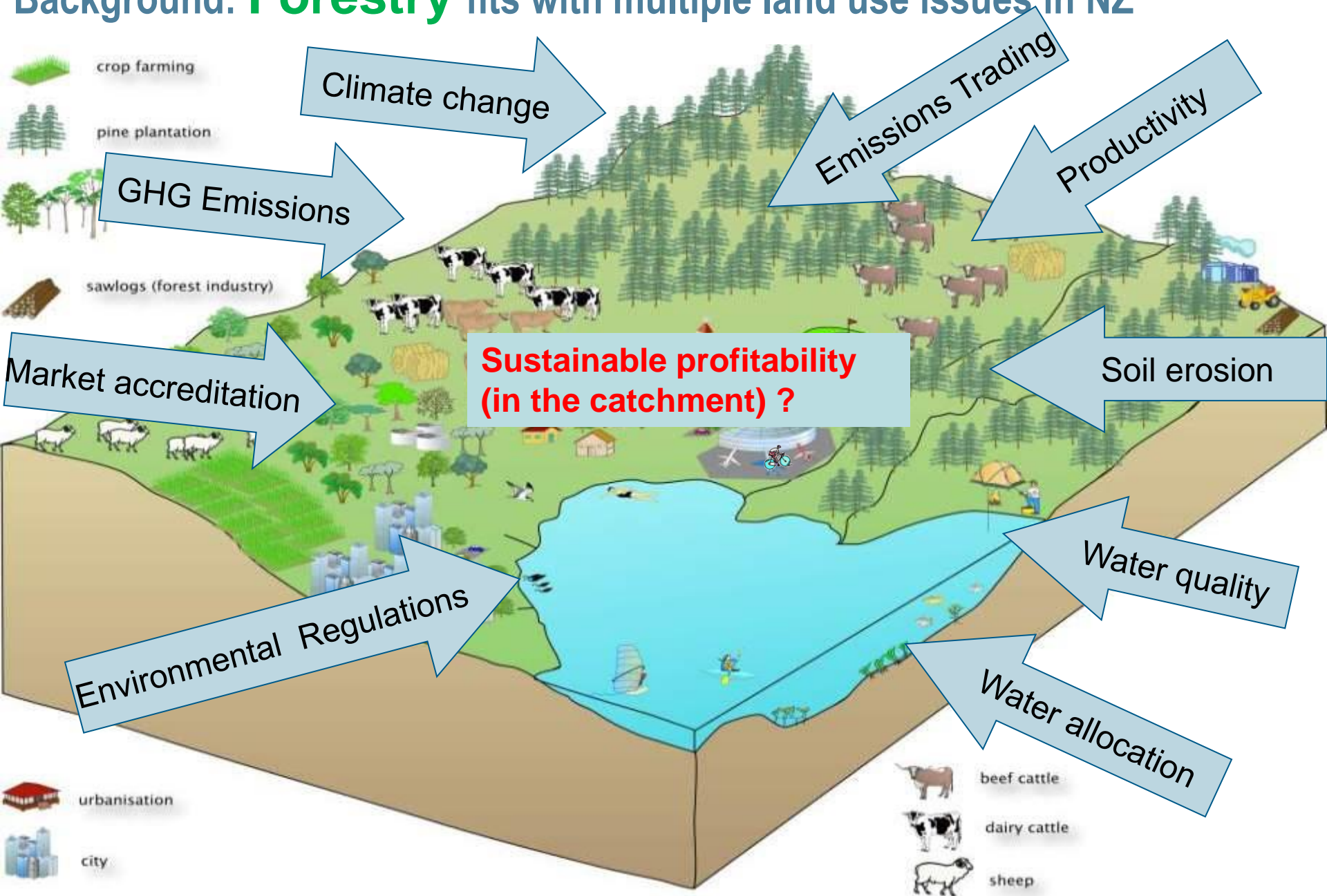


Where does forestry fit in your property and how does it balance economic and environmental objectives?

Graham West
Principal Technologist
17 June 2015



Background: **Forestry** fits with multiple land use issues in NZ



What did we learn with Lake Taupo N scheme?

- Mike Barton (Lake Taupo Beef)

“If productivity can not increase with costs then product price needs to rise based on products certified for the (sustainable) catchment”.

