Land Management Change & Land Use Change in the Lake Rotorua catchment

SUSTAINABLE LOAD ALLOCATIONS

Definitions

- StAG : Stakeholder Advisory Group
  = proud, and nimble on it's feet
- SHAG : StakeHolder Advisory Group
  = something else entirely
- RR : Reduction Responsibility (270tN from pasture)
- SLA : Sustainable Load Allocation (435tN total, **256tN for pasture ***)
  = Nitrogen Discharge Allowance (NDA)
- LUC : Land Use Capability
  Classes 2 - 8; 2 = high quality, 8 = steep

*** If forestry and bush do not receive increased allocations**

The ‘Straw Man’
- big picture overview

- This presentation attempts to take a ‘big picture look’ at what might be possible in the Lake Rotorua catchment

- The ideas and scenarios presented are only that
  - in **no way** is this a prescription of what **must** happen

The ‘Straw Man’
- big picture overview

- But … it is a picture of what ***could*** happen
- **The intent is to further the debate and stimulate discussion**

Two central issues to deal with

1. **The allocation of the 435tN sustainable load.** TODAYS TASK. **256tN*** of this can be allocated to pasture

2. **Incentives package** to remove 270tN from pasture

*** If forestry and bush do not receive increased allocations**

Data

Underpinning data is that used by NIWA in their ROTAN modelling

Catchment Loads (ex. NIWA)

Spreadsheet link

** *Amended on advice from BoPRC*				Attenuation Options from 725t N					
EXPORTS FROM Lake Rotorua Catchment *NIWA May 2011*	Area (ha)	N loss coeff. (kg/ha/yr)	Derived N loss coeff	N load (t/yr) TLI 4.8	Current Pasture Export	Required Total Redn	**Reqd Pasture Reduction**	Sustainable Export TLI 4.2	
Forest - General	19,594	4	3.68	72.20		0.0		72.2	*
Forest - Puarenga	1,588	2	2.02	3.20		0.0		3.2	
? Gorse 900ha (35-45tN)									
Unidentified Sources						**0.0**		**0.0**	
Pasture									
Pasture - Dairy	5,050	56	54.06	273.00					
Pasture - Drystock	15,072	16	15.66	236.00	525.7	270.0	270.0	**255.7**	
Lifestyle	1,053	16	15.86	16.70					
Geothermal									
Tikitere	28	1071	1071.43	30.00		30.0		0.0	
Whaka	31	10	9.68	0.30		0.0		0.3	
Urban & Sewerage									
RLTS	300	112	112.33	33.70		0.0		33.7	
Septic Tanks	308	85	85.06	26.20		15.0		11.2	
Urban	2,548	10	10.01	25.50	**	5.0		20.5	
Urban Open Space (UOS)	805	10	9.94	8.00		0.0		8.0	
Subtotal	*46,377*	*16*	15.63	***725***	*525.7*	*320.0*	*270*	*404.8*	
Rain *(direct to lake surface)*	8,079	4	3.71	30.00				30.0	
Totals	**54,456**	**14**	**13.86**	**755**	**526**	**320**	**270**	**435**	

= 93.4 tN

= 73.4tN

CURRENT LOAD		SUSTAINABLE LOAD		
Pasture N loss coeff. (kgN/ha)		**Load (t)**	**kgN**	**Sust. Pasture Load**
Current Pasture N loss coeff (kgN)	24.83	141.40	**28.00**	Dairy average (kgN/ha)
less required pasture reduction (kgN)	12.75	114.30	7.09	Implicit DStk / LStyle av.
Sustainable Pasture N loss coeff (kgN)	12.08	**255.70**	**12.08**	Aver.Sus. Pasture Load

To test spreadsheet for BAU : Change values in red to 54kgN/ha and 270tN

Various allocations for sustainable load can be tested in lower table

*** If forestry and bush do not receive increased allocations**

Could these figures change?

Possibly ... if a ROTAN re-run with updated parameters demonstrates the need, or other mitigations are identified

Irrespective ... the possibility of updates does not diminish the need to address the fundamental challenge

Allocations and policy will still require definition

Also need to reconcile various databases

… but the differences are not huge, and are unlikely to change the principles of allocation

eg. ROTAN = 21,175ha pasture

LUC database = 19,500ha pasture
(and what's in the 1136ha of Class 0 land?)

