

GROWING PAINS - COPING WITH RAPIDLY INCREASING MILK FLOWS

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Coping with Increasing Milk Flows

BACKGROUND

New Zealand faced the challenge of rapidly increasing milk flows three times in recent decades:

1) 1973

2) Mid 1990s

3) 2001



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(1)

The UK became a full member of the EEC (now the EU) in 1973. The 12 years of negotiation leading up to this gave New Zealand an opportunity to diversify its dairy production away from butter and cheese.

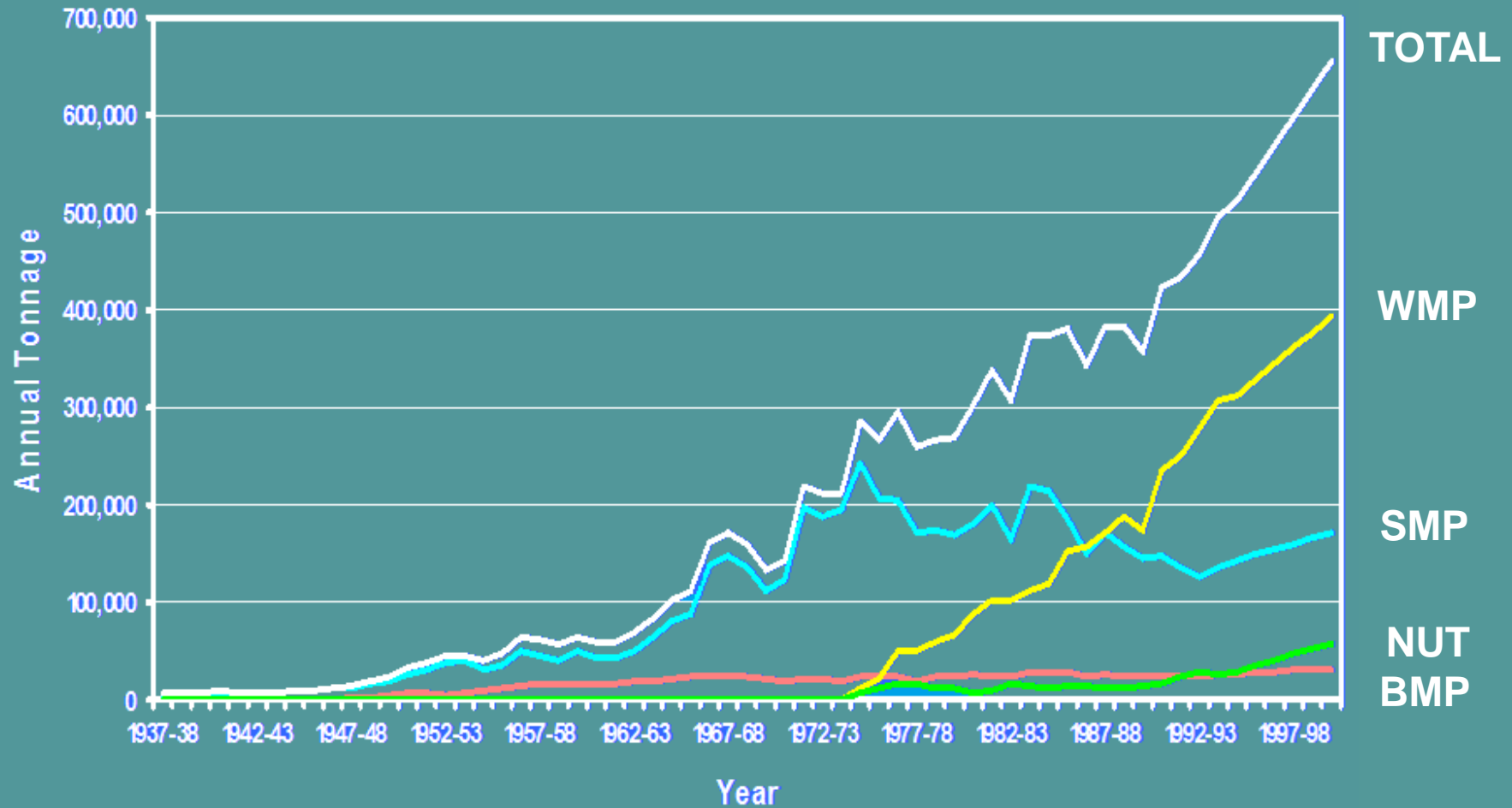
Wholemilk powder production ramped up from zero in 1972 to over 400,000 tonnes by 1999.

Total production of milkpowders nearly reached 700,000 tonnes.

Coping with Increasing Milk Flows

(1)

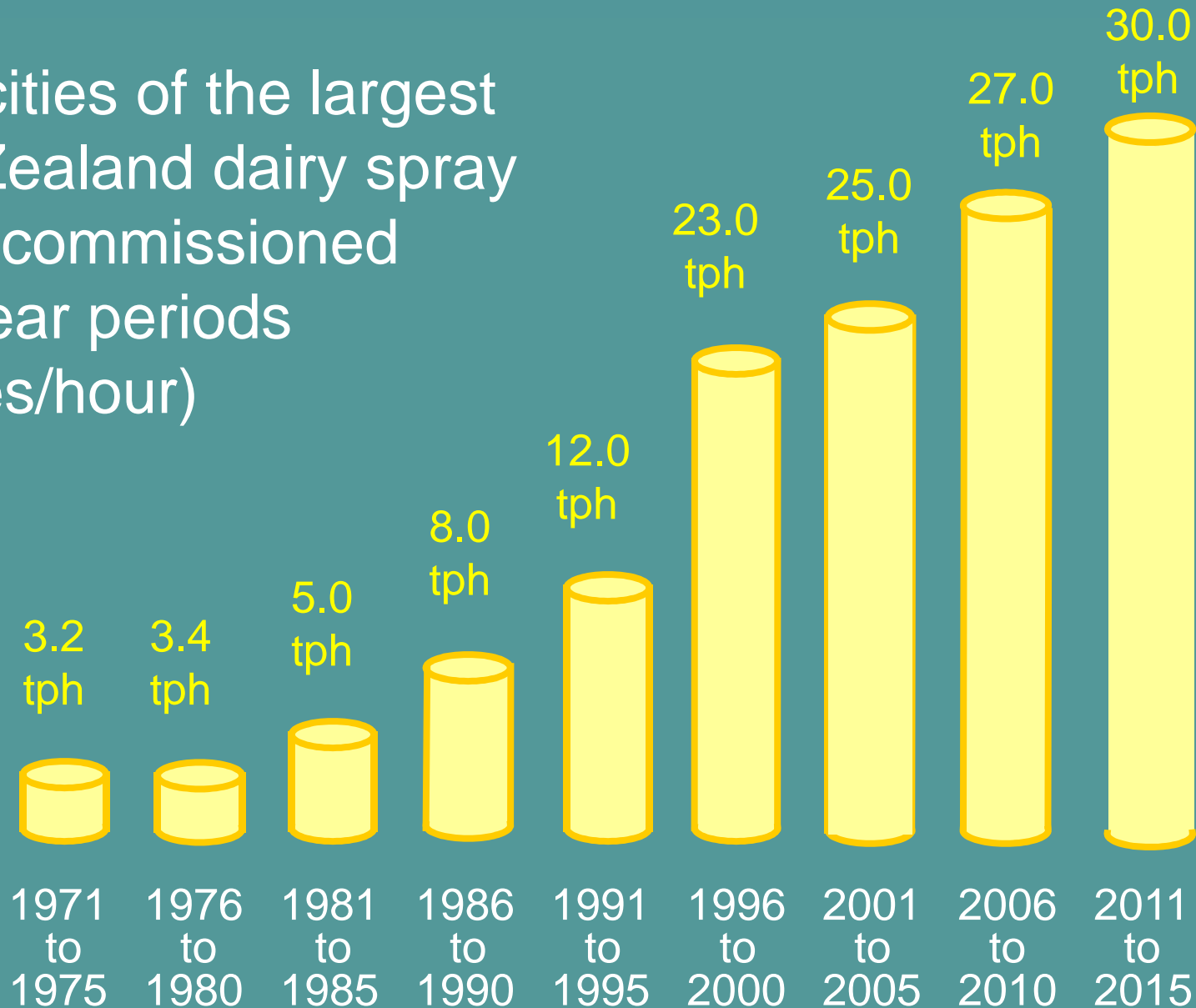
Historical Trends – NZ Milkpowder Production 1938-2000



