TDR SIZE AND QUANTITY

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'TDR size and quantity' is an ambitious topic which encompasses many issue already touched on this morning by other speakers. I am going to narrow down my talk to illustrate by examples what a TDR might mean at the farm level and the implications of the TDR rules that exist in a draft format or have been discussed at the stakeholder group (StAG). The 'principles of nitrogen allocation' have been an important topic at StAG group meetings for the last 6 months. Recently the Regional Council staff put forward a paper with hard numbers around the two main options, 'grand parenting' and 'sector averaging'. It brought focus to the allocations debate. The same is true of TDRs – examples of how TDRs might work bring focus to understanding the concept of TDRs.

Here are two hypothetical examples which we might derive questions and considerations when drafting TDR policy.

1. 100 ha dairy farm, Benchmark = 45 kgN/ha
2. 100 ha drystock farm, Benchmark = 16 kgN/ha

Tentative TDR rules:

a. 500kgN minimum qualifying N loss.

b. Full or partial land use change will qualify for TDRs

c. Prerequisite is that N reduction from land use change is > 10% of BM

d. Whole property meets N allocation rules at following N discharge levels

- dairy 25kgN/ha
- drystock 8kgN/ha
- trees 4kgN/ha

For the sake of this exercise, each farm is 100 hectare in size. The numbers pertaining to 100ha can readily be multiplied to simulate larger properties, or divided by 100 to determine per hectare impacts. The N discharge levels reflect average values from the Lake Rotorua Catchment Farmer Solutions Project (FSP). viz. 45kgN/ha from dairy farms, and 16kgN/ha from drystock.

The tentative TDR rules reflect current thinking, and some of them are more tentative than others. The 500kgN minimum qualifying quantity is already in the Proposed District Plan. We have assumed a requirement that only land use change would qualify; that land management change would not. To reduce the margin of error associated with *Overseer* modelling, I have also assumed that only changes greater than 10% of benchmarked values would qualify for TDRs. Benchmarked values are assumed as the threshold from which TDR entitlement is derived. The N discharge levels correspond with allocations which over the pastoral catchment would achieve a sustainable load consistent with the 435tN target for Lake Rotorua by 2032.

Dairy example Option 1

Benchmark	Area, ha	kgN/ha	kgN
pasture	100	45	4500
trees	0	4	0
total	100		**4500**

N allocation	Area, ha	kgN/ha	kgN
pasture	100	**25**	2500
trees	0	4	0
total	100		**2500**

25 very difficult without land use change component

Dairy Option 1 - minimum to get 1 TDR and meet N allocation

Option 1	Area, ha	kgN/ha	kgN	kgN below BM
pasture	87	**28**	2448	1467
trees	13	4	52	533
total	100		**2500**	**2000**

1 TDR
> 500kgN
> 10% of BM

28 still very difficult

Here is my hypothetical dairy farm, with a benchmark of 45kgN/ha, which over 100ha corresponds to 4,500kgN. At a Nitrogen Discharge Allocation (NDA) of 25kgN/ha, the required reduction would be 20kgN/ha (2000kgN over 100ha). 25kgN/ha would be extremely difficult to achieve for a dairy farm in this catchment, on these soils, and with typical rainfall.

The Option 1 example, in terms of a mitigation option, explores the bare minimum that would generate a single TDR of 500kgN equivalence. The numbers have been manipulated to achieve a 500kgN reduction, and also meet the 10% of

benchmark threshold. Land management change down to 28kgN/ha (difficult to achieve) would not be eligible for TDRs, but the change from 25kgN/ha to 4kgN/ha on 13ha does qualify. Adding the 13ha of trees is necessary to meet the required average NDA of 25kgN/ha.

Dairy example Option 2

Dairy Option 2 – try 25% land use change and meet N allocation

Option 2	Area, ha	kgN/ha	kgN	kgN below BM
pasture	75	**32**	2400	975
trees	25	4	100	1025
total	100		**2500**	**2000**

2 TDRs
> 500kgN
> 10% of BM

32 more do-able

This option manipulates the numbers a bit further, to achieve 2 x TDRs and a more achievable nitrogen loss rate (32kgN/ha) from the balance of the dairy farm. This would require 25% of the dairy farm to be changed to trees to meet the average NDA of 25kgN across the whole farm. This would qualify for 2 x TDRs. Whether that is attractive or not will be up to individual farmers to decide, but these are the sort of numbers that might deliver that 25kgN/ha NDA.

