

A satellite view of New Zealand, showing the two main islands, North and South Island, with their green and brown terrain and surrounding blue oceans. The view is from a high angle, looking down at the islands.

# AFB control

# Varroa control

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# Beekeeping in NZ

- 390,000 hives managed by 3300 beekeepers
- 250 'commercial' beekeepers with >500 hives
- Average honey yield ~ 33kg/hive
- 100,000 hives used in commercial pollination
- Sophisticated honey marketing and processing
- Monofloral honeys – manuka, clover, etc

# Foulbrood (*Paenibacillus larvae*) in NZ

- American foulbrood (AFB) first reported in NZ in 1877 –honey production dropped 70%
- Apiaries Act 1906 began official control
- Government-run control with network of regional apiary inspectors
- Government stopped funding disease control programmes in 1990s

# National Pest Management Strategy

- Biosecurity Act 1993 gave industry power to control disease
- National Pest Management Strategy for AFB developed by industry
- Began in 1998, after long development period
- Funded and run by industry

# Underlying assumptions

- Beekeepers best placed to effectively control AFB
- Most AFB spread by beekeeper actions
- Changing management can eliminate AFB from a business
- National Beekeepers' Association keeps apiary database, monitors disease levels, audits beekeepers

# Principles of Strategy

- Train beekeepers to identify AFB
- All hives inspected annually by a trained beekeeper (usually the hive owner)
- All beekeepers make an annual report on hive numbers and disease levels
- Regular visual inspections of brood
- Diseased hives burned immediately

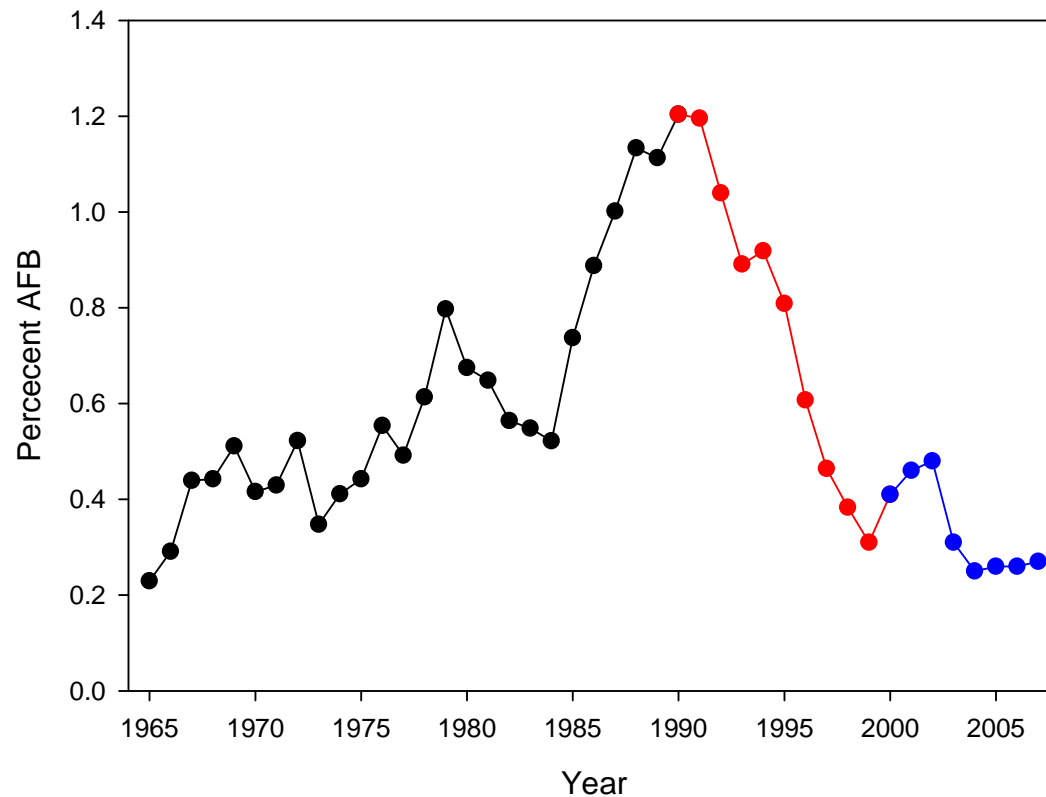
# Disease management



- Diagnosis by clinical signs
- Infected hives burned
- Boxes can be sterilised by hot wax dipping (160°C for 10 minutes)
- No compensation paid
- Antibiotics prohibited (and have never been used in NZ hives)\*