“Carbon trading essential to the N scheme”

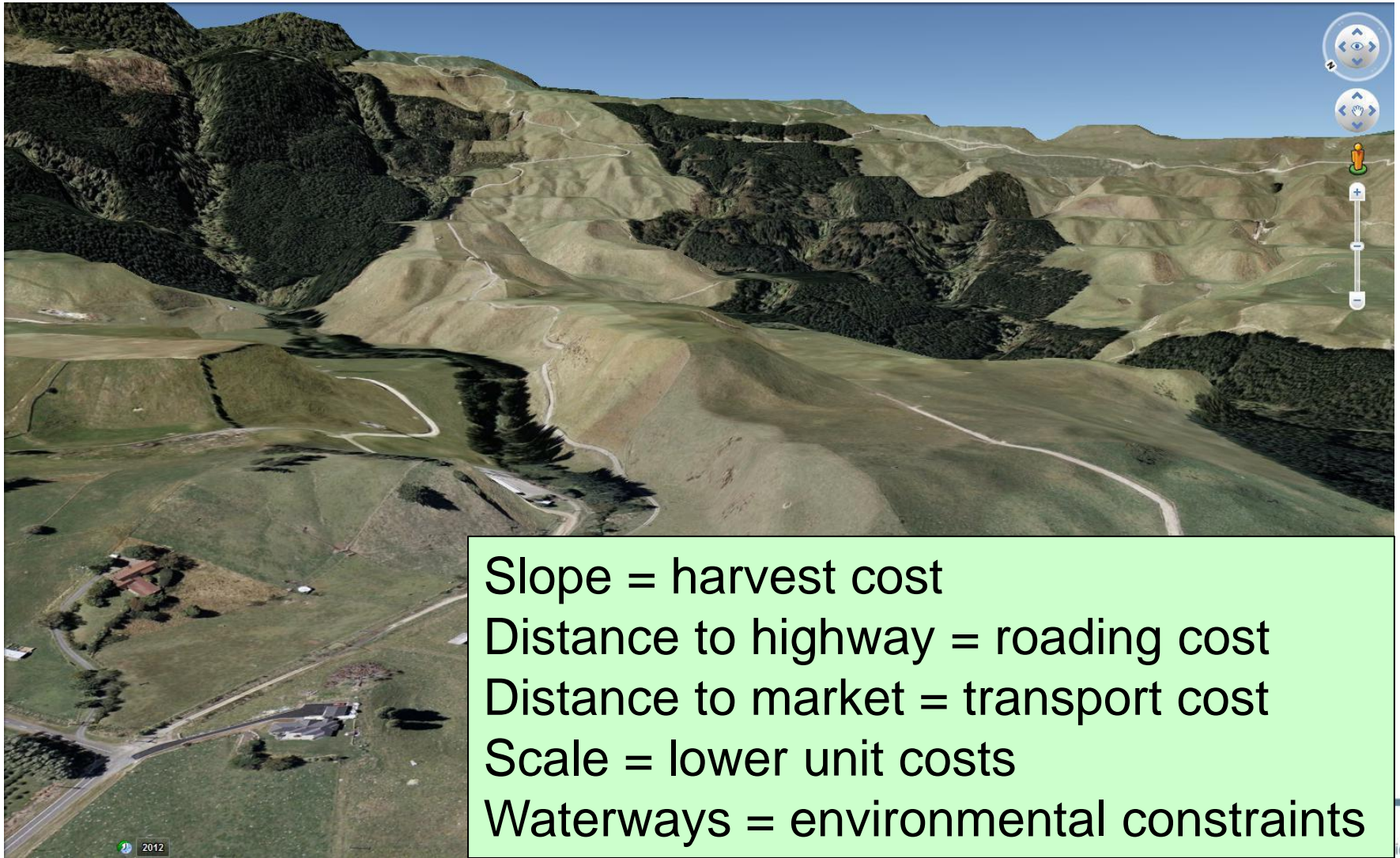
“A need for “whole system models”

<https://www.youtube.com/watch?v=Aj88IEWlnK4>

Forestry specific issues

- Location, location, location!

