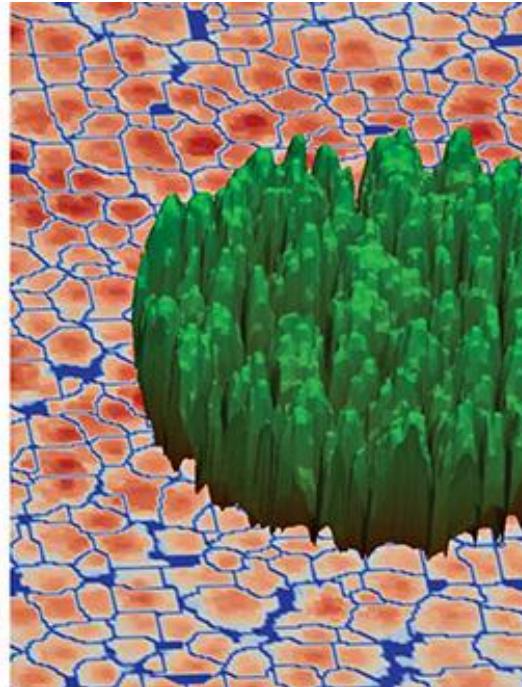


# Integrating forestry into the landscape: A profitable and environmentally sound alternative to cope with uncertainty

Juan J. Monge



# Objectives

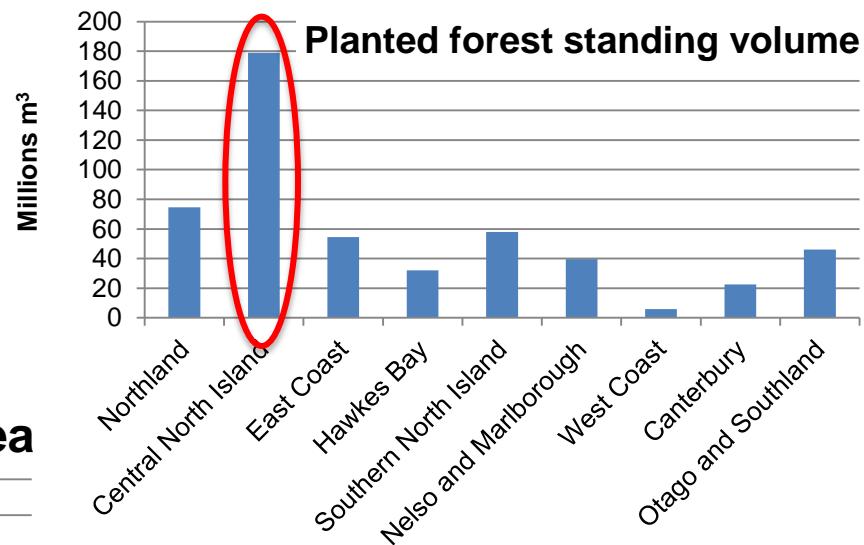
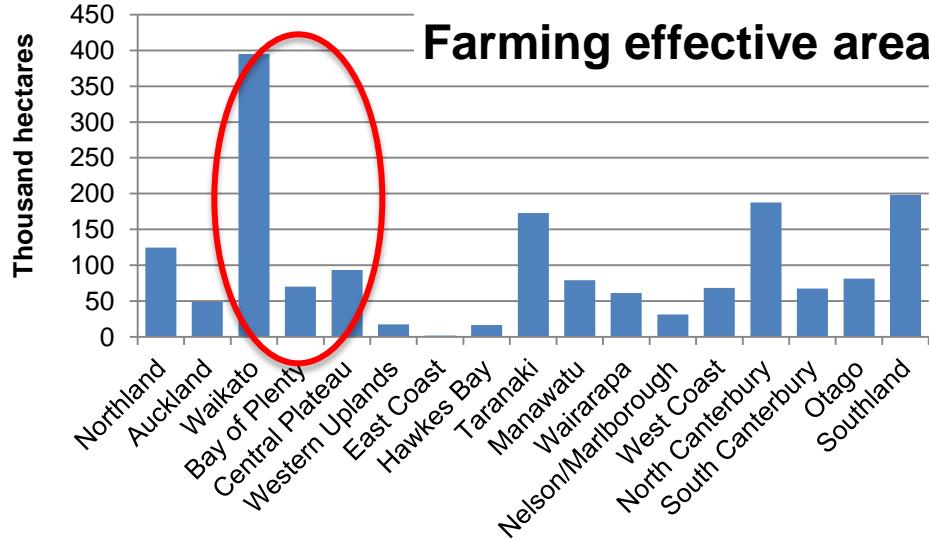
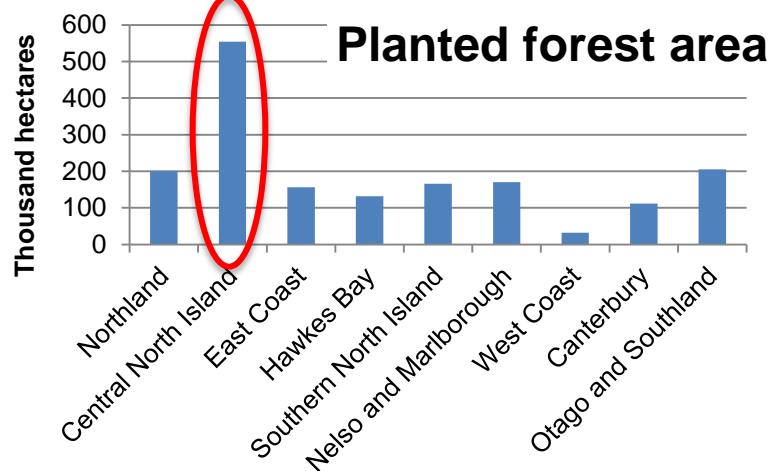
- Contextualize forestry's importance as an industry
- Compare apples to apples – per year per hectare
  - Economic and environmental
- Identify complementarities
- Analyze risk and uncertainty for land-use alternatives
- Scenario analysis of environmental policies