\* *Melissococcus pluton* not in NZ

# Long-term trend in AFB levels



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# Strategy funding

- Funded by industry levies
- Base levy of USD\*\$16 per beekeeper (2010)
- Per-apiary levy of USD\$8 (2010)
- Total strategy cost USD\$220,000 (2010)

\*USD\$1 = NZD\$1.20 approx

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<b>Year</b>	<b>Reported disease level</b>
2000	0.43%
2001	0.46%
2002	0.48%
2003	0.34%
2004	0.30%
2005	0.26%
2006	0.32%
2007	0.30%
2008	0.31%
2009	0.30%
2010	0.28%



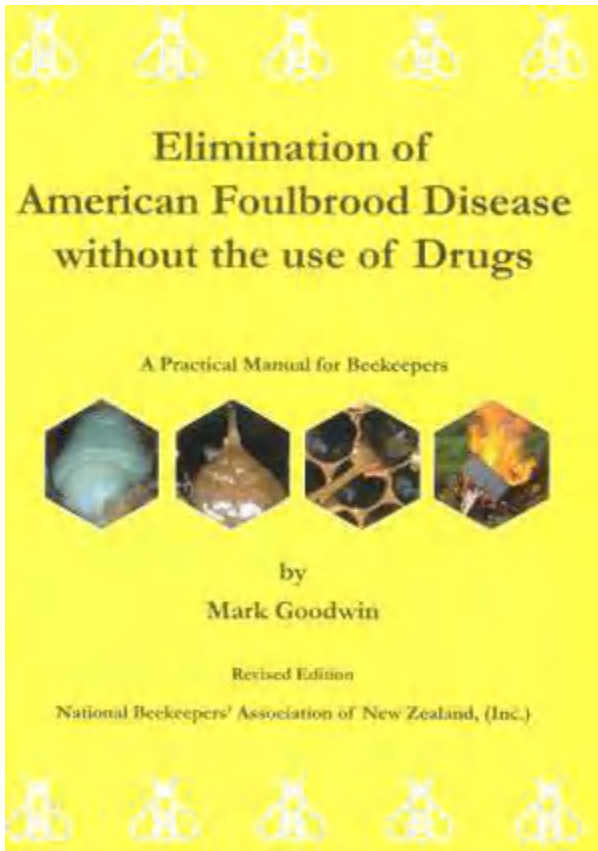
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# Key weaknesses

- Lack of industry management capacity and funding
- Heavy reliance on volunteers
- Balance of education and enforcement?
- Lack of enforcement powers
- Sometimes poor relationship with government

# Conclusion



- Industry-led control keeps AFB at very low levels in NZ without using antibiotics
- Achieving this has been more difficult than the industry expected

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# Varroa in NZ

- Detected April 2000
- Present 2 years?
- Found by hobby beekeeper
- Industrial/residential zone of largest city
- Source unknown
  - swarm in shipping container?
  - smuggled queen?



# Incursion response



- Suspect varroa report
- Laboratory confirmation of ID
- Response HQ established within 24 hours
- Movement controls imposed
- Delimitating survey started
- Evaluate options

# Response Options

- Eradication was preferred option
- Strong beekeeper/public support
- Degree of spread made eradication unfeasible
- Government chose to slow spread and minimise impacts
- Many beekeepers unhappy with decision