The Flaw of Averages



Slope = harvest cost

Distance to highway = roading cost

Distance to market = transport cost

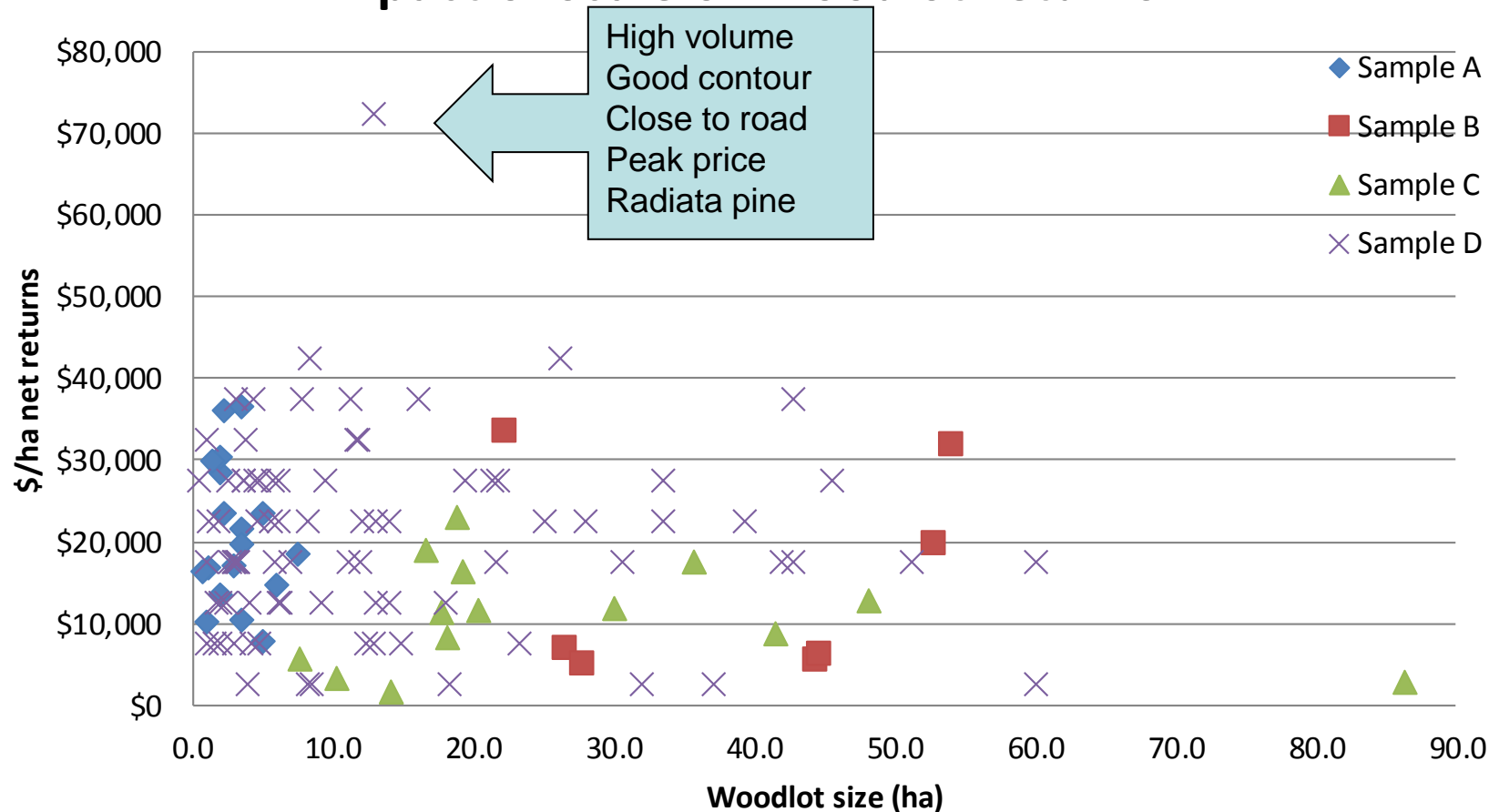
Scale = lower unit costs

Waterways = environmental constraints

Range of net returns from forestry

(123 woodlots harvested in 2014 - 15)