# Land use drivers

- Economic
  - Profits
  - Land values
- Land quality
  - Prime
  - Marginal
- Risk attitudes
  - Averse
  - Lover

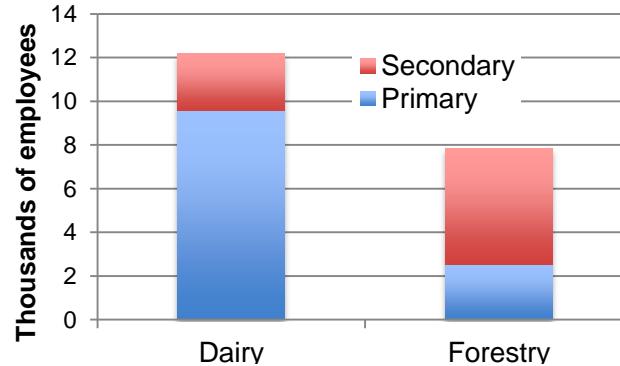


# Why the Central North Island?

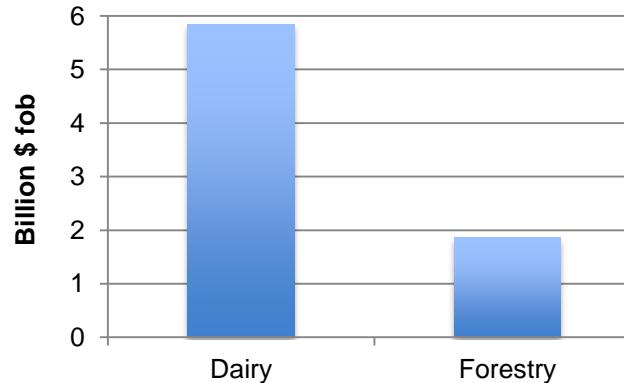


# General economic facts

- Employment