# Programme objectives

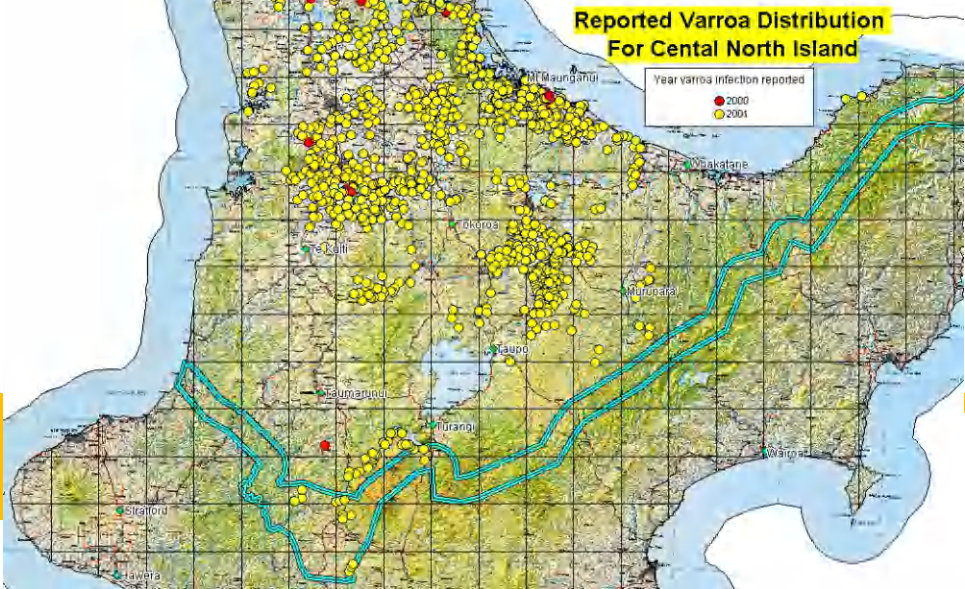
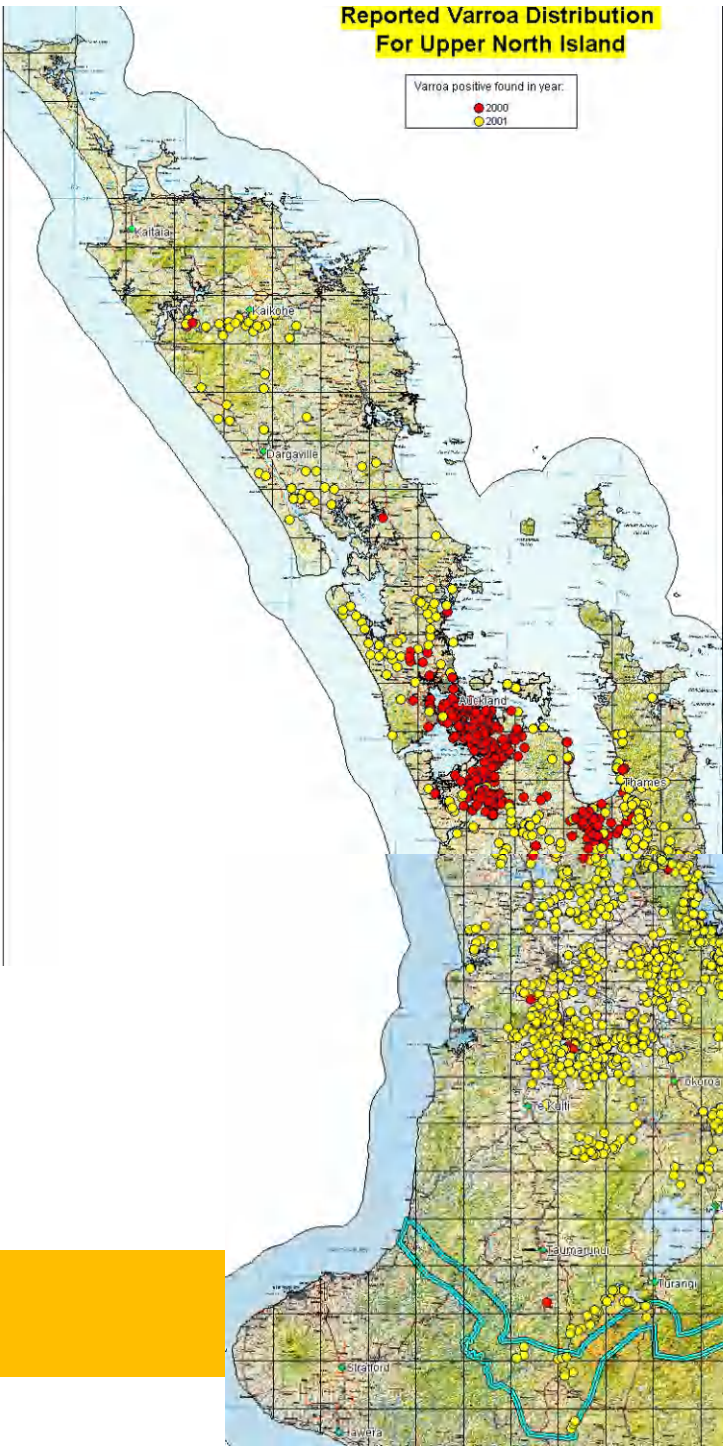
- Educate beekeepers in varroa management
- Register control products
- Slow spread to give beekeepers time to prepare
- Carry out research on varroa management under NZ conditions



