allocation methods we are assuming a similar timeframe for implementation.
- Allocations can be tradable – this will create incentive for innovation and higher efficiency where the allocated nitrogen discharges are scarce.
- All activities that cannot reduce their current nitrogen loss (e.g. forestry, urban, rain on lake) will receive an allocation equal to their current loss. See table below.

N source	Area ha	load tN/y (ROTAN 2011)		
		current	reduction	target
pasture	21,175	526	270	256
geothermal	59	30	30	0
urban & sewage	3961	93	20	73
pines	8800	35	0	35
bush	12,382	40	0	40
rain on lake	8079	30	0	30
total	**54,456**	**755**	**320**	**435**

Specific assumptions are also made for each allocation method. They are provided in the following assessments.

Grandparenting

Allocation is based on existing discharges and every landowner would receive an allocation equal to their current discharge. This is status quo under existing Rule 11. A grandparenting approach was also used for the Lake Taupō Variation.

Assumptions:

- Good information on current discharges rates is available to inform individual property N discharge allocation.
- "Current" relates to operations and discharges resulting from implementation of Rule 11.

Criteria	Comment
Meets policy intent	• No - will not achieve required target as current discharge levels are greater than the target.
Equity/fairness	• This approach benefits those with highest discharges (giving them the most flexibility of what they do on the land) and penalises those with the lowest discharges. • It supports status quo and those with best practices will be worse off.
Immediate impact	• Enables businesses to continue without disturbing their current operations. Therefore no immediate upfront costs.
Public costs and benefits	• Community and iwi costs when nitrogen targets are not met. • Little long-term monitoring and compliance costs. • Potentially maintains or reduces impacts on current local agricultural economy.
Private costs and benefits	• Growth in intensity of agricultural production is curtailed. • Low leaching enterprises cannot increase their leaching loss if they want to change land use activities. • Least economic disruption to current landowners. • This allocation approach allows a continuation of activities so provides high level of certainty to current landowners.
Future vision for landscape	• Won't achieve the vision as it doesn't encourage a transition to more efficient resource use.
Iwi land ownership	• Likely to disadvantage undeveloped Māori owned land –as that land will receive a lower allocation and therefore restricts future development (see equity/fairness).
Cultural values	• At risk as water quality will not improve.
Resource use efficiency	• Land use limits are based on past land use rather than land use potential. • Under-developed land cannot develop like other land has in the past. • Potentially rewards current inefficiencies by allocating a higher number of discharge allowances to operations on lower class or high leaching land.
Existing land use and farm capital investment	• Recognises existing land use.
Existing on farm capital investment	• Recognises capital investment.
Ease of transfer	• Can be applied quickly if based on the information gathered through Rule 11 benchmarking. • No upfront costs to landowners. • Technically feasible.

Grandparenting allocation approach assessed against StAG criteria

No major windfalls for any sector	Existing investment will be recognised	Least overall economic impact	Practices with high nutrient discharge are not rewarded
✓	✓	✓	X

Key
✓ Meets criteria
X Does not meet criteria

Discussion

The policy intent will not be met with grandparenting, as it will not achieve a sustainable lake load of 435t/N/yr. The total "steady state" nitrogen load to Lake Rotorua from current land use is estimated to be 755tN/yr. Therefore, grandparenting cannot be considered as a stand-alone allocation approach.

Staff also considered grandparenting with a proportionate reduction to meet the N target for the lake. To reduce current pastoral discharge of 526 tN/yr to the required 256 tN/yr equates to an approximate reduction of 50%. This means that if a current nitrogen discharge from a dairy farm was 56 kg/ha/yr and a dry stock farm was 16 kg/ha/yr then their discharges would need to drop to 28 kg/ha/yr and 8 kg/ha/yr respectively. This could be technically and/or financially unfeasible for some land uses.

This approach would penalise those with little room to move or improve and could force them out of their current land use to a lower leaching land use. This could create significant economic impacts.