Coping with Increasing Milk Flows

(1)

Capacities of the largest New Zealand dairy spray driers commissioned in 5-year periods (tonnes/hour)



Coping with Increasing Milk Flows

(1)

The large capital requirements encouraged amalgamations:

- to help raise the capital
- to exploit economies of scale in drying plants

All dairy companies were co-operatives operating a single-desk selling system for the 95% of their production that was exported.

The continual building of ever larger plants built up domestic engineering and construction capabilities.

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(2)

As the number of co-operatives dwindled and their milk flows increased, the price of farm land increased.

The mid 1990s saw mass migration of dairy farmers and herds to cheaper South Island traditionally sheep farming areas.

This allowed dairy production to continue to increase, but began to have visible effects on the environment.

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(2)

Around 1000 new dairy farmers arrived in Southland between 1994 and 1996, bringing stock with them.

The Southland Dairy Co-op experienced 55% compound annual growth in its a peak milk flow for 4 consecutive years, growing 5.8 times.

Much of the funding came from a bank which ended up owning over 70% of the company.

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(2)

Milkpowder driers could not be built fast enough to cope with the peak milk flows, so casein and AMF factories were built to swallow skim milk.

The casein drier could not be commissioned in time and thousands of tonnes of washed wet casein curd was frozen and stored until the winter when it could be thawed and dried (successfully).

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(3)

In 2001 the Dairy Industry Restructuring Act (DIRA) removed the single desk selling status of the NZ Dairy Board allowing independent dairy companies to produce and export New Zealand made dairy products.

All but two of the dairy companies merged to form Fonterra, leaving Westland and Tatura co-operatives on their own.

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(3)

New proprietary companies set up operations.

Open Country is now the second largest dairy company with 3 sites, 4 spray driers and over 500 independent dairy farmers. They process 900 million litres of milk per annum.

Westland, NZ Dairies (now owned by Fonterra), Synlait, Gardians (now owned by Danone), Oceania (owned by Yili) and Yashili each built milkpowder or infant formula plants.

Large scale corporate farming began.

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(3)

Open Country Dairy

Waharoa Whey Powder 2006
WMP 2008



Awarua WMP 2008



Wanganui WMP 2009



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(3)

NZDL Studholme
(now Fonterra)

WMP 2007



Synlait Dunsandel

WMP 2008
IF 2011



Miraka Taupo

WMP 2012



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(3)

Gardians Clydevale
(Danone)

IF 2012



Oceania Glenavy
(Yili)

IF 2014



Yashili Pokeno

IF 2014



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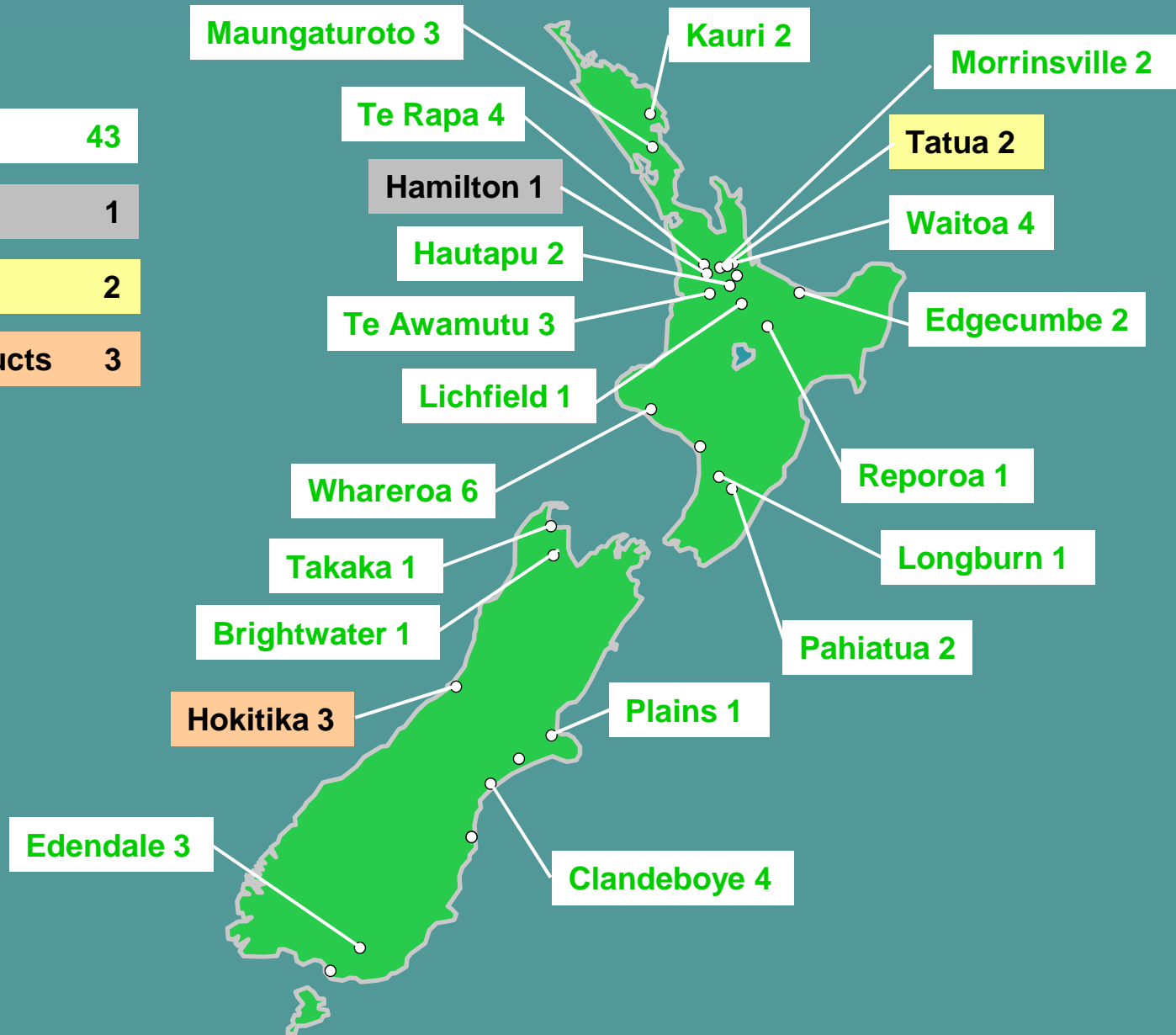
2004/05