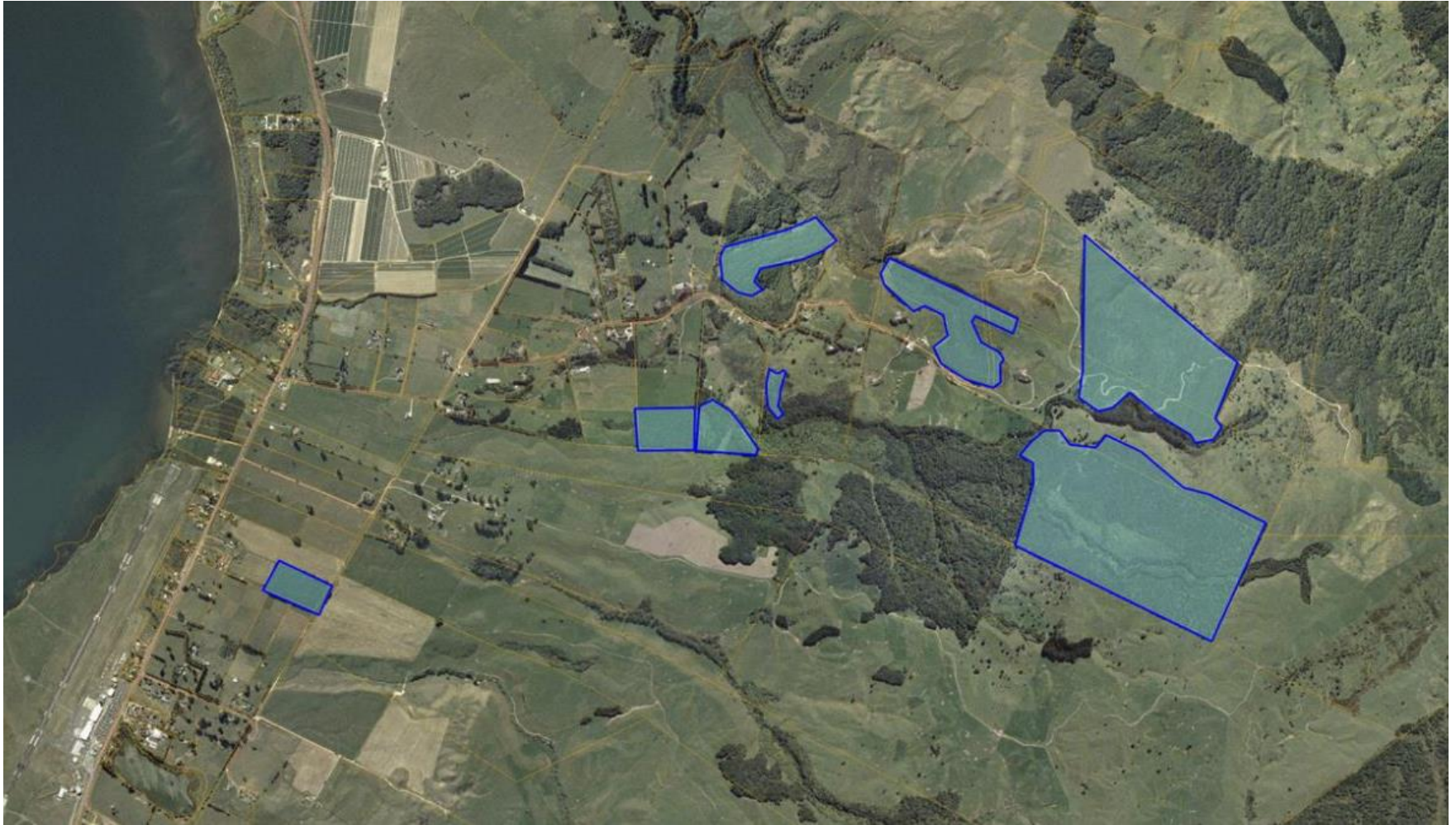
Impact of scale on woodlot returns



Genetic improvement increases volumes by 10-15%