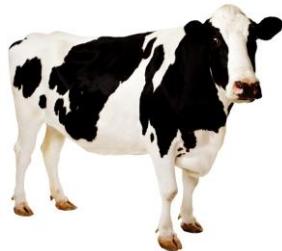
- Exports from Port of Tauranga



# Apples to apples comparison

## Dairy

- Annual
- Milk solid kilograms



## Forestry

- 28 years
- Cubic meters

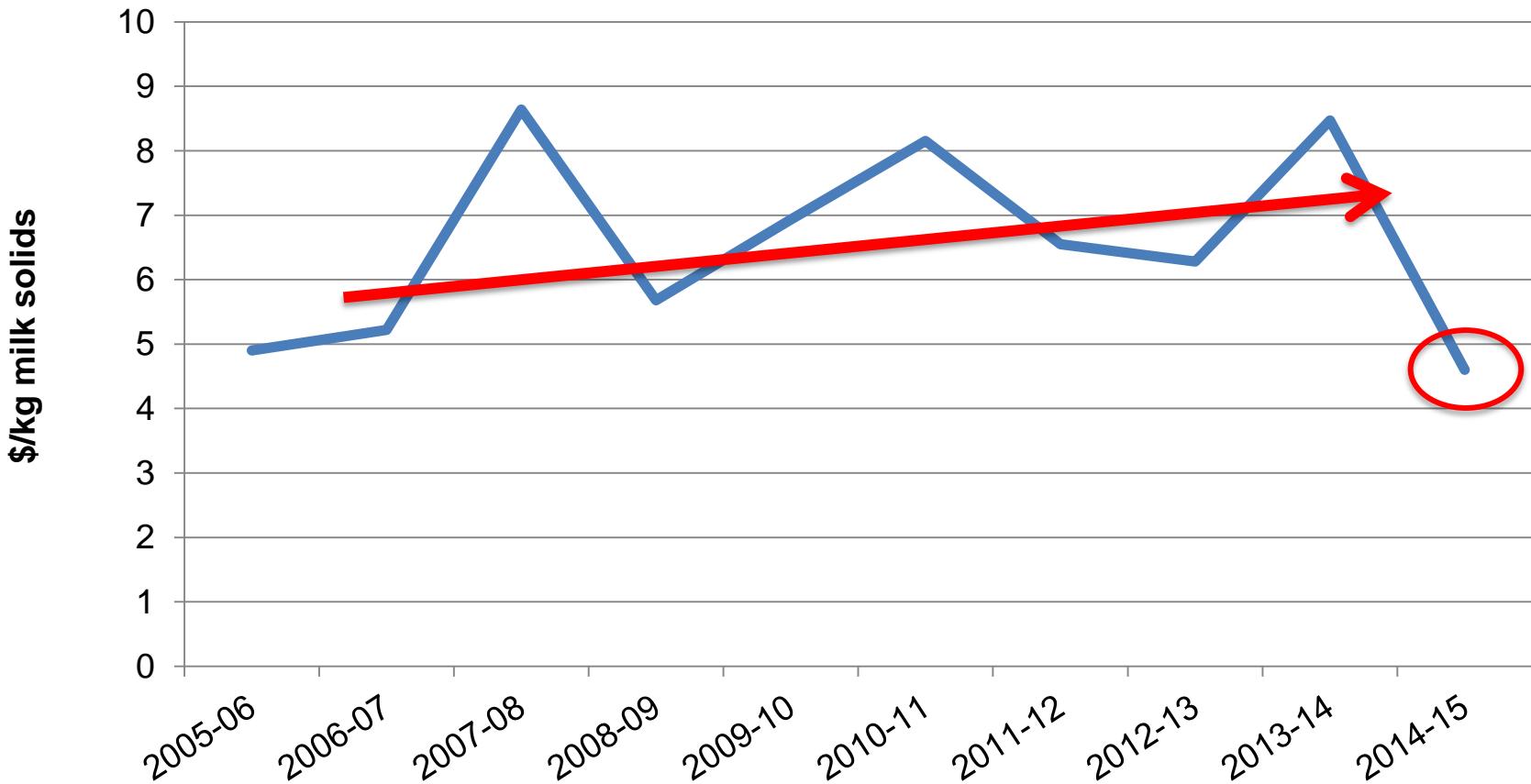


Land

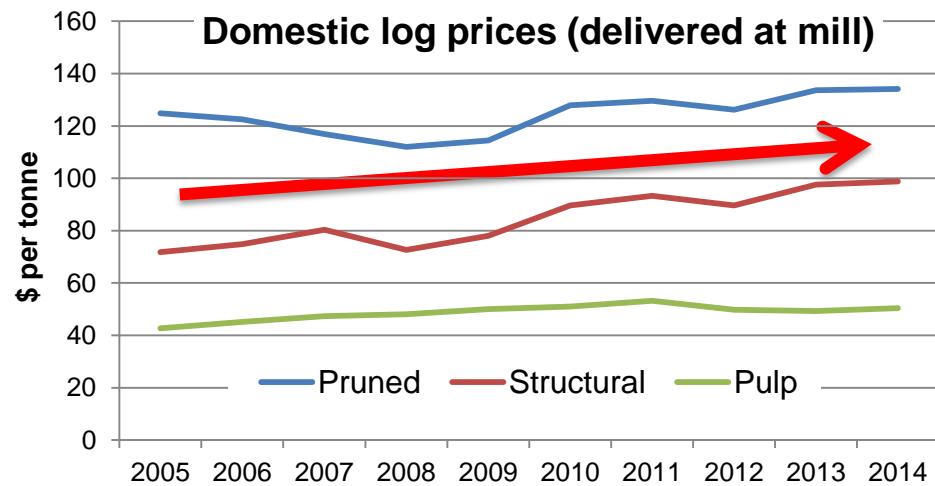
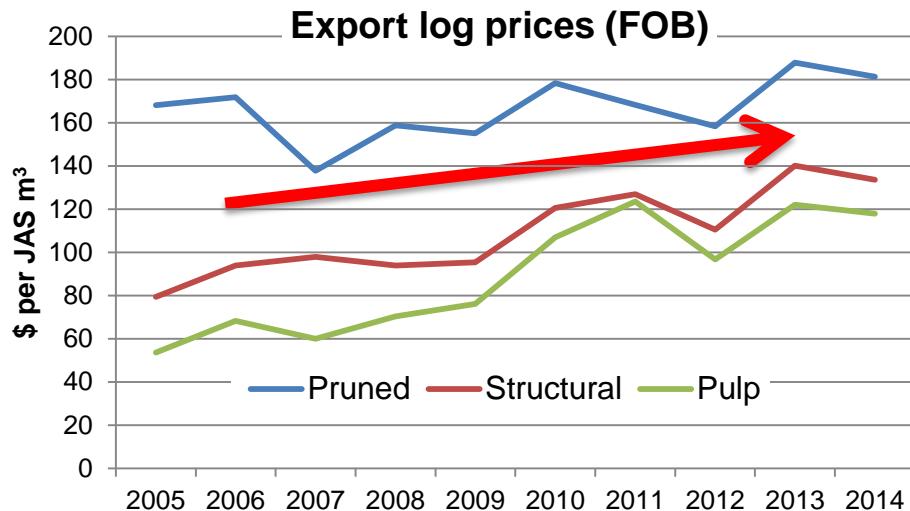