The above assessment does identify aspects of grandparenting that have merit for inclusion in a hybrid approach. These include:

- Recognises existing land use
- Recognises existing investment
- Considers current nitrogen loss rates.

It is recommended that these aspects be considered as part of any hybrid model(s).

Land Use Capability

The land use capability class approach assesses the physical quality of the land, soil and environment. Basing an allocation approach 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.

Assumption:

- More versatile soils are more productive; higher leaching activities should occur on the most productive lands.
- We have the data necessary to determine the most suitable characteristics on which to base the allocation (LUC, N leakiness, etc.).

Criteria	Comment
Meets policy intent	• Yes, providing the N target is used as the basis of the allocation.
Equity/fairness	• Degree of equity as it is partially independent of current land uses. It treats land in the same manner regardless of current use. • Does not recognise existing land uses or the variations in management techniques that are currently in place to deal with environmental variability.
Immediate impact	• There would be a significant impact as a majority of dairy and drystock farms are on class 4 and 6 land in the Rotorua catchment. Therefore, allocating the bulk of nitrogen to class 1-3 land would disrupt many agricultural landowners at the catchment scale. • Only 15% of the catchment is class 2/3 land. Thus, there is limited additional land that could be suitable for dairy even if relocation of dairying was a desirable objective.
Public costs and benefits	• Significant private costs are likely to have some broader downstream and flow-on costs to the wider community. • Could completely change the rural and urban landscape – which may be either a benefit or a cost. • Encourages sustainable and efficient land use in the long-term reducing future mitigation costs and achieving a clean lake
Private costs and benefits	• Potential for landowners on land considered more versatile (ie have higher leaching allocation) to further reduce their N leaching and sell their excess N loss reductions to others • Cost to intensive farmers on less productive land. Only 15% of the catchment is Class 2/3 land. 81% of existing dairy and 73% of existing dry stock is on class 4-6 land.
Future vision for landscape	• Allows flexibility on what can be produced on the land. • Encourages versatile land to be used more intensely for production. • By encouraging land uses to move to its most suitable location, aligns with assumption that the community wants a catchment where land is used efficiently and sustainably.
Iwi land ownership	• The accompanying map shows Māori owned land with lower productive capability (classes 6-8). See costs above.
Cultural values	• Cultural benefits from a clean lake. • Supports concept of kaitiakitanga.

Resource use efficiency	• Allows flexibility on what can be produced on the land. • LUC Classes do not determine actual or predicted amounts of nutrient leaching from soils – its intent is to encourage intensive farming towards higher quality soils. • Efficient approach because it encourages production in the most appropriate places. Flow on effect is improved economics. • Sustainable land uses do not necessarily correspond to the land use classification class as LUC does not capture all considerations. For example, class 2 land could be leaky and be next to the lake with a higher probability of that N reaching the lake.
Existing land use	• Results in a large shift of existing land uses.
Existing on farm capital investment	• Does not acknowledge significant historical investment in infrastructure including nutrient mitigation expenditure.
Ease of transfer	• Complex - Many farms in Rotorua catchment have a number of different LUC classes and it will be difficult to determine how nutrients will be allocated at the property scale. • Resource intensive - issues associated with the accuracy of LUC mapping. • Not supported by affected landowners (StAG) so risk of poor cooperation from many landowners.

Land use capability allocation approach assessed against StAG criteria

No major windfalls for any sector	Existing investment will be recognised	Least overall economic impact	Practices with high nutrient discharge are not rewarded
-	X	X	X

Key
✓ Meets criteria
X Does not meet criteria

Discussion

Allocation based on LUC or natural capital alone does not specifically address inputs or leaching rates, but it can be designed in such a way that the target can be achieved.