Forestry specific issues

- which block will make the most profit?

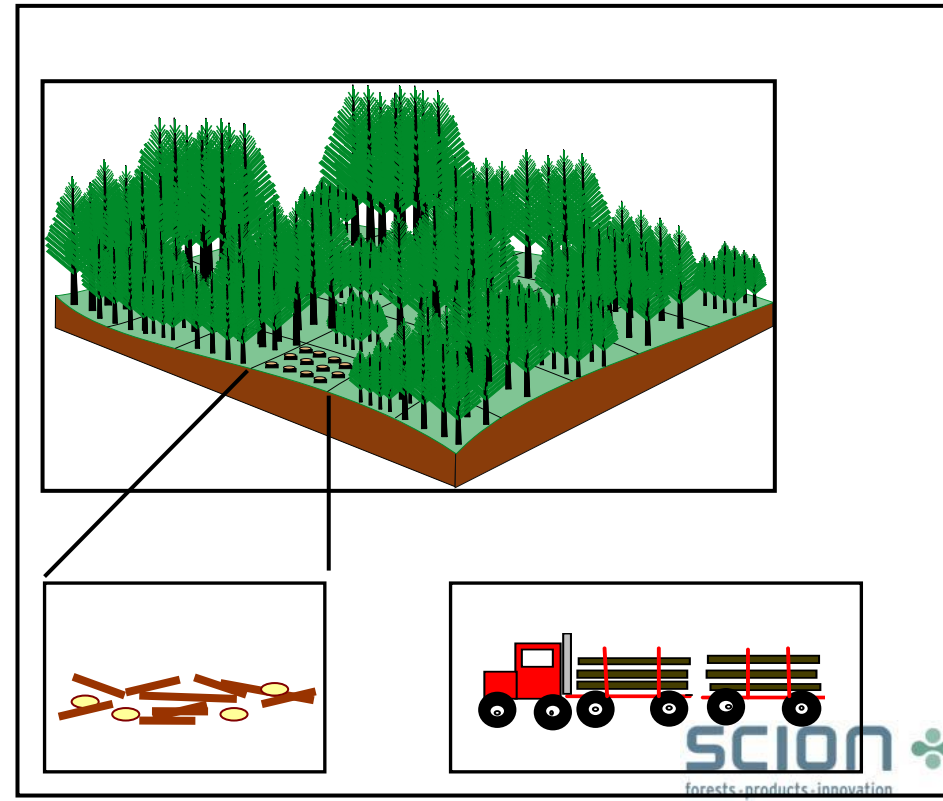
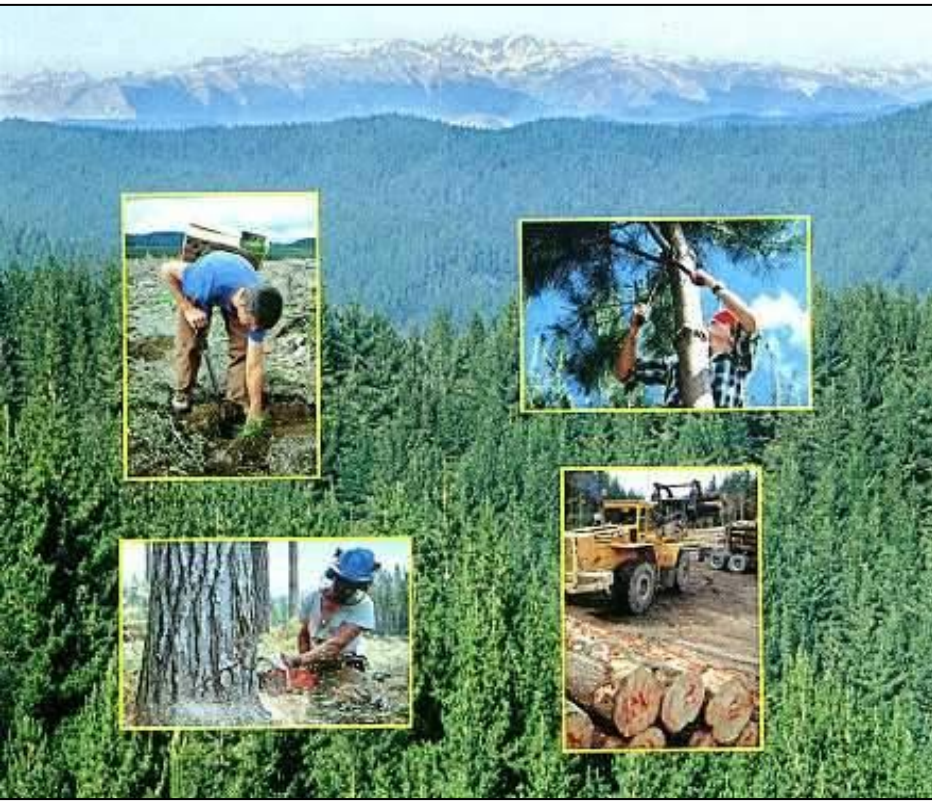