RDC database also at variance with ROTAN / BOPRC database

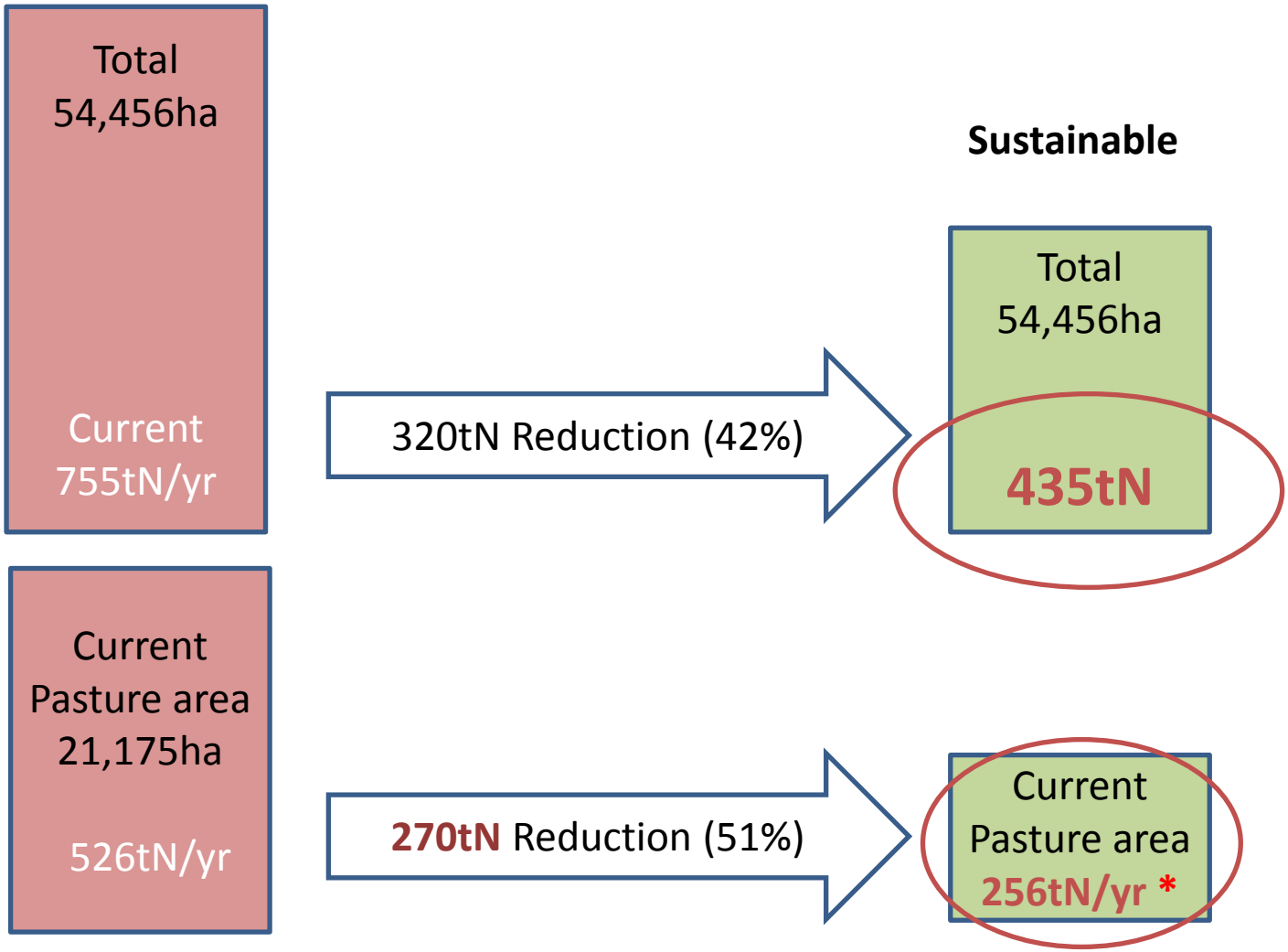
What land to include in allocations?