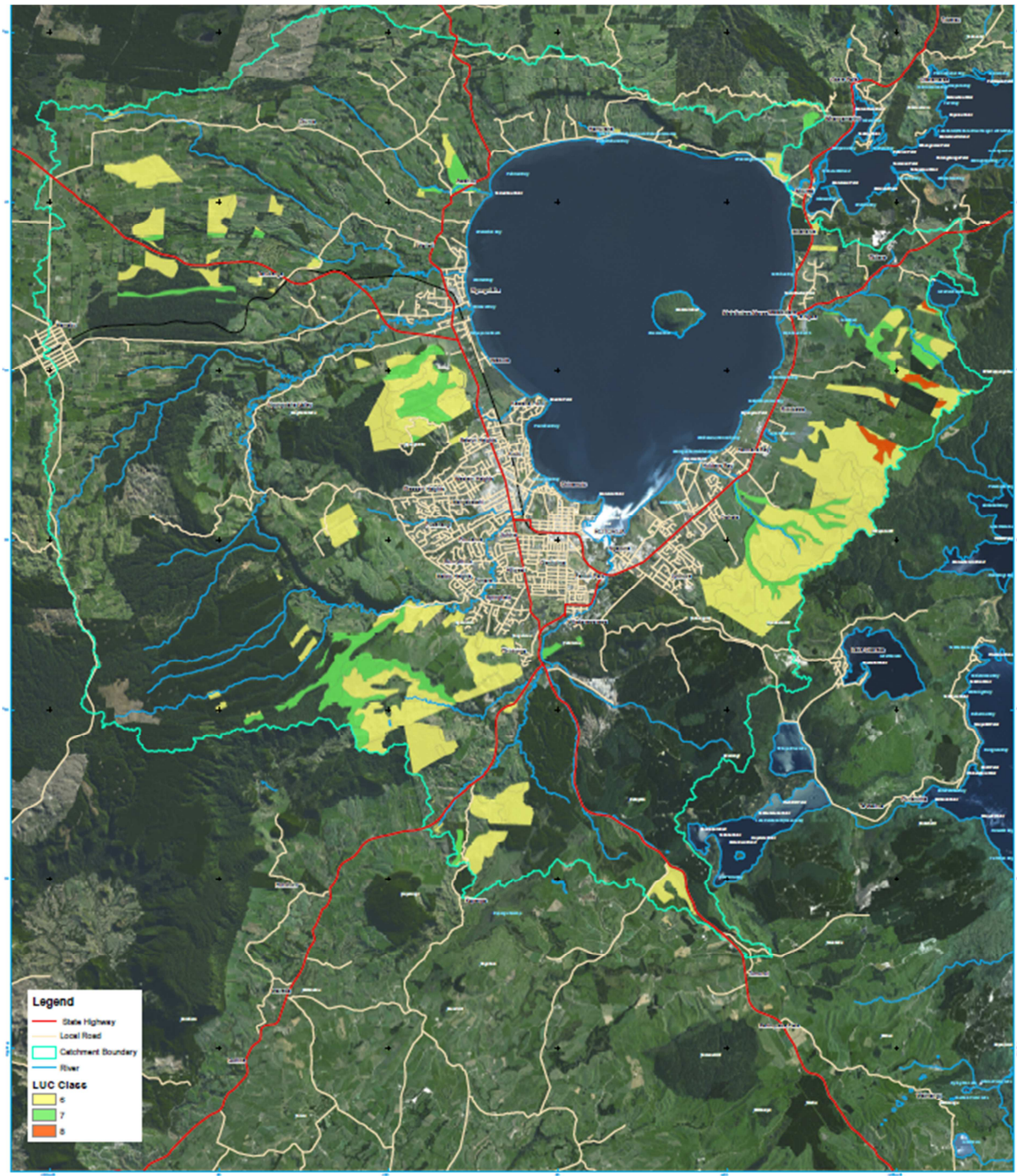
In theory it's the best allocation approach because it recognises the capacity of the land. However, it is difficult to see it as appropriate in the Rotorua context because:

a) Poor correlation between LUC and current land use in the Lake Rotorua catchment.