Forestry specific issues

- Timing, timing, timing!

Tax liability spread back over current + 3 years

- planting → tending → harvest → Tax
- Forestry business model = Continuous cropping
- Life planning – succession, intergenerational

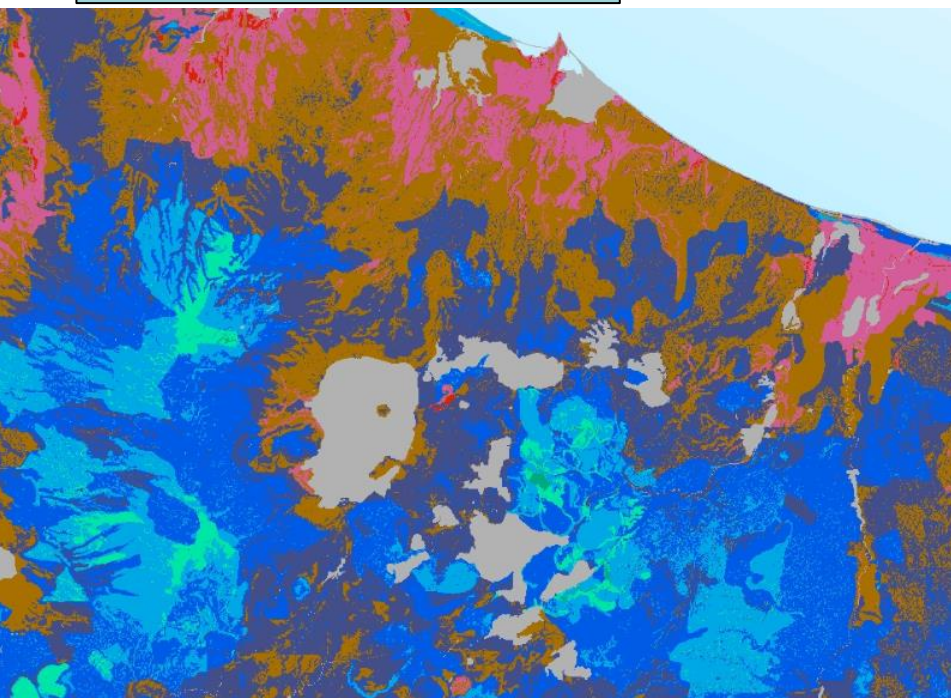


Forestry specific issues

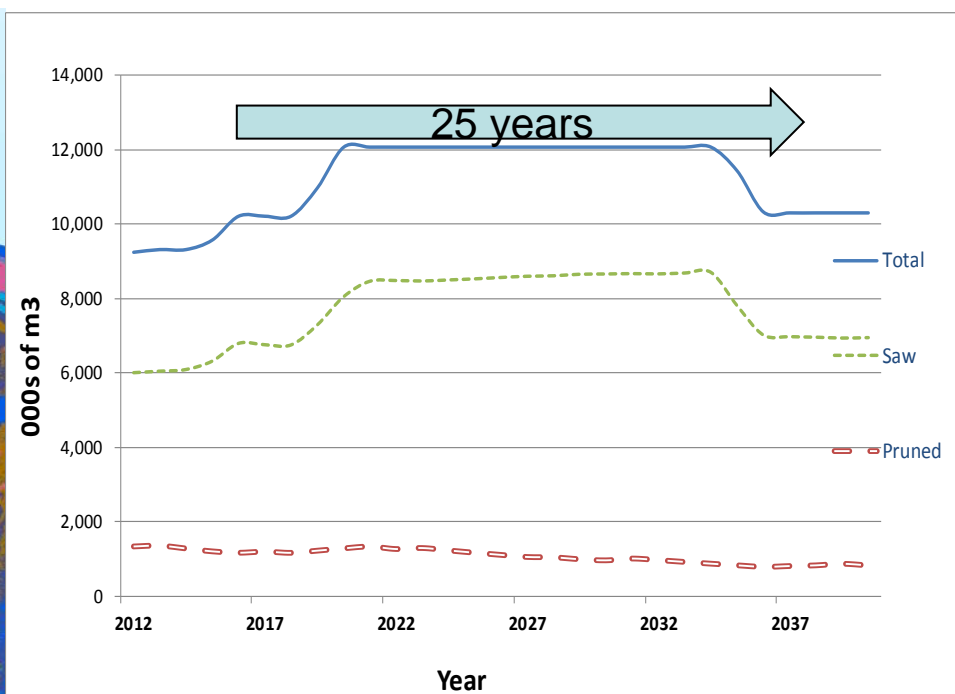
- R&D - Forecasting yields & Increasing wood supply,

Productivity map – Radiata pine volume

$32 \text{ m}^3/\text{ha}/\text{yr} = 13,000\text{kg DM}$



CNI regional wood supply



28-30

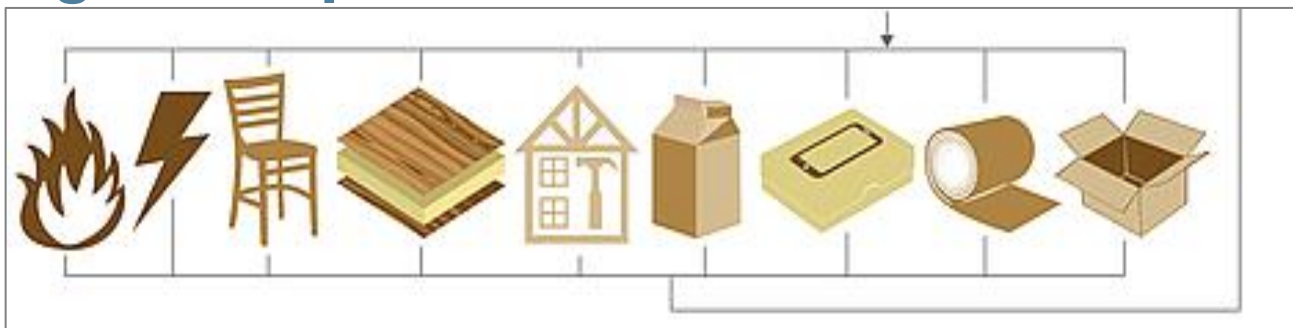
30-32

32-35

35-37

Volume growth $\text{m}^3/\text{ha}/\text{yr}$

What target end product?



- **Solid wood** – lumber, posts & poles
- **Engineered** – Laminated beams, LVL, CLT
- **Panels** – MDF, particle Board, Plywood
- **Fibre** – export pulp, tissues, newsprint, packaging
- **Extractives** – transport fuel, tall oil, cleaning products, disinfectants, inks, fragrances, soaps
- **Health products** - Antioxidants & anti-inflammatory bioflavonoids from bark

www.enzogenol.com

What future market for end products?