Land Class	0	2	3	4	6	7	8	Total	cf. NIWA		Sustainable Load	
Dairy	0	0	701	1444	2189	156	8	4499	5050	*112%*		
Drystock	83	291	2304	4153	6050	972	95	13948	15072	*108%*		
Lifestyle	1053							1053	1053	*100%*		
Pasture only	*1136*	*291*	*3005*	*5598*	*8239*	*1128*	*103*	***19500***	*21175*	*109%*	256tN	12kgN/ha
%	*6%*	*1%*	*15%*	*29%*	*42%*	*6%*	*1%*	*100%*				
plus												
Pines	114	16	662	1378	3608	1065	101	6944	*8800*	*127%*	35tN	4kgN/ha
Pasture + Pines	*1250*	*306*	*3668*	*6976*	*11847*	*2192*	*205*	***26445***	*29975*	*113%*	291tN	10kgN/ha
%	*5%*	*1%*	*14%*	*26%*	*45%*	*8%*	*1%*	*100%*				
plus												
Bush	245	31	694	2382	3953	1909	556	9769	*12382*	*127%*	40tN	
Pasture + Pines + Bush	**1495**	**337**	**4362**	**9358**	**15800**	**4101**	**760**	**36214**	*42357*	*117%*	331tN	8kgN/ha
% of land in each Class	*4%*	*1%*	*12%*	*26%*	*44%*	*11%*	*2%*	***100%*** *incl.L/Style*				

Sustainable Load

Pasture only	required average = 12kgN/ha
Pasture + Pines	required average = 10kgN/ha
Pasture + Pines + Bush	required average = 8kgN/ha