Fonterra 43

Dairy Goat Co-op 1

Tatua 2

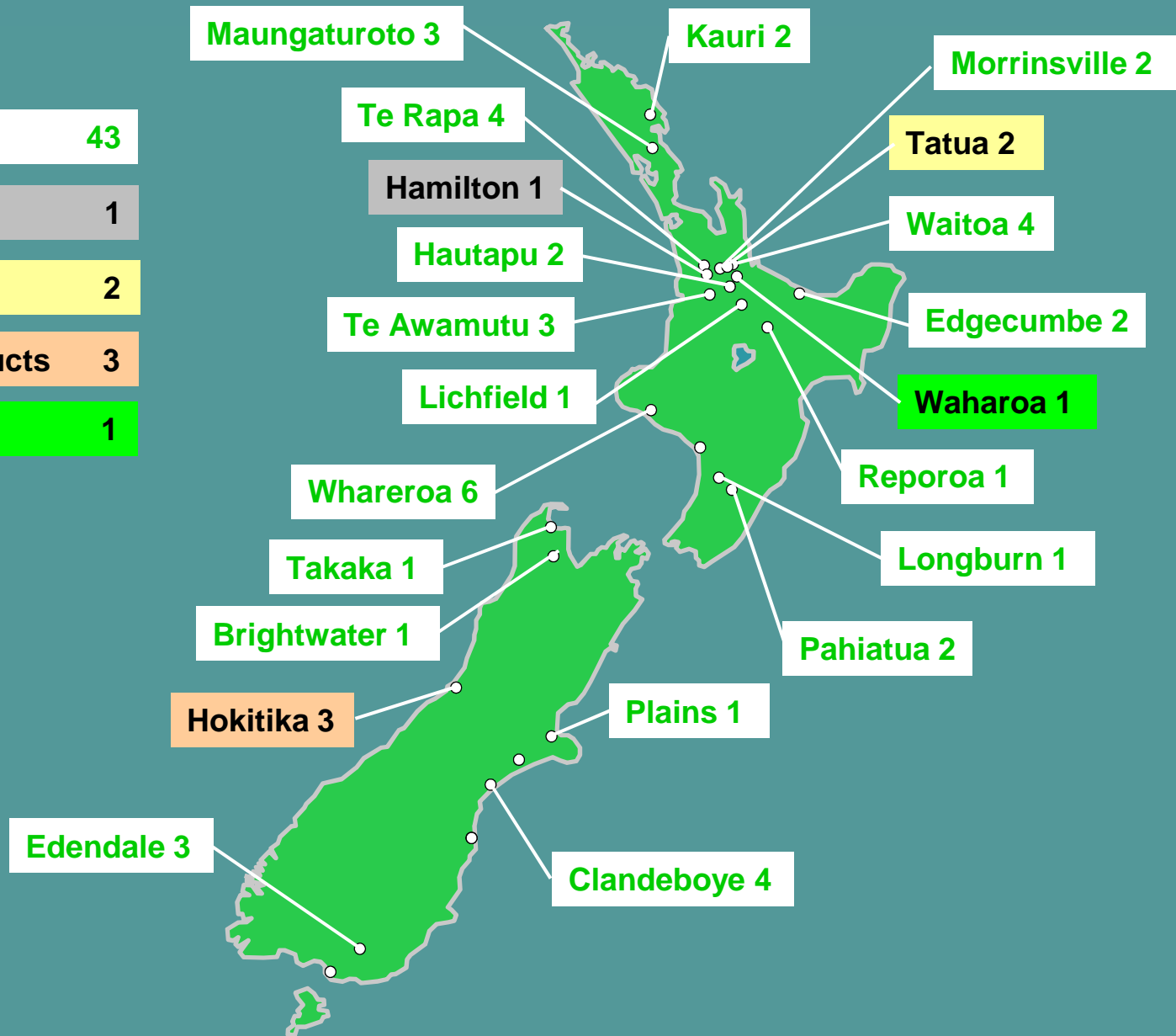
Westland Milk Products 3



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2005/06

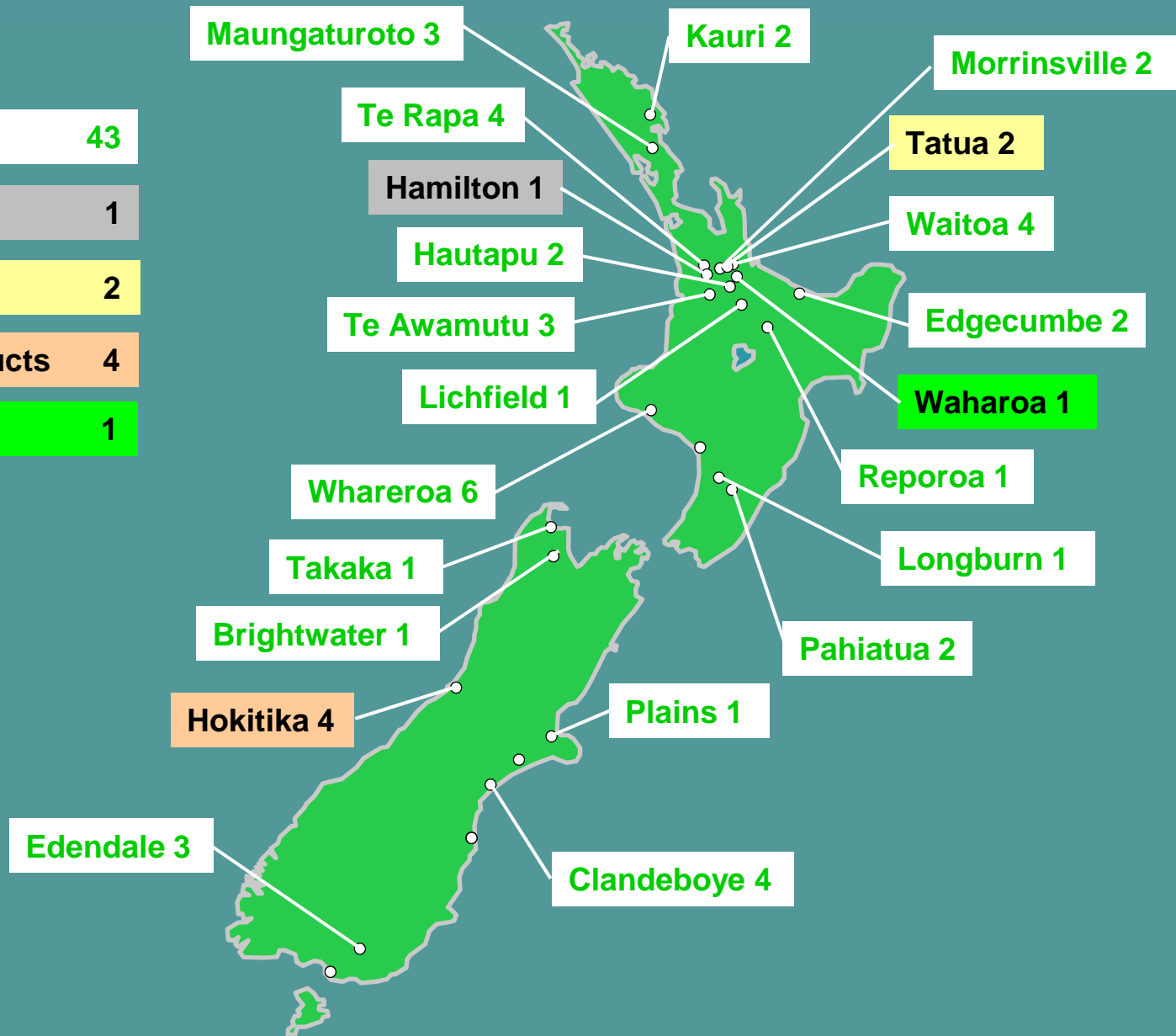
Fonterra	43
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	3
Open Country	1