Per hectare

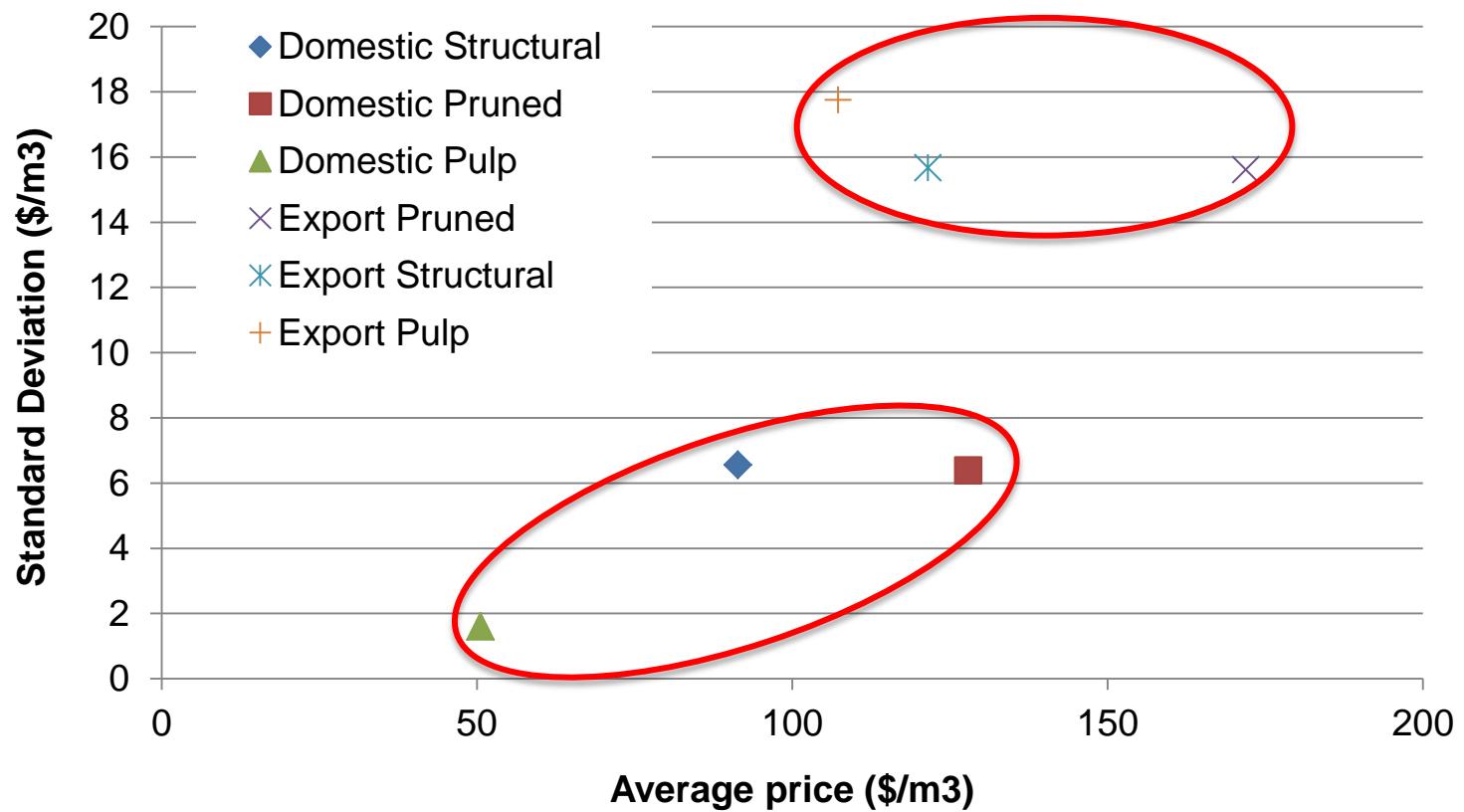
# Historical dairy payout



# Historical log prices



# Log price volatility



# Nitrogen and carbon payments

	Dairy	Forestry
Yield*	1,017 kg MS/ha	696 m <sup>3</sup> /ha **
Price	\$6.54/kg MS ***	\$87/m <sup>3</sup> ****
Nitrogen	50 kg/ha	3 kg/ha

\* Representative of a hectare in the CNI

\*\* Yield for a structural regime

\*\*\* 10-year average

\*\*\*\* Weighted average between export (\$99/m<sup>3</sup>) and domestic (\$75/m<sup>3</sup>)

- \$40 million from government to remove 100 tonnes of N
  - Results in a price of \$400/kg nitrogen
  - Afforestation of pasture: 47 kg/ha lower
  - Lump sum payment of \$18,800/ha and capitalise over 28 years
- Carbon price (current): \$6.8/NZU

# Operating expenses

## Dairy

<b>Annual expense items</b>	<b>\$/ha</b>
Farm working expenses	4,180
Management expenses*	748
<b>Total expenses**</b>	<b>4,928</b>

\* Include labour adj., admin., insurance, ACC and rates.

\*\* Exclude adj. factors (inventory, supp. block) and depreciation.