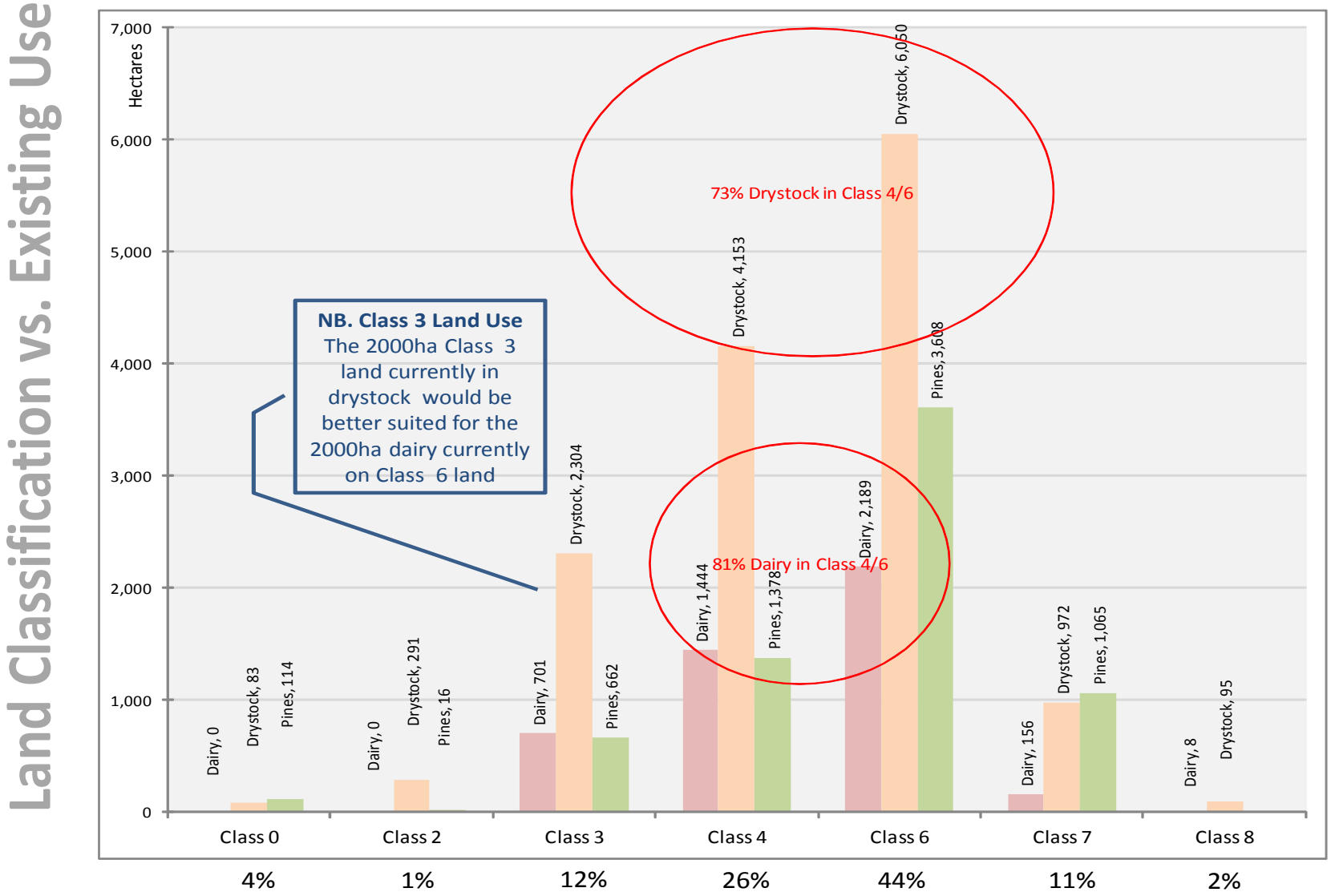
b) Not enough scope for existing farm operations to change where they operate to align with land use productivity (see attached slide).

c) Doesn't recognise all the existing mitigation landowners have already adopted to compensate for soil characteristics.