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2006/07

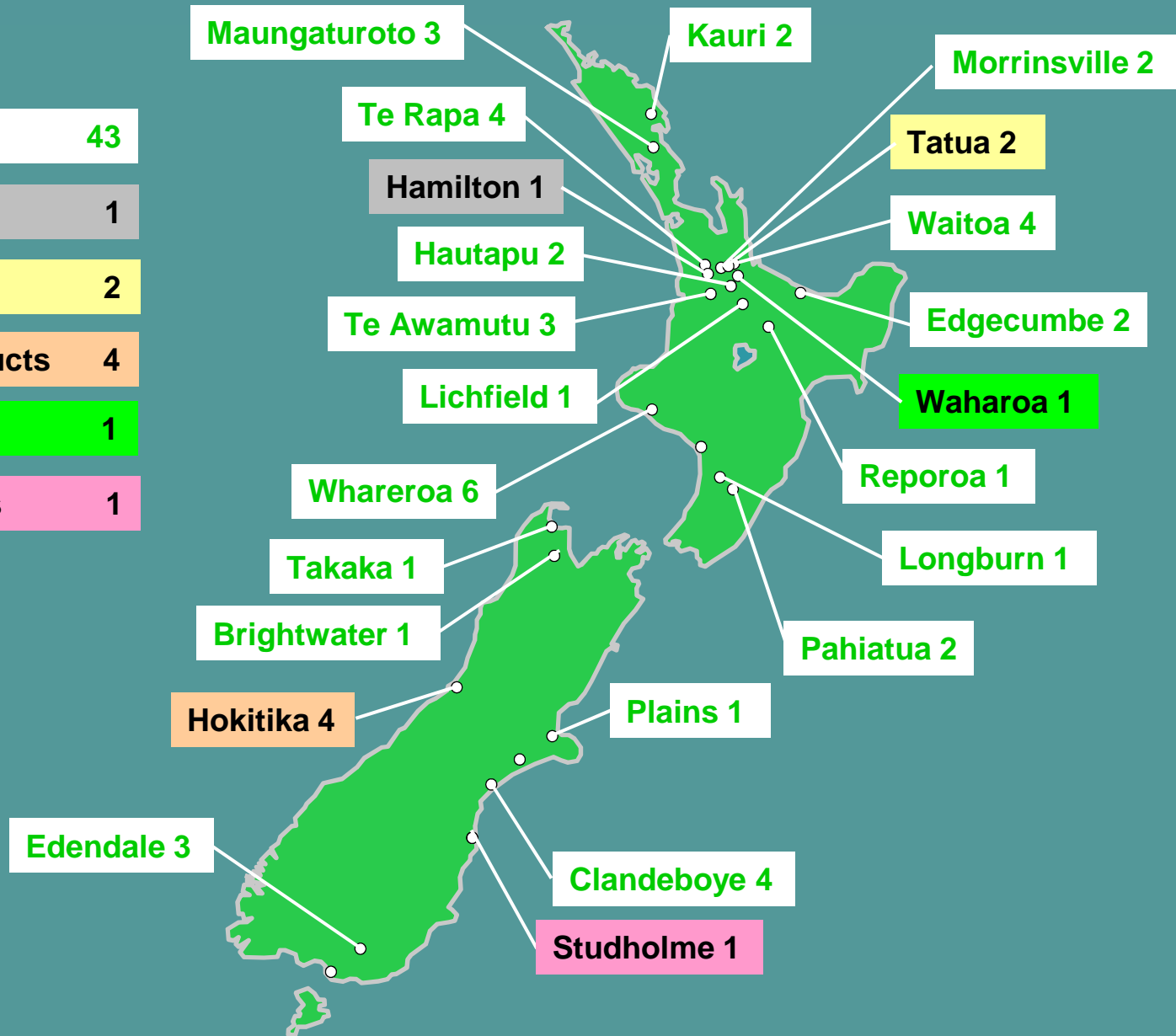
Fonterra	43
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	1