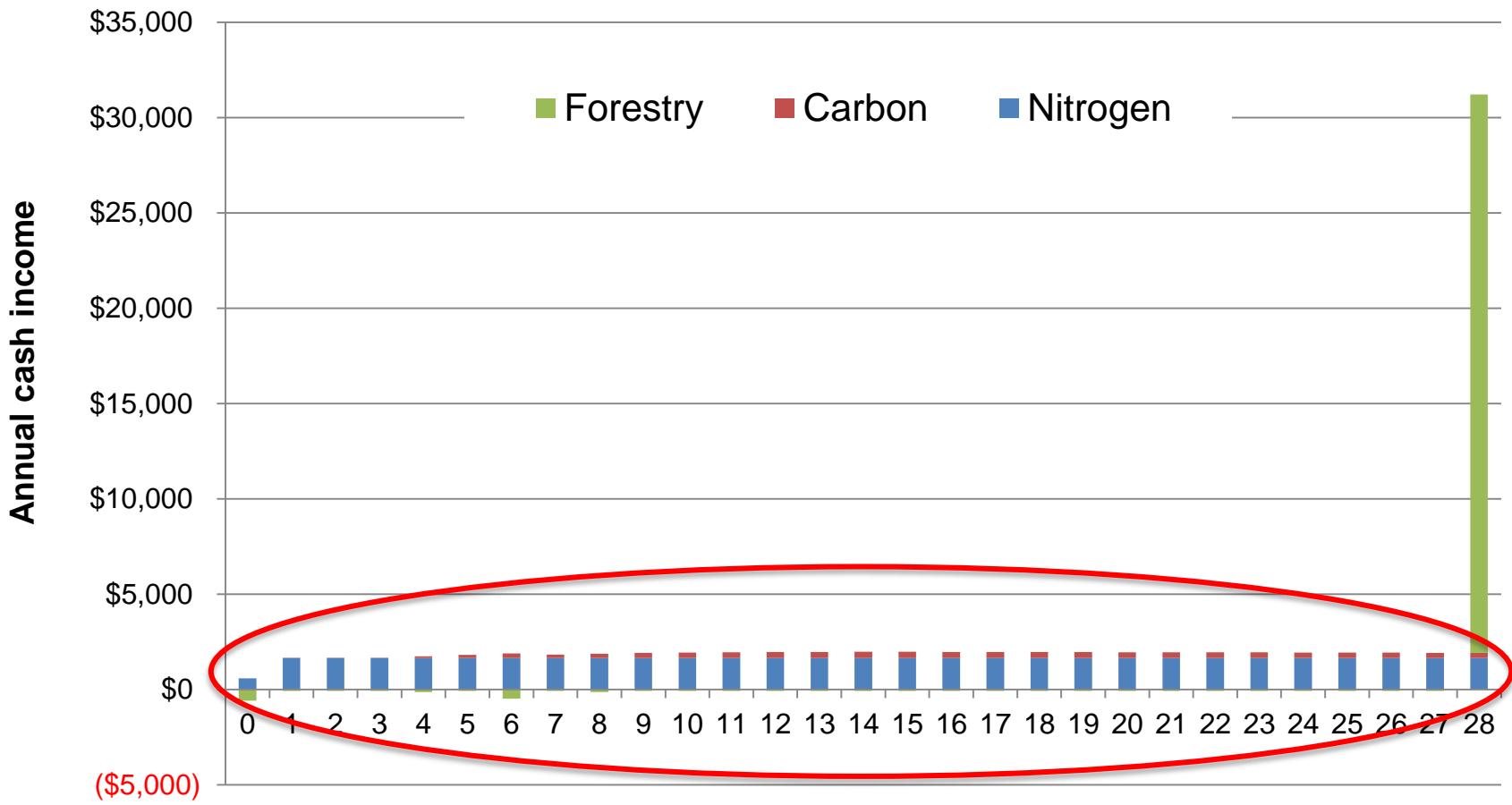
## Forestry

<b>Year</b>	<b>Expense items</b>	<b>\$/ha</b>
0	Site Prep	80
0	Planting	500
4	Dothistroma	60
6	Thin to Waste	405
8	Dothistroma	60
28	Roading	2,000
28	Harvesting*	17,400
28	Transport*	13,920
All	Management**	80