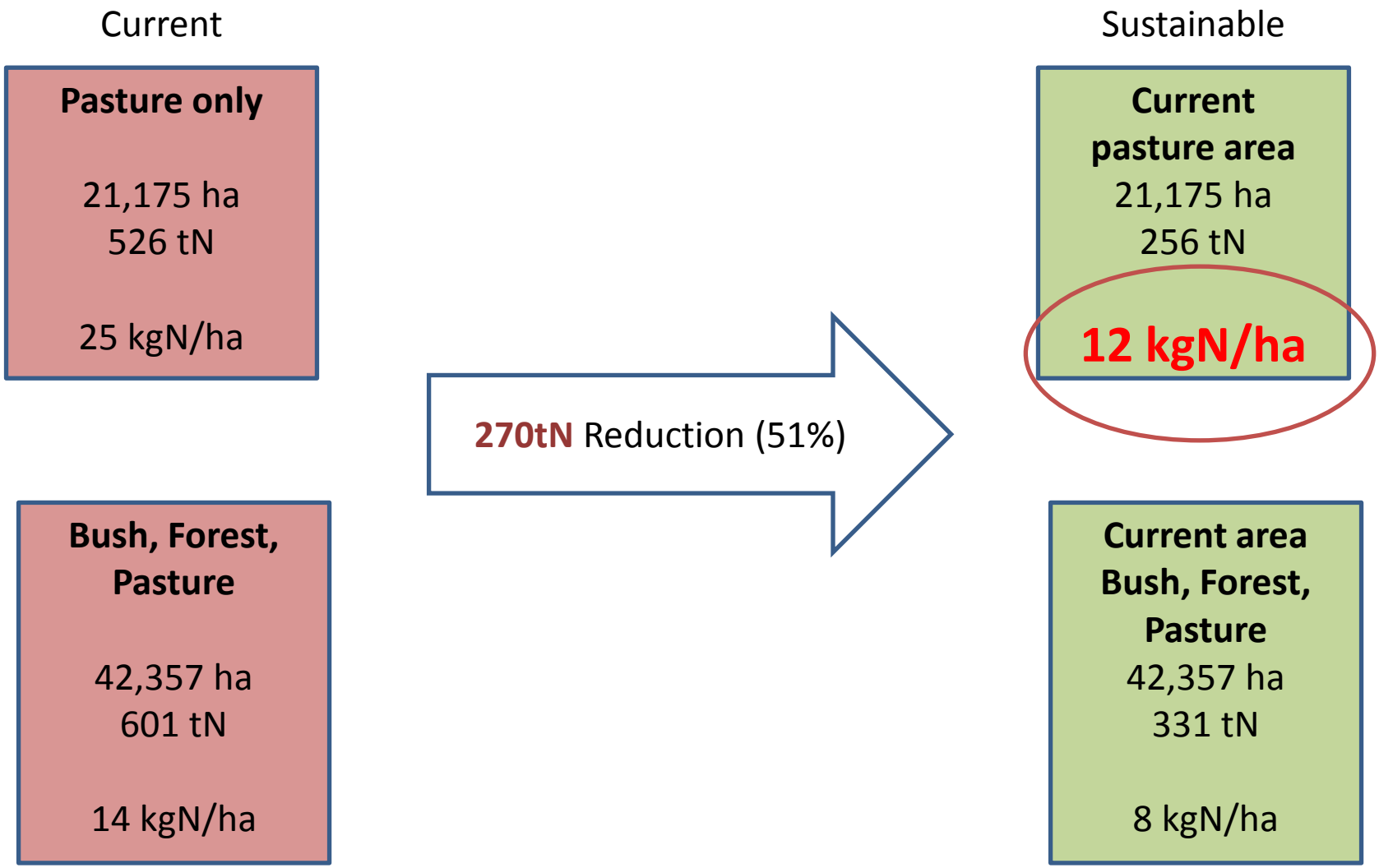
Target = 435t Sustainable Load to lake



*** If forestry and bush do not receive increased allocations**

51% leaching reduction required from pasture

If forestry and bush do not receive increased allocations



Sustainable Load Allocation (SLA)

What options?

1. **Grandparenting** – existing use at current discharge *(will not achieve 256tN sustainable pasture load target)*

2. **Sector average (modified grandparenting)** – existing use at modified and differential discharges to achieve 256tN target (eg. 28kgN/ha for dairy, 7kgN/ha for drystock)

3. **Pastoral average** - fixed and equal discharge (12kgN/ha) for every farmed hectare to achieve 256tN target

4. **Land Use Capability** – as basis for sustainable load allocation

Question

Is ‘existing use’ a fair basis to determine allocations?

Why - for example - should an existing dairy farm on poorer quality Class 6 land receive preferential allocation over higher quality Class 3 land currently in forestry or drystock?

Question

Is allocation by LUC the preferable basis?

Complex - most farms will have a mix of LUC classes.

Only 15% (approx) of the catchment is Class 2/3 land.
85% (approx) of existing pasture/pine landuse is on Class 4-8 land.

Is Land Use Capability a robust, scientific measure?

Is allocation by Land Capability relevant in this catchment?

Land Classification vs. Existing Use

How could allocation by LUC look?

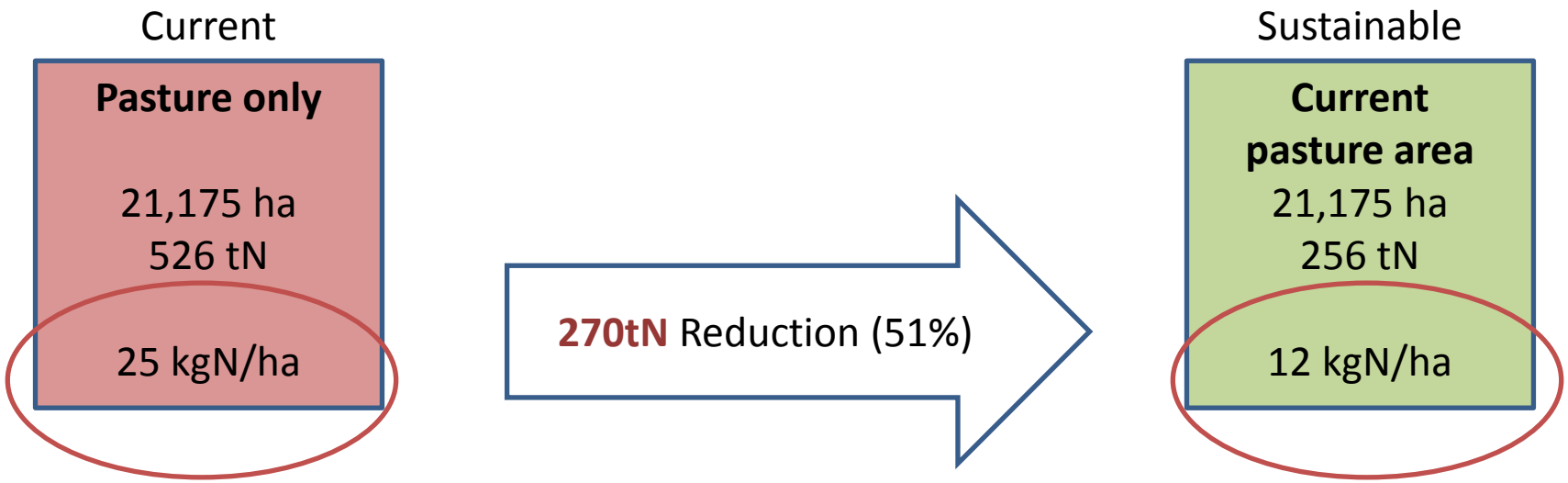
%	*6%*	*1%*	*15%*	*29%*	*42%*	*6%*	*1%*	*100%*	
Land Class	**0**	**2**	**3**	**4**	**6**	**7**	**8**	Totals	*Targets*
Pasture only	*1136*	*291*	*3005*	*5598*	*8239*	*1128*	*103*	***19500***	
Correction for area	x 109%	x 109%	x 109%	x 109%	x 109%	x 109%	x 109%	x 109%	
Corrected Area (ha)	1234	316	3263	6079	8947	1225	112	**21175**	*21,175*
Possible NDE Allocation	**20**	**18**	**16**	**13**	**10**	**4**	**3**	**12.10**	*12.08*
cf. Horizons (Year 20)		21	18	13	10	6	4		
	24,671	5,685	52,212	79,021	89,466	4,899	337	**256.29**	*255.70*