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2007/08

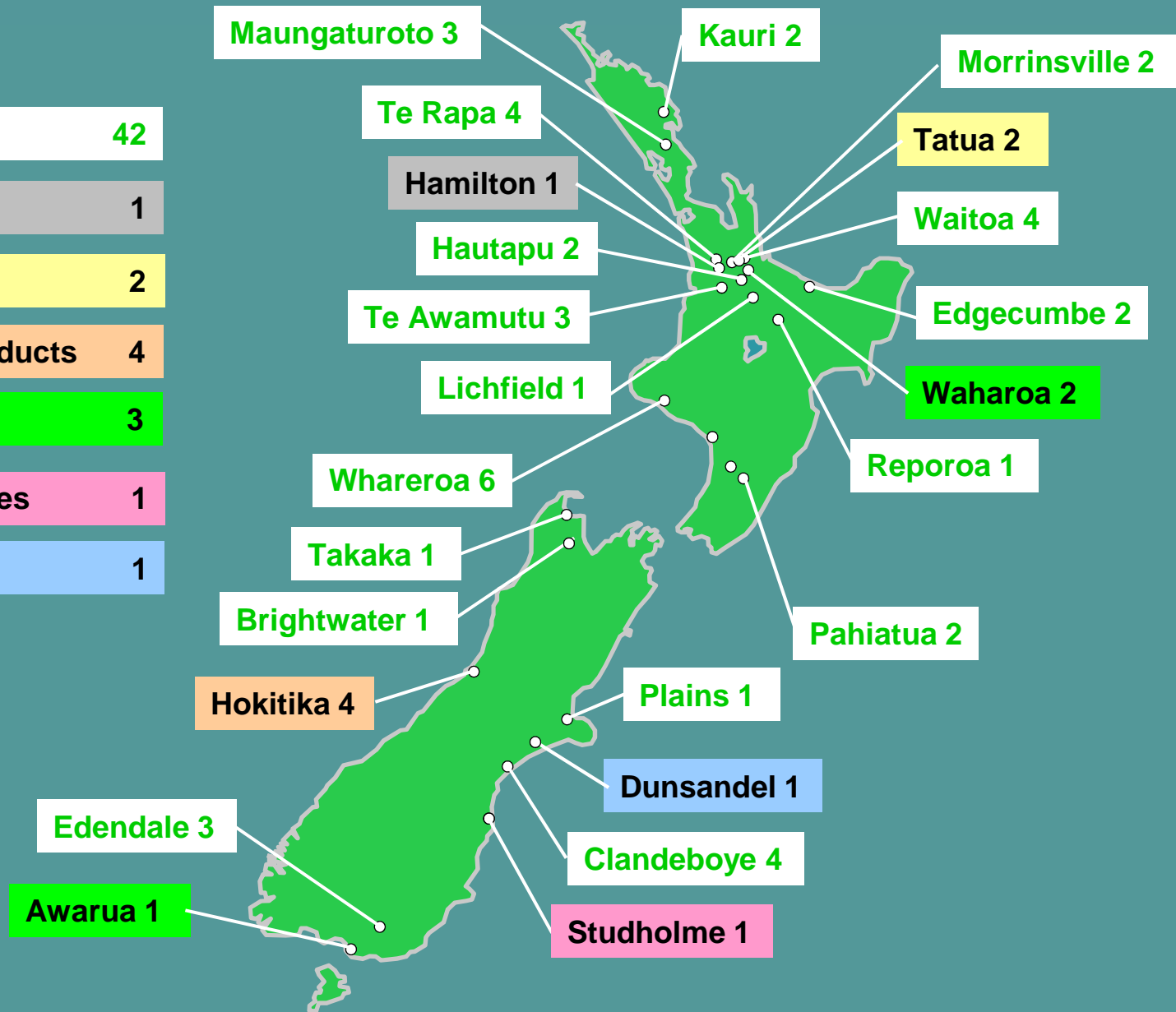
Fonterra	43
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	1
New Zealand Dairies	1



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2008/09

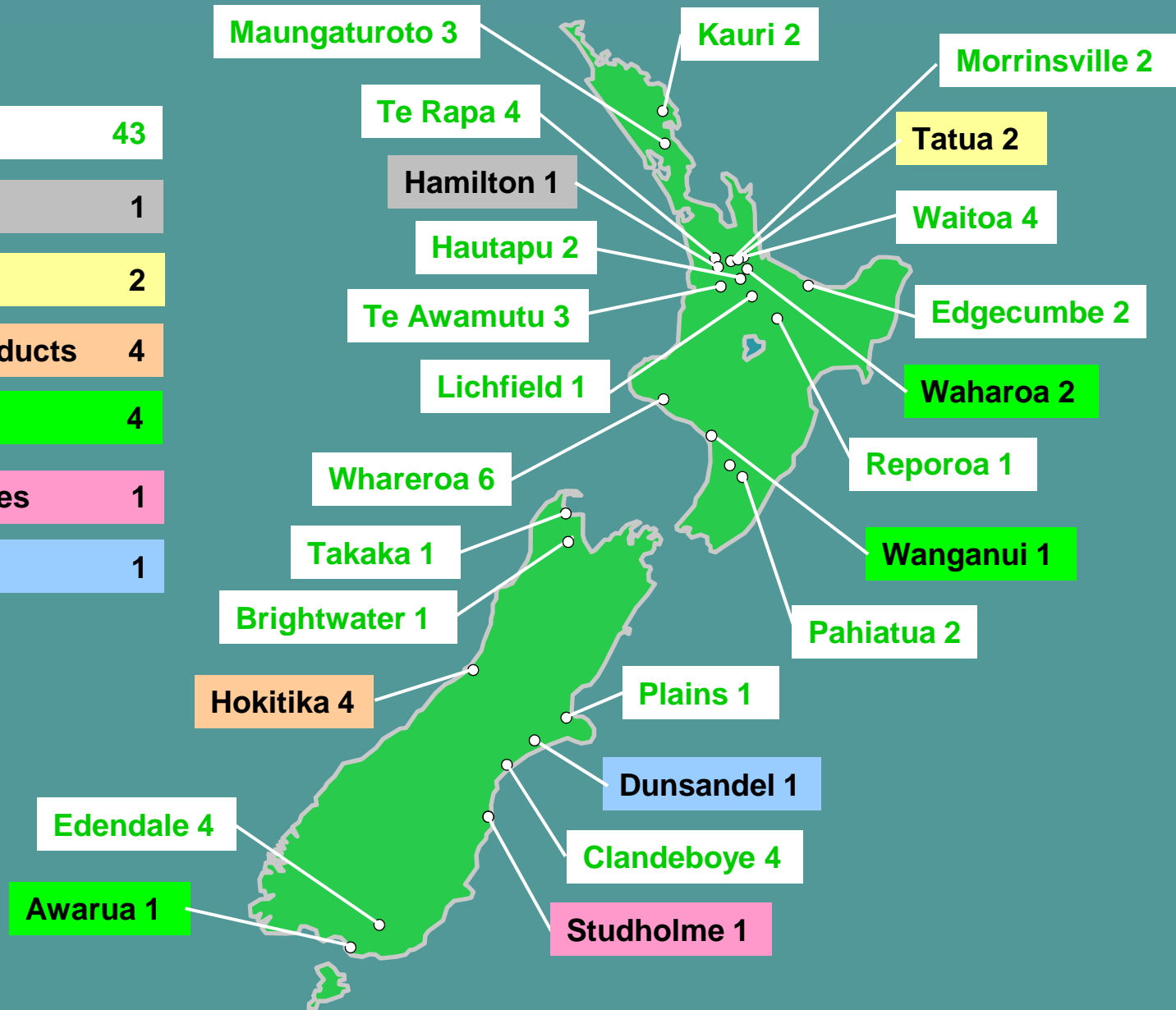
Fonterra	42
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	3
New Zealand Dairies	1
Synlait	1