Dairy example Option 3

Dairy Option 3 – try 100% land use change

Option 3	Area, ha	kgN/ha	kgN	kgN below BM
pasture	0	**na**	0	na
trees	100	4	400	na
total	100		**400**	**4100**

8 TDRs

A 100% land use change would be very costly in terms of capital value loss. This option would generate 8 x TDRs at 500kgN equivalence. Of course if the N equivalence was lower (eg.100kgN per TDR) you would create more TDRs; but this runs the risk of reducing TDR $ value by creating too many in the market place.

What loss of value for a dairy farm?

In the following table I have estimated the loss of land value; this is rather dangerous stuff, but I can speculate because I am not a council staff member. The table is busy, but please bear with me as I work through the detail. We have

Option 3 (100% land use change), and also Option 2 (25% land use change). The loss of land value is estimated for land use change at $20,000/ha, based on a dairy farm valuation in the mid to low $20K, and a forestry valuation of around $3000/ha. The numbers were provided to the Farmer Solutions Project by a valuer.

$ value	Option 3 - full LUC	Option 2 – 25% LUC
land value loss est. $/ha	20,000	20,000
gross value $ loss (LUC)	2,000,000	500,000
est. pasture land value loss	0	375,000
combined gross value loss	**2,000,000**	**875,000**
Incentive $/kgN	227.50	227.50
incentive $ rc'd	932,750	455,000
Shortfall	**1,067,250**	**420,000**
Consider TDR value		
breakeven value per TDR	133,406	210,000
estimate value per TDR	30,000	30,000
total TDR value	240,000	60,000
combined TDR & incentive	1,172,750	515,000
net value loss	**827,250**	**360,000**

FSP estimated $22,000/ha

20% less MS/ha, 20% less value/ha

Not credible

The 100 hectare dairy farm is losing about $2m in value with 100% land use change, and a little under $1m with partial land use change. With the partial land use change, I have also assumed a value loss of 20%, because dairy land tends to be valued on its milk solids production.

How is the value loss softened by incentives? The main incentive scheme assumes $227.50/kgN ($45.5m/200tN). Incentives certainly make a difference; we have chopped nearly $1m off the loss for Option 3, and half of that for Option 2.

The break-even value for a TDR would need to be $133,406 and $210,000 respectively – values which are unlikely to be realistic in the market place. If we assume $30,000 per TDR, and combine this with the main incentive package, we still end up with losses in value of $827,250 and $360,000 respectively.

This is an arbitrary exercise but does illustrate the potential financial impact. Perhaps, we need to structure the TDRs so that more incentive is available through the TDR mechanism?

Impact on the drystock example farm

This assumes an 8kgN/ha required NDA average for the property – it is probably impossible to practically farm at that level.

With a 25% land use change, and a challenging 12kgN/ha achieved on the balance of the farm, the 300kgN reduction achieved would not qualify for a TDR (because of the 500kgN required minimum reduction assumed); nor would that combination achieve the 8kgN/ha required NDA average.

To generate even 1 x TDR under these assumptions requires 50% land use change.

Benchmark	Area, ha	kgN/ha	kgN
pasture	100	16	1600
trees	0	4	0
total	100		**1600**

Allocation	Area, ha	kgN/ha	kgN
pasture	100	8	800
trees	0	4	0
total	100		**800**

8 impossible

Drystock Option 1 – try 25% land use change and 12

Option 1	Area, ha	kgN/ha	kgN	kgN below BM
pasture	75	12	900	300
trees	25	4	100	300
total	100		**1000**	**600**

Nil TDR

12 challenging

Above allocation

Drystock Option 2 – try 50% land use change and 12

Option 2	Area, ha	kgN/ha	kgN	kgN below BM
pasture	50	12	600	200
trees	50	4	200	600
total	100		**800**	**2000**

1 TDR

50% trees: viable?
Implies reconfiguration?

Is catchment change viable?

We know farmers are not that keen on farming trees instead of animals, but it also implies that we may need to do some creative thinking about re-configuration. There might be several dry stock farms that are able to collaborate in terms of a joint proposal to have a viable farm, a viable forestry block and advantage from TDRs.

Some TDR Lessons

These are some of the lessons that I have drawn out of it.

1. 100% land use change option is a major restriction, particularly for dry stock farms
2. TDR value will be better protected by restricting TDRs to land use change only
3. TDRs can be a useful ‘top-up’ to other incentive programmes.
4. 500 kgN per TDR leaves a value gap
5. 100-200kgN equivalence per TDR may add total value, but only if oversupply does not depress TDR value