1 cubic metre of wood can contain:

- 0.5 m³ Lumber or Fibre
- 650kg CO₂ gas
- 6.9 Gigajoules of heat (\$300 electricity)
- 95 litres biodiesel
- 140 litres ethanol



Forestry specific issues

- Aesthetics – species, mosaics, planting rows, boundaries

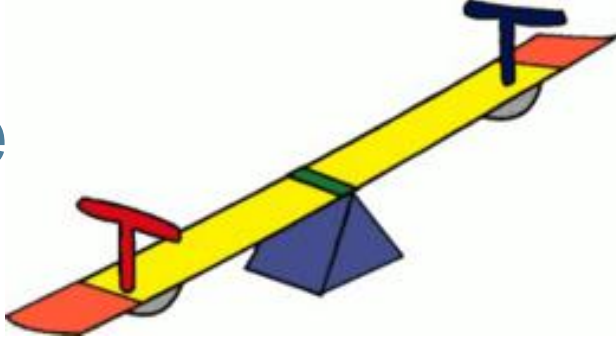


Finding the right Balance of Land Use goals

Profit	✓
ROI	✓
Water Quality	✓
GHG	✓
Biodiversity	✓
Animal welfare	✓
Lifestyle	



Forestry in the environmental balance



GHG emissions

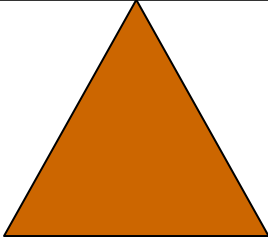
+ and - = balance

Dairy 12 t CO₂ /ha
S&B 4 t CO₂ /ha

Forestry -24 t CO₂ /ha
Manuka -3 t CO₂ /ha



Dairy 45 kg N/ha
S & B 12 kg N/ha



Forestry 3 Kg N/ha
Manuka 3 Kg N/ha

Nitrate in ground water



Reduces input to future catchment total

Whole System Analysis for Land Use options

- N & P
- CO₂
- Sediment
- E. coli
- Biodiversity

Catchment Certified as sustainable ?

Scenario	Land Use (proportion of total property)					Net profit /ha	Net profit/kg DM	Nitrate in ground water per ha	Nitrate in ground water for property	Sale/ purchase of N credits	Livestock GHG emmisions	Sale/ purchase of CO ₂ units	Combined Profit /ha (incl Eco system sales or costs)
Use system	Sheep	Beef	Dairy	Forest	Conservatn/ Riparian	EBIT \$/ha/yr	cents/Kg	NO ₃ Kg/ha	kg	\$/ha	kg/ha/yr CO ₂ e	\$/ha	\$/ha
A	55%	35%			10%	304	4.00	10.6	2120	19.2	3,100	- 15.5	308
B	55%	25%		15%	5%	296	3.62	9.6	1910	27.6	- 1,000	2.5	326
C		85%		10%	5%	363	4.18	12.3	2460	5.6	1,600	- 8.0	361
D			95%		5%	310	2.71	42.9	8570	-238.8	11,250	- 56.3	15
E			80%	20%		303	2.61	36.6	7320	-188.8	4,600	- 23.0	91
F	70%	20%			10%	289	3.87	10.0	2000	24.0	2,800	- 14.0	299
G	25%	40%		35%		309	3.39	9.2	1830	30.8	- 6,000	15.0	355
H			60%	40%		280	2.50	28.2	5640	-121.6	- 2,800	7.0	165
I	25%	25%	25%	25%		309	3.17	18.0	3600	-40.0	- 1,250	3.1	272
J				90%	10%	189	2.09	2.9	580	80.8	- 22,800	57.0	327
Optimised		83%		17%		370	4.04	12.2	2433	6.7	0	- 0.0	377

Some of the key price Variables in land use trade offs

	Milk Price	Beef Price	Lamb	Log price	N Cap	N price	CO ₂ cap	CO ₂ price	Manuka Honey	Discount rate
	\$/kg MS	cents/kg	\$/head	\$/t net	kg/ha	\$/kg	kg/ha	\$/t	\$/kg	%
Bottom	3.5	300	40	25	3	150	4,000	2	15	2
Low	4.5	360	60	40	10	225	4,000	8	35	4
Medium	5.5	420	80	55	25	300	8,000	14	55	6
High	6.5	480	100	70	40	375	12,000	20	75	8
Peak	7.5	540	120	85	55	450	16,000	26	95	10