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2009/10

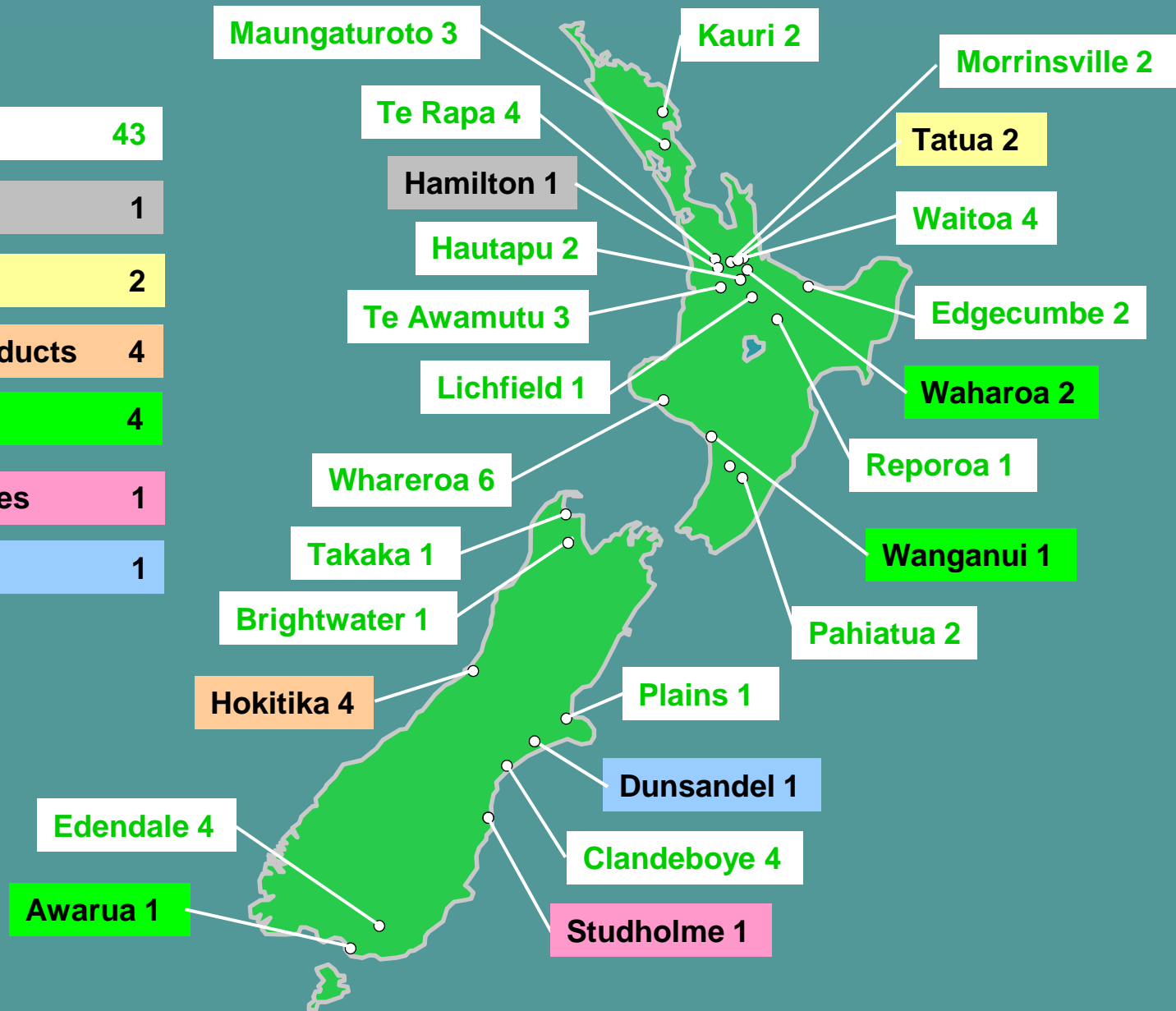
Fonterra	43
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	4
New Zealand Dairies	1
Synlait	1



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2010/11

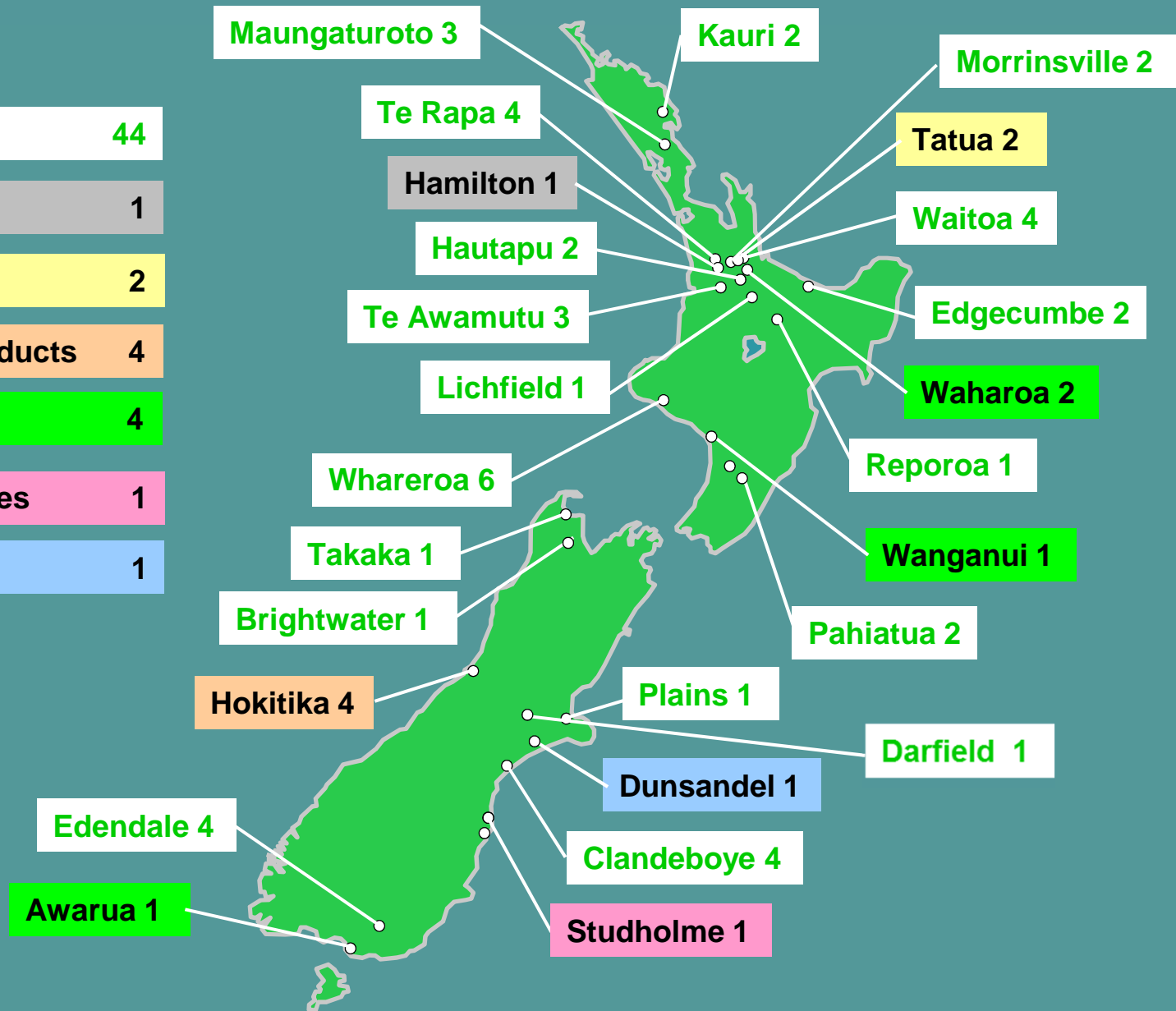
Fonterra	43
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	4
New Zealand Dairies	1
Synlait	1