Note :

81% of existing dairy (& 73% of existing drystock) is on Class 4 or 6 land, which in the above scenario would attract only 13kgN or 10kgN NDA respectively

How else could we achieve 12kgN/ha for existing pasture land?

Combinations which will achieve 12 kgN/ha average for the existing pastoral catchment



Dairy		Drystock		Achieved average
5,050 ha		**16,125 ha**		
12 kgN/ha		12 kgN/ha		= 12 kgN/ha
25 kgN/ha		8 kgN/ha		= 12 kgN/ha
28 kgN/ha	+	**7 kgN/ha**	=	**= 12 kgN/ha**
35 kgN/ha		5 kgN/ha		= 12 kgN/ha
40kgN/ha		3 kgN/ha		= 12 kgN/ha

Other approximate combinations which include higher allocation to forestry but still meet target 291tN/29,975ha = 10kgN/ha *

Forestry		Drystock		Dairy		Achieved average
8,800 ha		**16,125 ha**		**5,050 ha**		
10 kgN/ha	+	10 kgN/ha	+	10 kgN/ha	=	= 10 kgN/ha
9 kgN/ha	+	9 kgN/ha	+	15 kgN/ha	=	= 10 kgN/ha
8 kgN/ha	+	8 kgN/ha	+	20 kgN/ha	=	= 10 kgN/ha
7 kgN/ha	+	7 kgN/ha	+	25 kgN/ha	=	= 10 kgN/ha
6 kgN/ha	+	6 kgN/ha	+	28 kgN/ha	=	= 10 kgN/ha

* approx. only

Worked example

Worked example

Uses Sector Averaging ('modified grand-parenting')