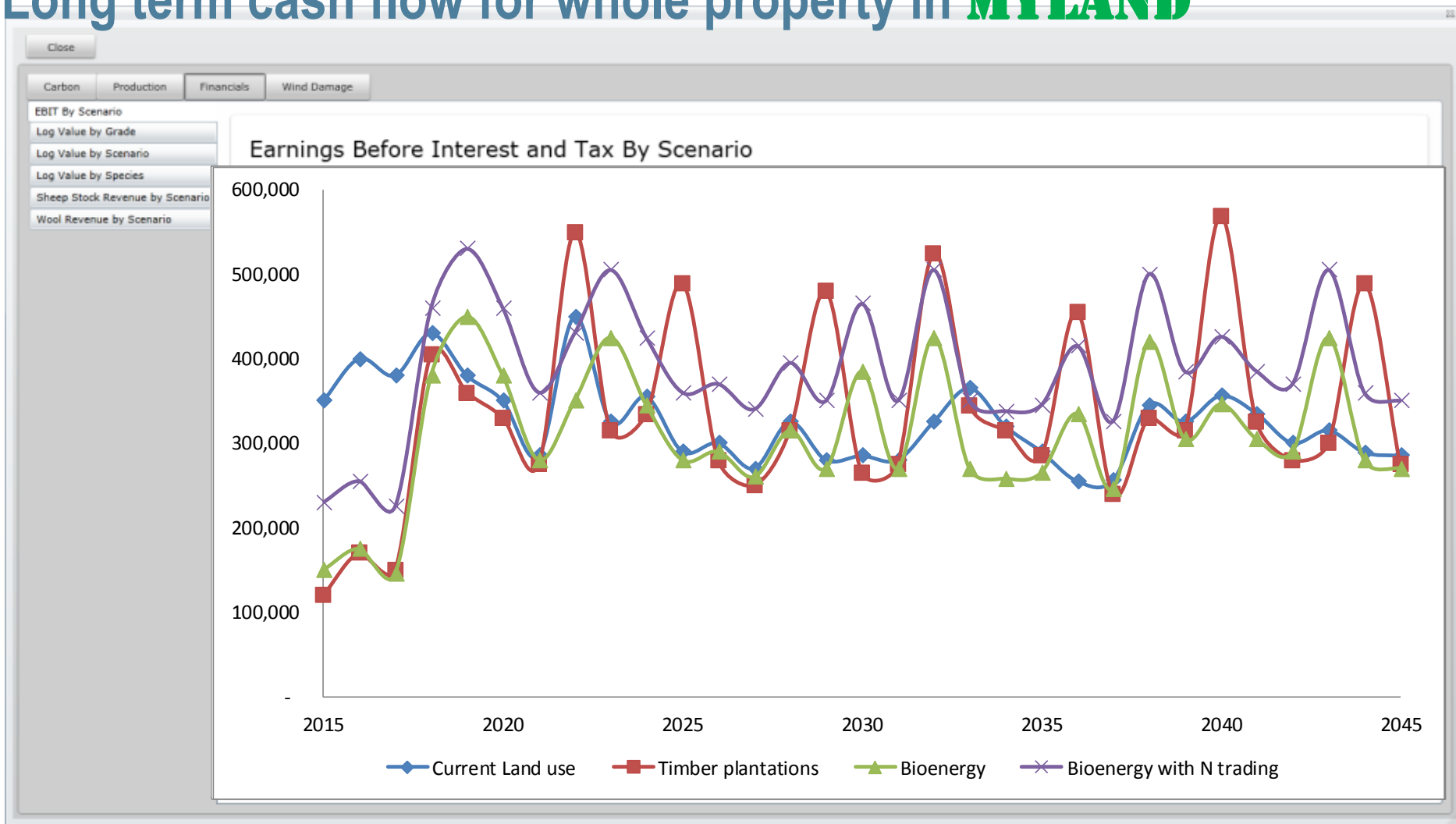
Land use	Emissions		EBIT/Annuity (\$/ha/yr)	
	N (kg/ha/yr)	CO ₂ (t/ha yr)	N trading	N & CO ₂ trading
Sheep	10	3	\$ 635	\$ 643
Beef	14	5	\$ 650	\$ 642
Dairy	45	12	\$ 704	\$ 640
Forest	3	-24	\$ 866	\$ 972
Manuka	2	-4	\$ 710	\$ 742

Economic trade-offs

Milk price/N price tradeoff for Dairy EBIT (\$/ha) - buy 10 kg N/ha				
	Milk Solids price (\$/kg)			
	4.0	5.0	6.0	7.0
0	-398	636	1671	2705
200	-518	516	1551	2585
400	-638	396	1431	2465
600	-758	276	1311	2345

The bottom line: **EBIT** or **net Profit**

Long term cash flow for whole property in **MYLAND**



Financial structures for forest investment

1. Carbon Emitter; Investor; Land Owner
2. Managed Carbon Investment Funds
3. Farm Plans with a Regional Council JV on Carbon
4. Afforestation Grant Scheme (\$1300/ha) – carbon 10 yrs
5. Joint ventures with Forestry Companies
6. Investment by land owner or their children

Key legal instruments are:

“Forestry Rights registration Act 1983”

“Climate Change Response (Emissions Trading) Amendment Act 2008”

Summary - So where does Forestry fit ?



- **Location** and **timing** key are drivers
- Considerable **opportunity** for diverse end products from underpinning **Research & Development**
- Helps **balance** multiple objectives demanded by **sustainability**
- Helps cash flow risks with income from **environmental services**
- Options analysis needs a “**Whole System**” and “**Whole property cash flow**” approach
- Several financial instruments available and develop a **long term plan** that includes **aesthetics**



Thank you