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2011/12

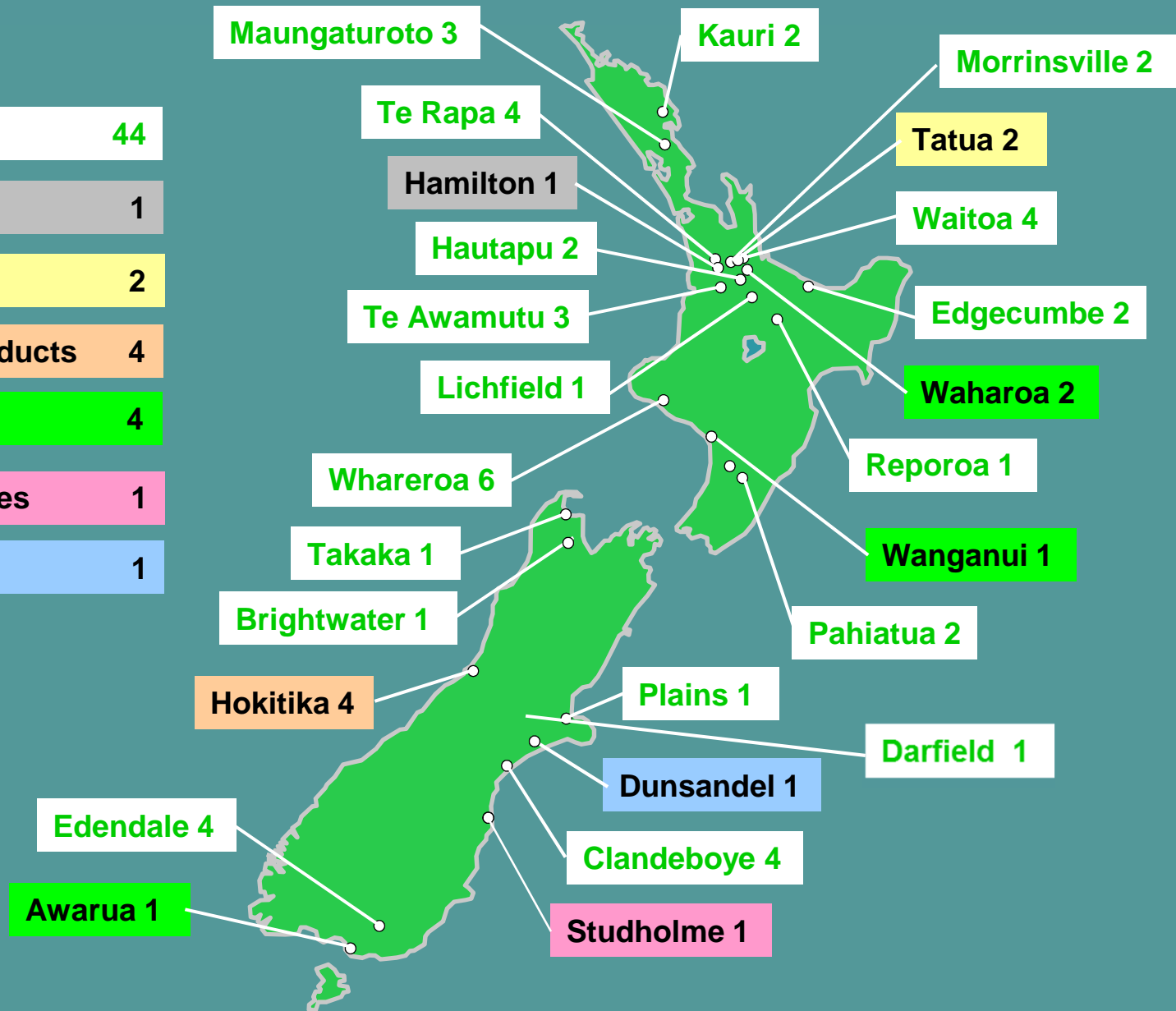
Fonterra	44
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	4
New Zealand Dairies	1
Synlait	1



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2012/13

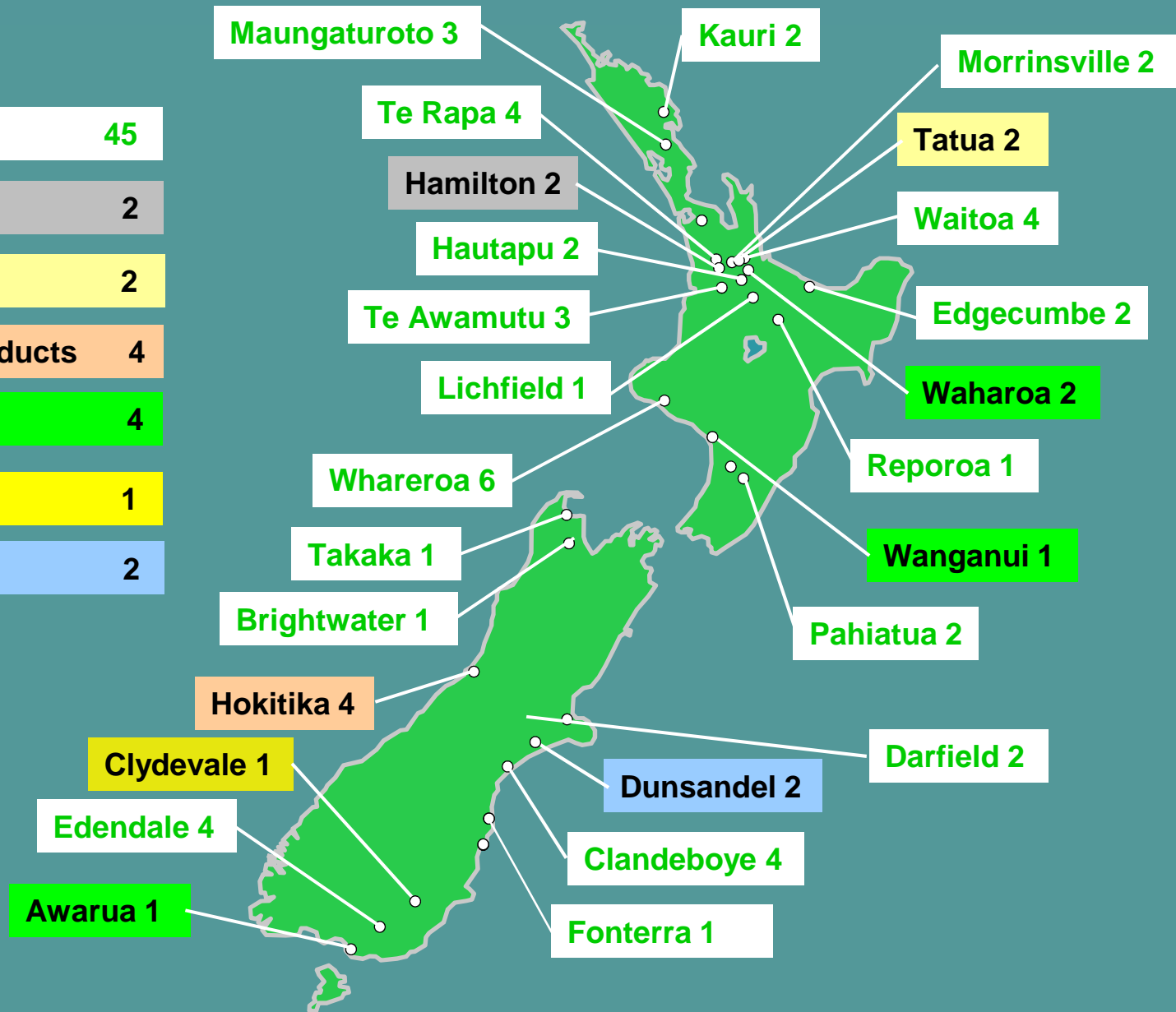
Fonterra	44
Dairy Goat Co-op	1
Tatua	2
Westland Milk Products	4
Open Country	4
New Zealand Dairies	1
Synlait	1