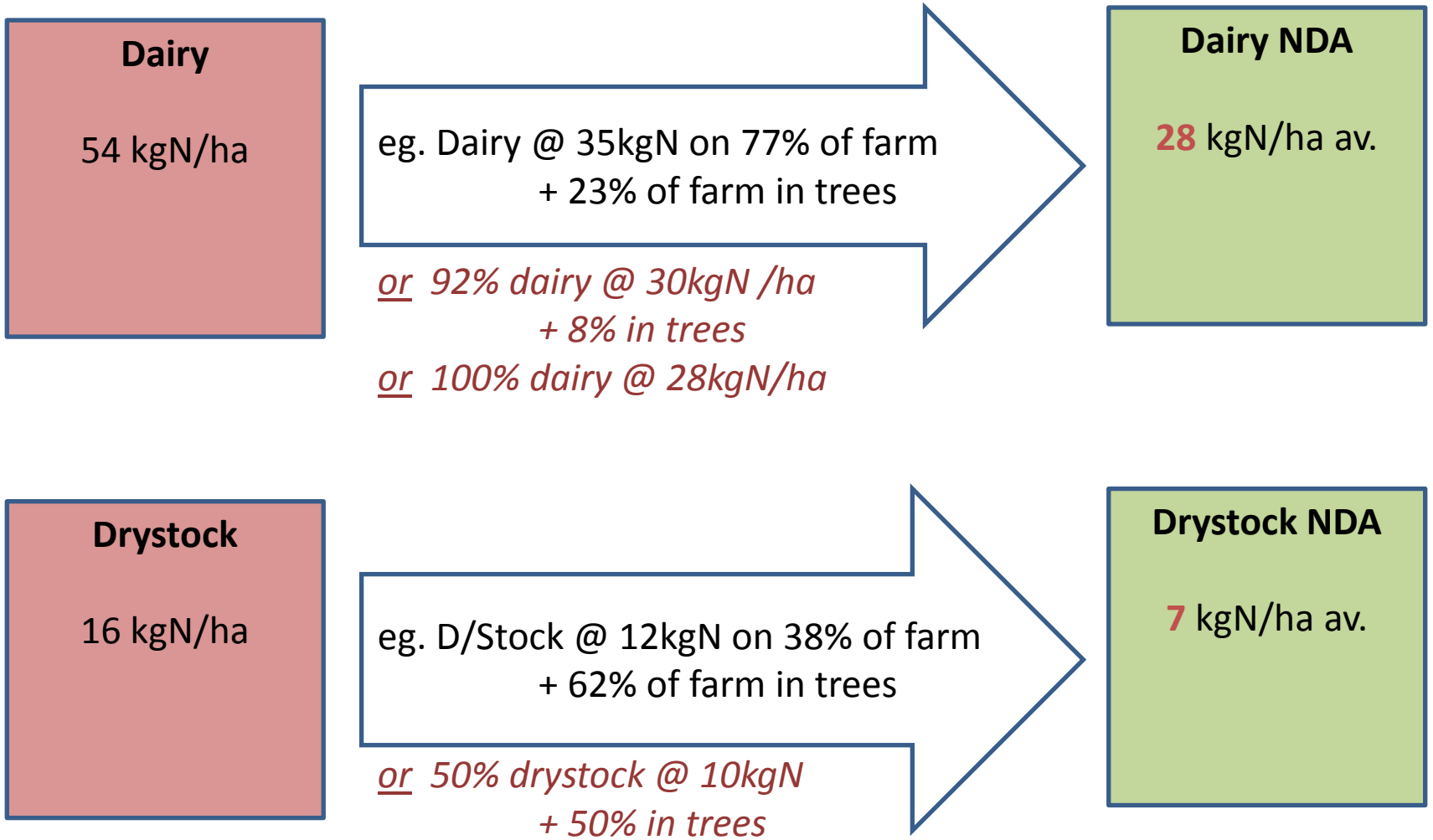
(could also add a **reducing cap** to achieve the sustainable load over a defined period)

For example:

5,050ha dairy x **28 kgN/ha**	= 141tN
16,125ha drystock / lifestyle x **7 kgN**	= 115tN
Sustainable pasture load (526tN less 270tN)	= **256tN**

28kgN/ha for dairy and 7kgN/ha for drystock … how could that look?

Only one of many possible scenarios!!



One of many possible scenarios ...

77% dairy retention, 38% drystock retention

DAIRY			*Dairy retained*	*3,889*	***Area (ha)***	**Area %**	***N Redn***	***N Redn***
Pre	***Post***		**56kgN/ha base**		**5,050**		**(kg/ha)**	**(Total t)**
54	45	LMC	**Non-subsidised redn**		5,050	100%	9	46
45	35	LMC	Subsidised reduction		3,889	77%	10	39
45	4	LUC	Dairy to lowest leach use		1,162	23%	41	48
						100%		**132**

D/STK & L/STYLE			*Drystock retained*	*6,047*	***Area (ha)***	**Area %**	***N Redn***	***N Redn***
Pre	***Post***		**16kgN/ha base**		**16,125**		**(kg/ha)**	**(Total t)**
16	14	LMC	**Non-subsidised redn**		16,125	100%	2	24
14	12	LMC	Subsidised reduction		6,047	38%	2	12
14	4	LUC	Drystock to lowest leach use		10,078	63%	10	101
						100%		**137**

Will achieve 92% dairy retention if can farm @ 30kgN/ha discharge
& 100% if can farm @ 28kgN/ha discharge

SUMMARY			
Class	Unfunded	Purch N	N Redn
Dairy N	46	87	132
D/Stk N	24	113	137
TOTAL N	**70**	**199**	**269**
Targets	70	200	270

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