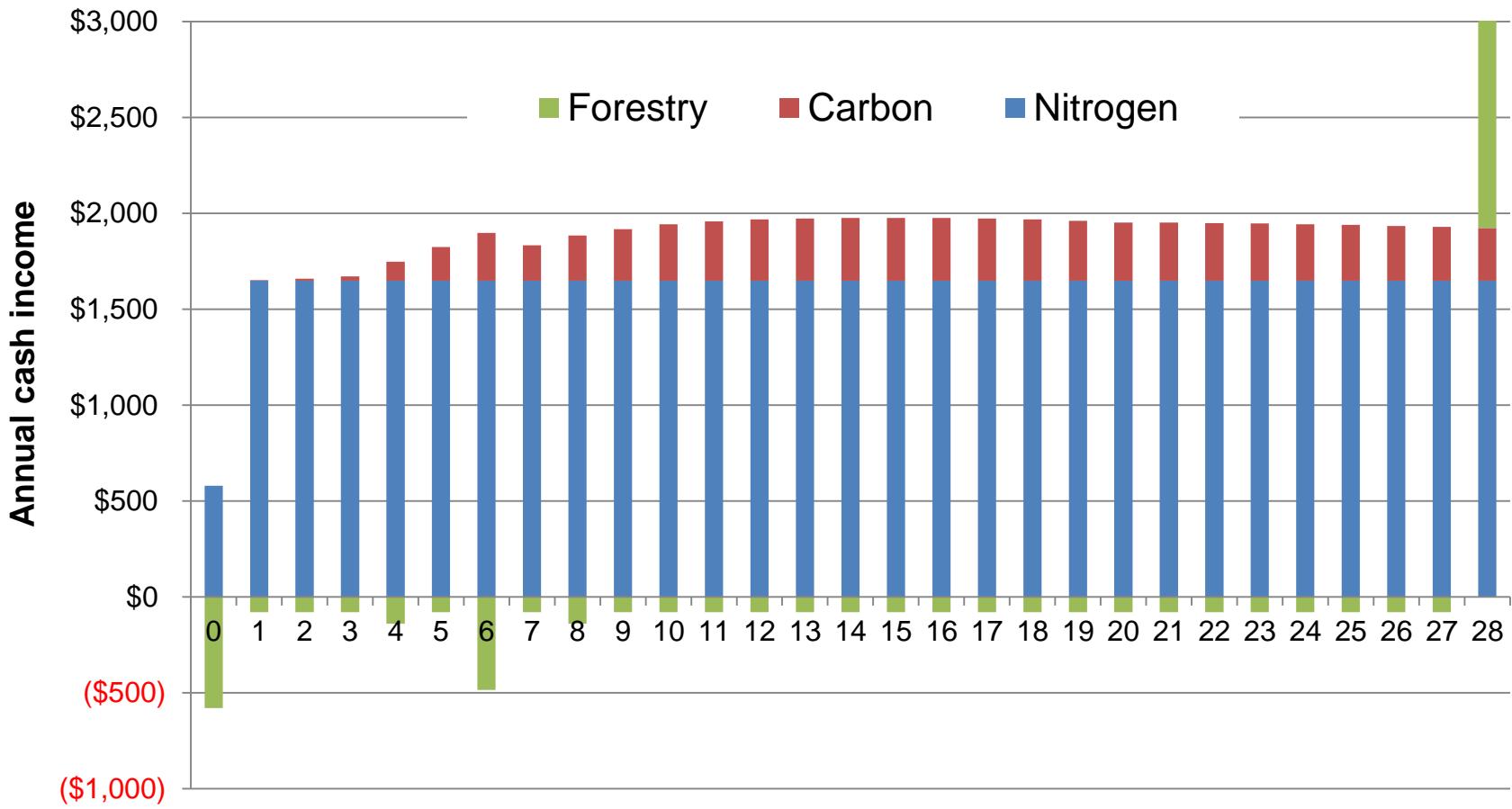
\* Harvest and transport cost were originally \$25/m<sup>3</sup> and \$20/m<sup>3</sup>.

\*\* Management includes admin., property maintenance, insurance, rates and management costs.