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2013/14

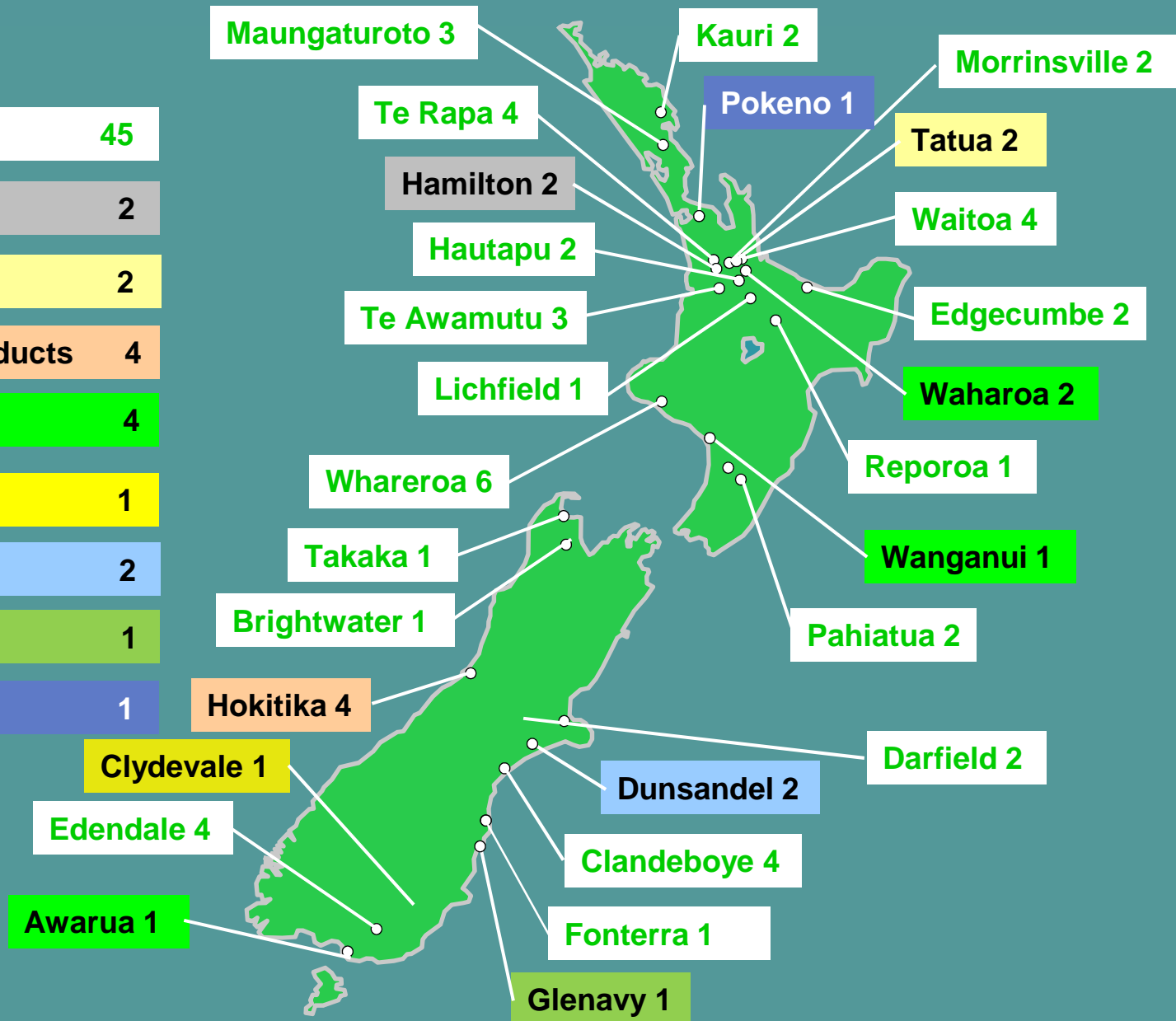
Fonterra	45
Dairy Goat Co-op	2
Tatua	2
Westland Milk Products	4
Open Country	4
Gardians	1
Synlait	2



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2014/15

Fonterra	45
Dairy Goat Co-op	2
Tatua	2
Westland Milk Products	4
Open Country	4
Gardians	1
Synlait	2
Oceania	1
Yashili	1



Coping with Increasing Milk Flows

Increasing Processing Capacity

- New Building
- Optimising Product Mix
- Pre-concentration
- Debottlenecking



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New Building

When the industry is growing steadily, engineering and building companies can achieve fast construction times (e.g. 10 months from signing the contract to first milk for a brownfield milkpowder plant).

Contracts with penalties for late completion and incentives for early completion have encouraged co-operation between subcontractors.

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New Building

Constraints include:

- Water availability
- Effluent discharge options
- Landlocked sites
- The need to maintain production during major site works

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Optimising Product Mix

The maximum milk swallowing capacity is achieved by making skim milkpowder (SMP) over the peak.

Processing the cream into butter or AMF generates buttermilk or serum. Spray drying this as buttermilk powder (BMP) on the same driers making the SMP reduces capacity.

Dedicating a small drier to BMP, sourcing it from several plants, significantly improves overall capacity.

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Preconcentration

Increase the total solids of evaporator feed, increasing the solids throughput of evaporators.

Methods include:

- RO preconcentration of milk
- RO concentration of milk UF permeate
- Standardising with dry ingredients (e.g. lactose, dried permeate, SMP)

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Debottlenecking

Systematic debottlenecking can increase the daily output of drying plants by between 10% and 25%.

Each 1% TS Increase in the drier feed total solids increases the powder output by 4.2% for the same water evaporation.

Optimising CIP provides more productive running time per day.

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Debottlenecking

Adding an extra evaporator and drier feed system can allow a spray drier to be run continuously, giving a capacity increase of around 15 to 18%.

The powder transport rate is often the final bottleneck.

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Summary

Increasing milk volumes provide opportunities:

- to upgrade existing production facilities
- to construct new ones
- to retire old facilities

Increasing milk volumes put pressure on:

- finances
- organisational management
- staff