However, the Regional Policy Statement recognises land use capability as a tool to achieve integrated management. LUC could form part of a high level policy response to achieve the vision for the catchment over the next 50 years rather than as a basis for allocation. We have assumed our community wants a catchment where land is used efficiently and sustainably for a prosperous community. Land use planning could be guided by LUC as opportunities for change arise in the future.


Legend
State Highway
Local Road
Catchment Boundary
River
LUC Class
6
7
8
Bay of Plenty
REGIONAL COUNCIL
GIS-462813
Māori owned land with LUC Classes 6-8 in the Rotorua Lake Catchment

Is allocation by Land Capability relevant in this catchment?



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 of12kg/ha. Every pastoral landowner in the catchment would receive 12 kg/ha.

Also referred to as equal allocation.

Assumption:

- Averaging only applies to pastoral farming.

Criteria	Comment
Meets policy intent	• Yes. Modelling has shown that to achieve 435t, pastoral farming needs to reduce to 256t. Allocation would be based on meeting this target.
Equity/fairness	• An equal allocation for everyone. • Large wealth transfer – for example windfall gains for undeveloped land or landowners operating below 12 kg/ha as they will be able to sell their excess allowance. • Losses to land uses such as dairy (5050 ha) as they will be required to purchase allowances to continue to operate. • Higher leaching land uses are heavily penalised through the requirement to purchase a large number of nutrient discharge entitlements.
Immediate impact	• Large upfront costs to some farmers - they would have to reduce nitrogen to meet rule or purchase discharge allowances from foresters or owners of undeveloped land. • May not be technically feasible to dairy farm at 12 kg/ha so dairy farmers would be required to obtain additional allowances to continue to operate.
Public costs and benefits	• May force certain farm types out of the catchment – loss of diversity in land use. • Likely downstream or flow-on social and economic effects that could impact the community. • A clean lake through achieving water quality aspirations over time.
Private costs and benefits	• Ability to continue dairy farming may not be technically possible without significant new investment. • Provides incentive to innovate and diversify land use and management.
Future vision for landscape	• Will encourage resource efficiency and prosperity in the long term - aligns with assumption community wants a catchment where land is used efficiently and sustainably for an on-going prosperous catchment.
Iwi land ownership	• Opportunities for owners of undeveloped Māori land that are assigned a higher discharge allowance than current discharge levels.
Cultural values	• Once target is met there will be cultural benefits to lake.
Resource use efficiency	• The trading of leaching entitlements can direct those permits to their most efficient use. • Does not encourage marginal land to be retired.
Existing land use	• Does not recognise existing land use

Existing on farm capital investment	• Does not acknowledge historical investment in infrastructure including nutrient mitigation expenditure.
Ease of transfer	• Risk of poor co-operation from land owners. • Risk that holders of nitrogen allocation surplus refuse to sell.

Pastoral averaging allocation approach compared against StAG criteria

No major windfalls for any sector	Existing investment will be recognised	Least overall economic impact	Practices with high nutrient discharge are not rewarded
X	X	X	✓

Key
✓ Meets criteria
X Does not meet criteria

Discussion

Pastoral averaging will heavily penalise higher leaching land uses and higher leaching environments. This allocation approach does not recognise existing land use (including investment), management practices that may reduce leaching, soil type (leakiness) or areas with higher rainfall.

The Stakeholder Advisory Group does not support pastoral averaging as an allocation approach for the Lake Rotorua Catchment.

The above assessment does identify the following aspect of pastoral averaging as having merit for inclusion in a hybrid approach:

- Resource use efficiency

It is recommended this aspect be considered as part of any hybrid model(s).

Sector Averaging

This method allocates an averaged level of nutrient discharge rights across specific types of land use e.g. dairy, sheep and beef, deer and forestry.