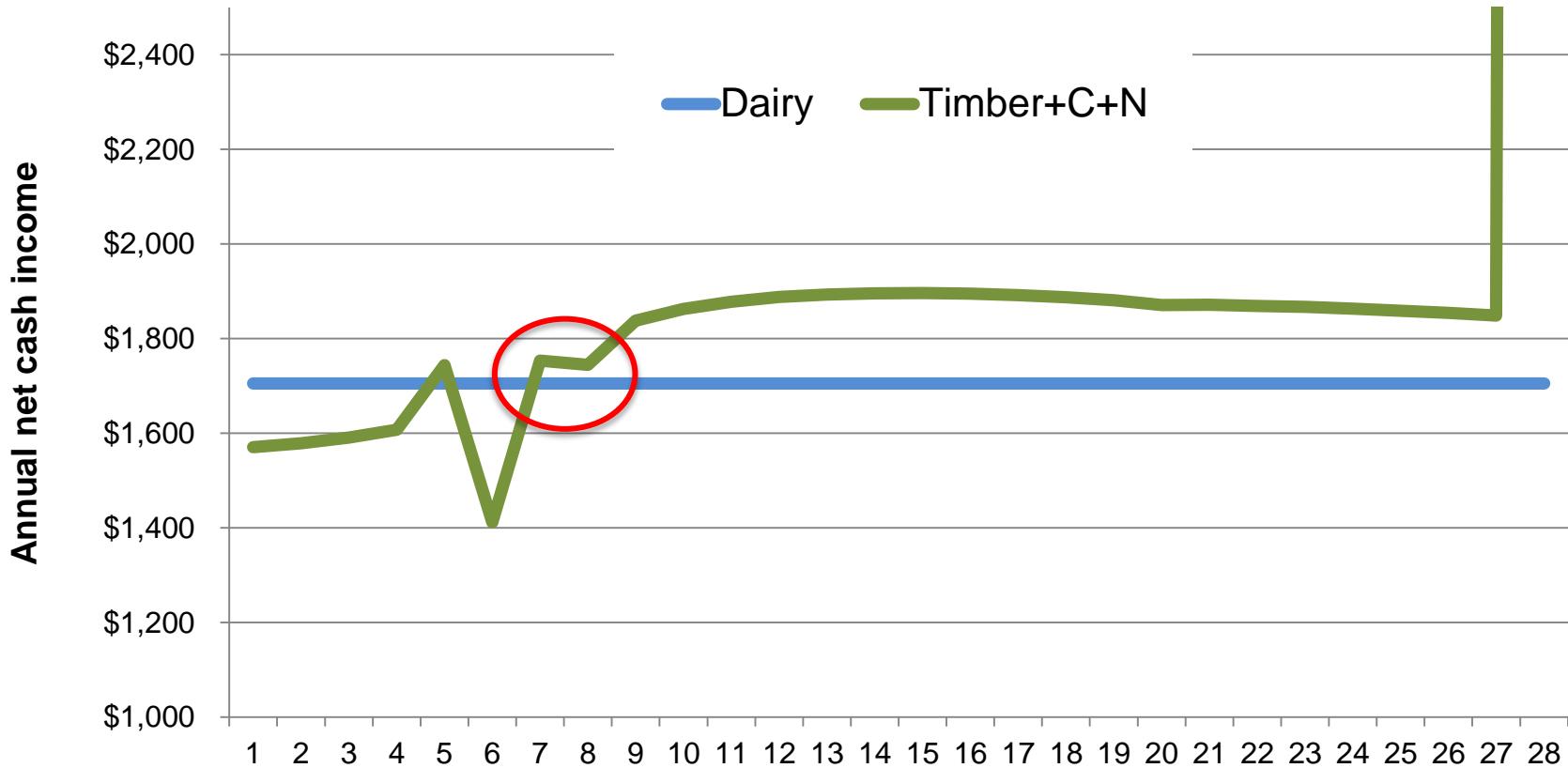
# Forestry annual cash income



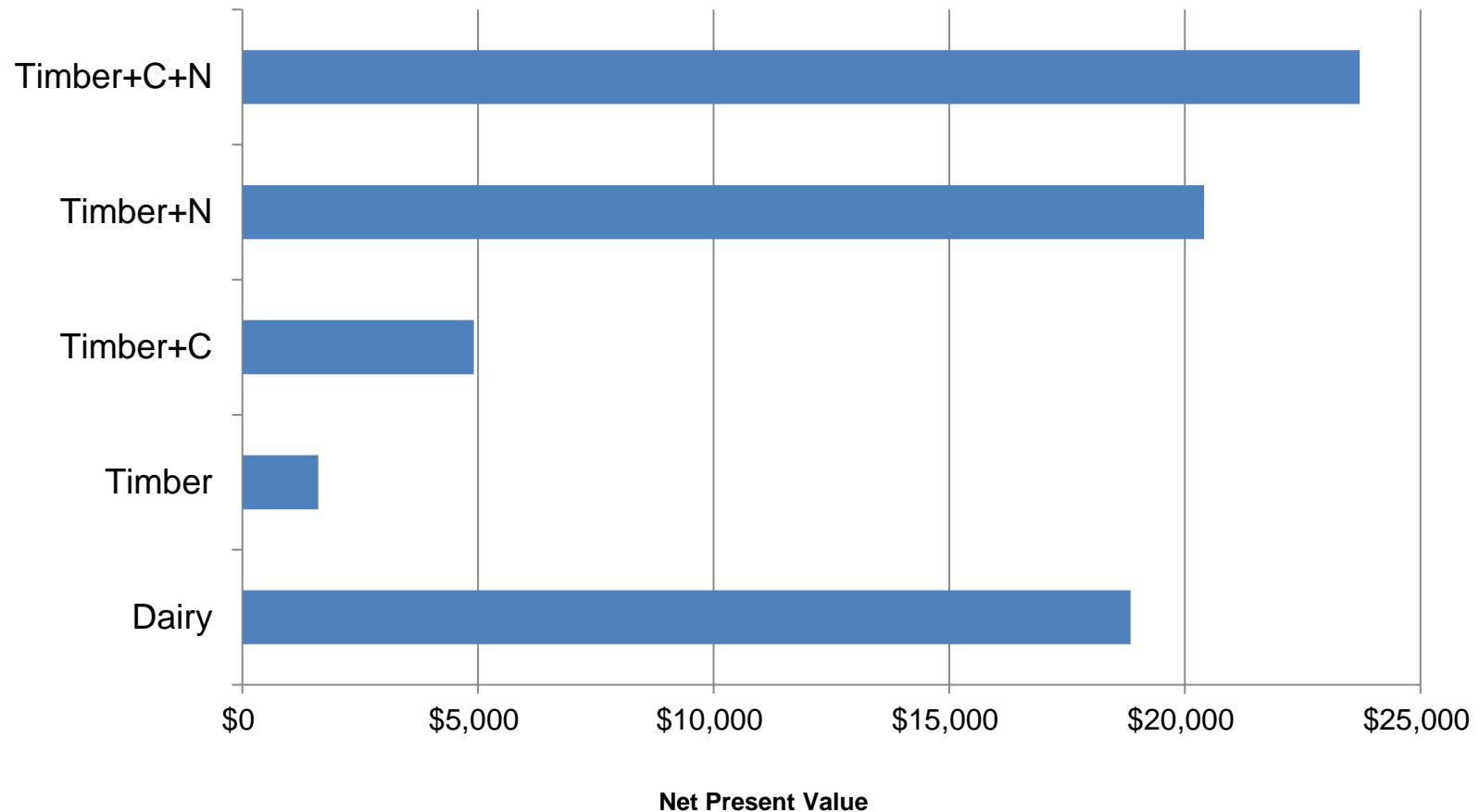
# Forestry annual cash income



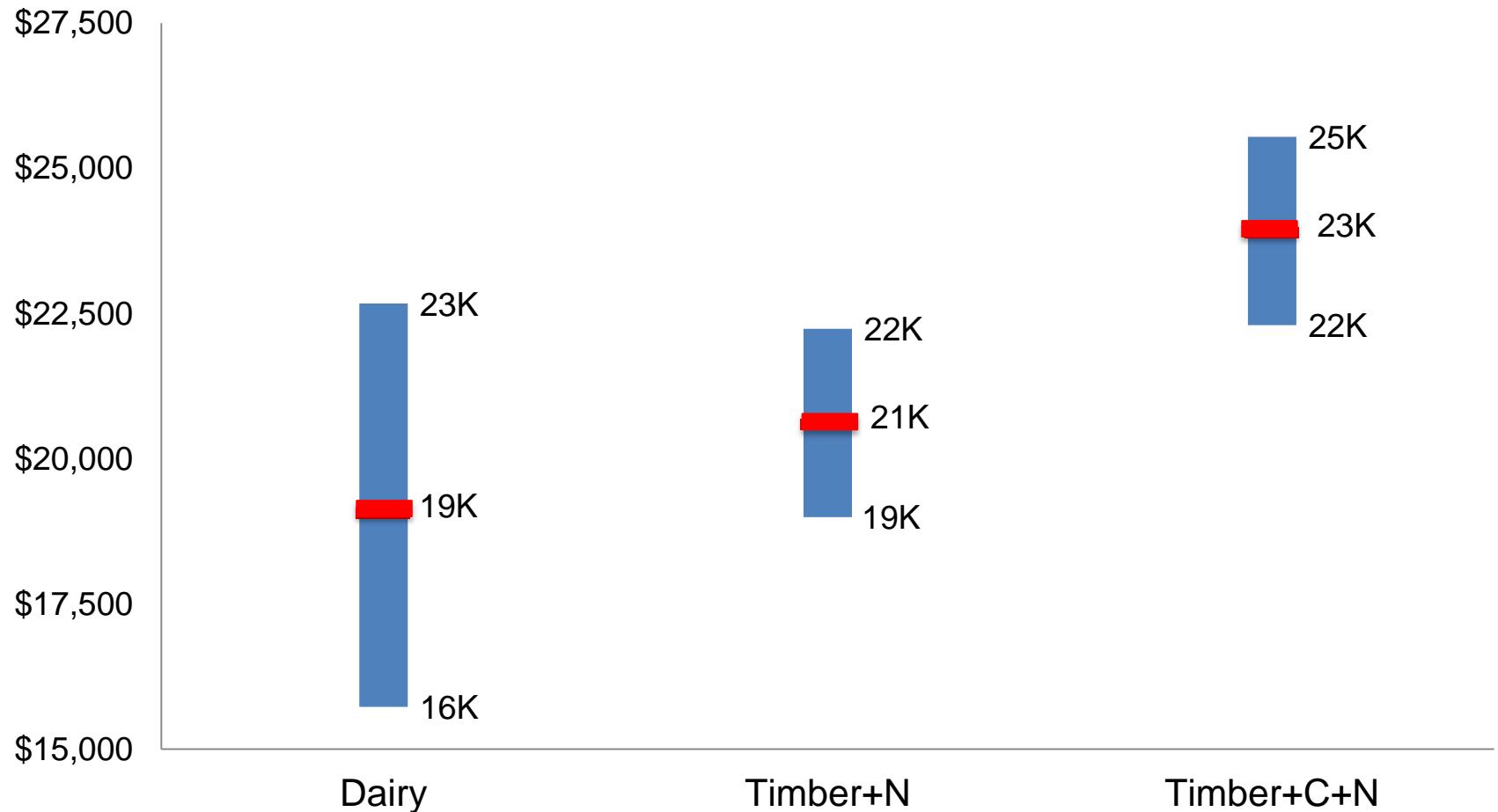
# Annual net cash income



# Net present value



# Net present value range



# The entire picture

	Units	Dairy	Forestry
Economic			
Exports <sup>b</sup>	Billion \$	5.8	1.8
Employment <sup>c</sup>	Employee counts	12,199	7,865
NPV	\$/ha	18,850	23,710 <sup>d</sup>
Environmental			
Nitrogen	kg/ha/yr	15 – 115	3 – 28
Phosphorus	kg/ha/yr	0.30 – 1.70	0.03 – 0.10
GHG	Tonnes CO <sub>2</sub> e/ha/yr	+9	-11

<sup>a</sup> Effective area

<sup>b</sup> From the port of Tauranga

<sup>c</sup> Considers primary and secondary industries

<sup>d</sup> Structural regime with carbon and nitrogen payments

**Complementarity opportunities**



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