Assumption:

- Good information on current discharges rates is available to inform individual property allocations.

Criteria	Comments
Meets policy intent	• Yes, provided the total allocation achieves a pastoral N leaching loss of 246t meaning the 435t target is met.
Equity/fairness	• All landowners with similar land uses are expected to achieve the same leaching levels. • Landowners who have developed their pastoral land are more likely to be able to continue their current land use. However, those on undeveloped land (eg. forestry) will be limited in their options.
Immediate impact	• Change required for landowners who have higher discharge rates than the sectoral average (which would achieve the target).
Public costs and benefits	• A clean lake through achieving water quality aspirations over time. • On-going compliance and monitoring costs.
Private costs and benefits	• Provides certainty to landowners. • Landowners who have used good nutrient management practices will more easily meet their nitrogen discharge allowance and have more flexibility for land use options. • Mitigation costs for those landowners with currently high levels of N leaching
Future vision for landscape	• Could force land use change for landowners with high leaching levels.
Iwi land ownership	• See costs.
Cultural values	• This approach will improve water quality and therefore recognise cultural values.
Resource use efficiency	• Encourages good practice to reduce N leaching. • Can encourage marginal land to be retired. • A pure sector averaging approach does not account for variability between soil leaching rates, rainfall etc.
Existing land use	• Recognises existing land use.
Existing on farm capital investment	• Recognises sunk investment
Ease of transfer	• Already have information on current discharges (2001-2004) to guide level of change required. • May be technically and/or financially unfeasible for some farms.

Sectoral averaging allocation approach compared against StAG criteria

No major windfalls for any sector	Existing investment will be recognised	Least overall economic impact	Practices with high nutrient discharge are not rewarded
✓	✓	-	✓

Key
✓ Meets criteria
X Does not meet criteria

Discussion

Unlike the pastoral averaging approach, sector averaging recognises current land use, investment and management techniques that reduce leaching rates.

However, every farm is different and it is impractical to say that every hectare of land of the same land use will discharge the same amount of nitrogen (e.g. dairy with high (>2000mm) and low rainfall).

The Stakeholder Advisory Group supports sector averaging as an allocation approach.

Some useful concepts to incorporate into a hybrid model include:

- Recognises existing land use
- Recognises existing investment
- Considers current rates of nitrogen leaching
- Supports good land use practice

It is recommended these aspects be considered as part of any hybrid model(s).

Input Based Allocation

Input based allocation 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.

Assumptions:

- Managing what goes onto a farm can be used to control what is discharged.
- Good data is available that identifies the relationship between inputs and nitrogen loss.

Criteria	Comments
Meets policy intent	• Possible, but it is difficult to link the input control with the nitrogen leaching with any precision. Also, given the scale of reduction required, it is unlikely that traditional input rules will be able to achieve the limit.
Equity/fairness	• Doesn't acknowledge that some landowners have already heavily invested in mitigation techniques to minimise losses, and if these don't fit with the input controlled approach they will be penalised. • All individuals within each sector are treated equally.
Immediate impact	• May require change to existing operations. • Unlikely to result in significant land use change across the catchment.
Public costs and benefits	• On-going compliance and monitoring costs. • Further council (and other) investment to derive the relationship between land inputs and discharges e.g. take into account variances in soil type, climate difference, lag etc. • On-going research and assessment as farm inputs change over time.
Private costs and benefits	• Landowners currently operating in accordance with the regime will not have to change. • Landowners not operating in accordance with the regime will be impacted significantly.
Future vision for landscape	• Doesn't address future vision as it doesn't really change the status quo catchment landscape, and doesn't encourage innovation or diversity.
Iwi land ownership	• May provide new opportunities in undeveloped land, provided it complies with input requirements.
Cultural values	• May not meet limit so unlikely to reflect cultural values.
Resource use efficiency	• Does not require marginal land to be retired or high quality land be intensified. • Limits on inputs could encourage resource efficiency. • Opportunity for land-users, industry sectors and fertiliser companies to develop best practice.
Existing land and farm capital investment	• Does not explicitly acknowledge historical investment in infrastructure including nutrient mitigation expenditure. Also doesn't reflect diverse 'non-input' approaches to nutrient management that may be equally valuable.
Ease of transfer	• Hard to implement, may require complex and expensive monitoring and enforcement systems. • Relies on high degree of cooperation from land users.

	• Feasibility of future continuation of all land users unknown.

Input allocation approach compared against StAG criteria:

No major windfalls for any sector	Existing investment will be recognised	Least overall economic impact	Practices with high nutrient discharge are not rewarded
✓	X	-	✓

Key
✓ Meets criteria
X Does not meet criteria

Discussion

Input and output based allocation is used as surrogate measures for actual (or estimated) N leaching losses. This approach is generally suggested in response to the potentially high cost and feasibility of measuring or estimating N leaching losses per property in real time.

Of most concern with this approach are the challenges involved in determining the relationship between inputs and nitrogen leaching loss for each climatic, soil and management option. This allocation approach also does not recognise variations in management techniques that may already be in place to mitigate N losses or in response to other environmental or management concerns a landowner may have.

The above assessment identified the following aspects as having merit for inclusion in any hybrid approach(es):

- Resource use efficiency

It is recommended this aspect be considered as part of any hybrid model(s).

Output Based Allocation

Under an output based approach allocation is 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.

Assumptions:

- There is a strong relationship between product output and N leaching.
- Good data is available that identifies the relationship between outputs and nitrogen leaching.

Criteria	Comments
Meets policy intent	• Possible, but unlikely unless the initial calculation of output/N leached is scaled to meet the target. Although we know the N target we need to achieve, we have limited understanding of how this is linked to farm outputs
Equity/fairness	• Doesn't acknowledge that some landowners have already heavily invested in mitigation techniques to minimise losses, as all landowners face the same N leaching allocation per unit of output.
Immediate impact	• May require change to existing operations. • Detailed information required to determine relationship between output and discharge levels.
Public costs and benefits	• On-going compliance and monitoring costs. • Further Council (and other) investment to derive the relationship between output and discharge levels. • Potential public benefit associated with allocation going to those who can generate the most return. Flow on economic impact.
Private costs and benefits	• Benefits to people who use nutrients most efficiently.
Future vision for landscape	• Will encourage resource efficiency and prosperity in the long term - aligns with assumption community wants a catchment where land is used efficiently and sustainably for an on-going prosperous catchment.
Iwi land ownership	• All landowners are treated the same.
Cultural values	• May favour economic values over other values.
Resource use efficiency	• Supports not giving allocation 'units' to inefficient use.
Existing land use	• Recognises existing land use productivity but easily complicated by factors outside landowners control.
Existing on farm capital investment	• Does not acknowledge historical investment in infrastructure including nutrient mitigation expenditure.
Ease of transfer	• Hard to implement, requires complex monitoring and enforcement systems. • Relies on high degree of cooperation from land users. • Feasibility for any landowners unknown.

Output based allocation approach compared against StAG criteria:

No major windfalls for any sector	Existing investment will be recognised	Least overall economic impact	Practices with high nutrient discharge are not rewarded
-	X	-	X

Key
✓ Meets criteria
X Does not meet criteria

Discussion

Input and output based allocation is used as surrogate measures for actual (or estimated) N leaching losses. This approach was suggested in response to the potentially high cost and feasibility of measuring or estimating N leaching losses per property in real time.

This approach would be complex to implement because of the challenges to:

- Establish the relationship between product output and N leaching
- Determine the factors that (could) disrupt that relationship in a way that cannot readily be seen/accounted for
- Production outputs are likely to be highly variable due to factors outside landowner control, eg. market, economics, climate, disease, pests.

For these reasons staff do not consider output based production as a feasible option for the Lake Rotorua Catchment.