# Rate of spread

2000

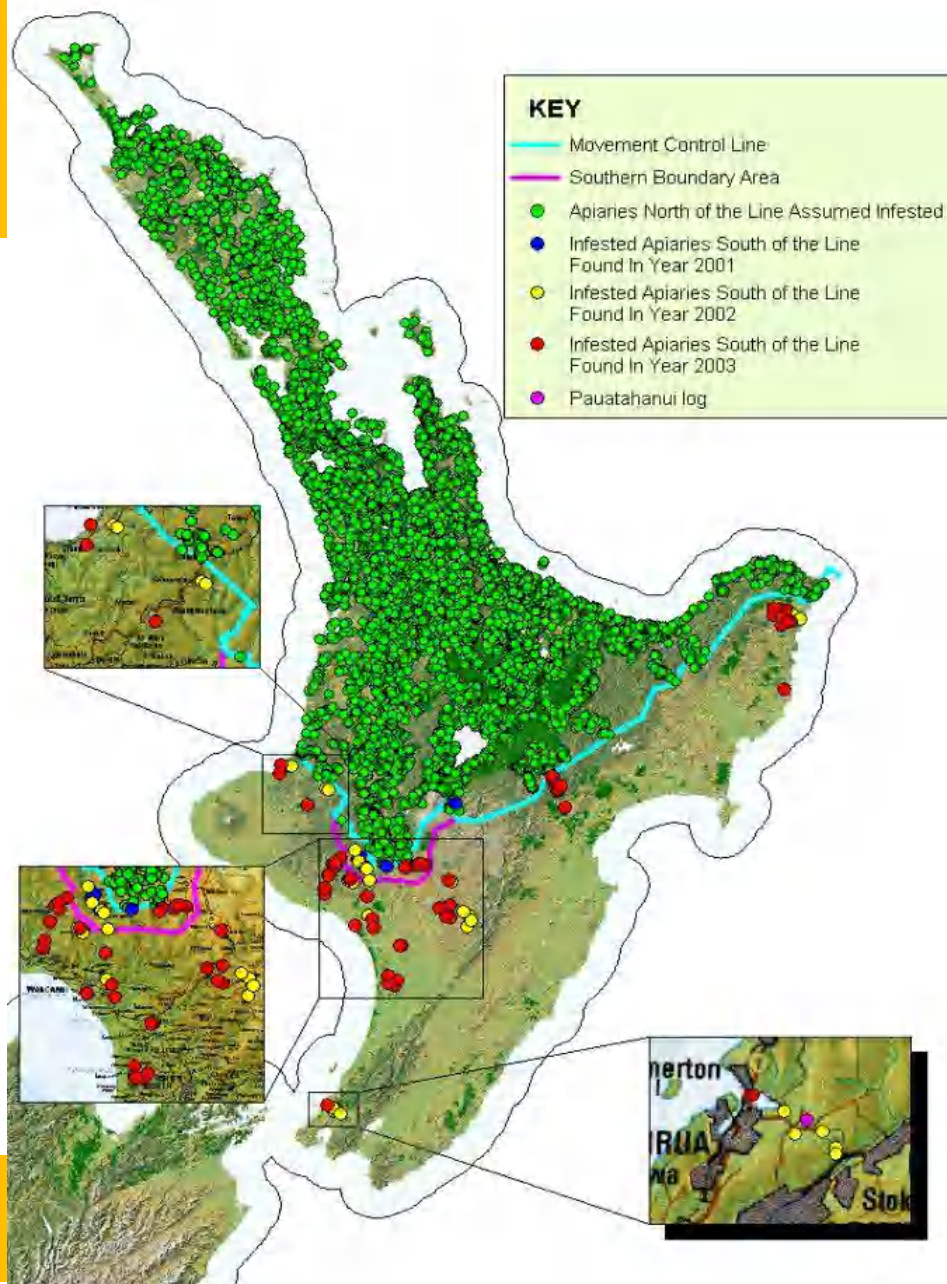
2001



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# Rate of Spread 2003



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# Movement controls

- Popular with beekeepers far away
- Unpopular with beekeepers affected by control lines
- Extremely demanding to impose and administer
- Played some role in slowing initial spread
- Not very effective overall

# Beekeeper education



- Free workshops for beekeepers 2000 – 2003
- Control handbook published 2001
- Technical advice in industry magazine
- Varroa experts from other countries

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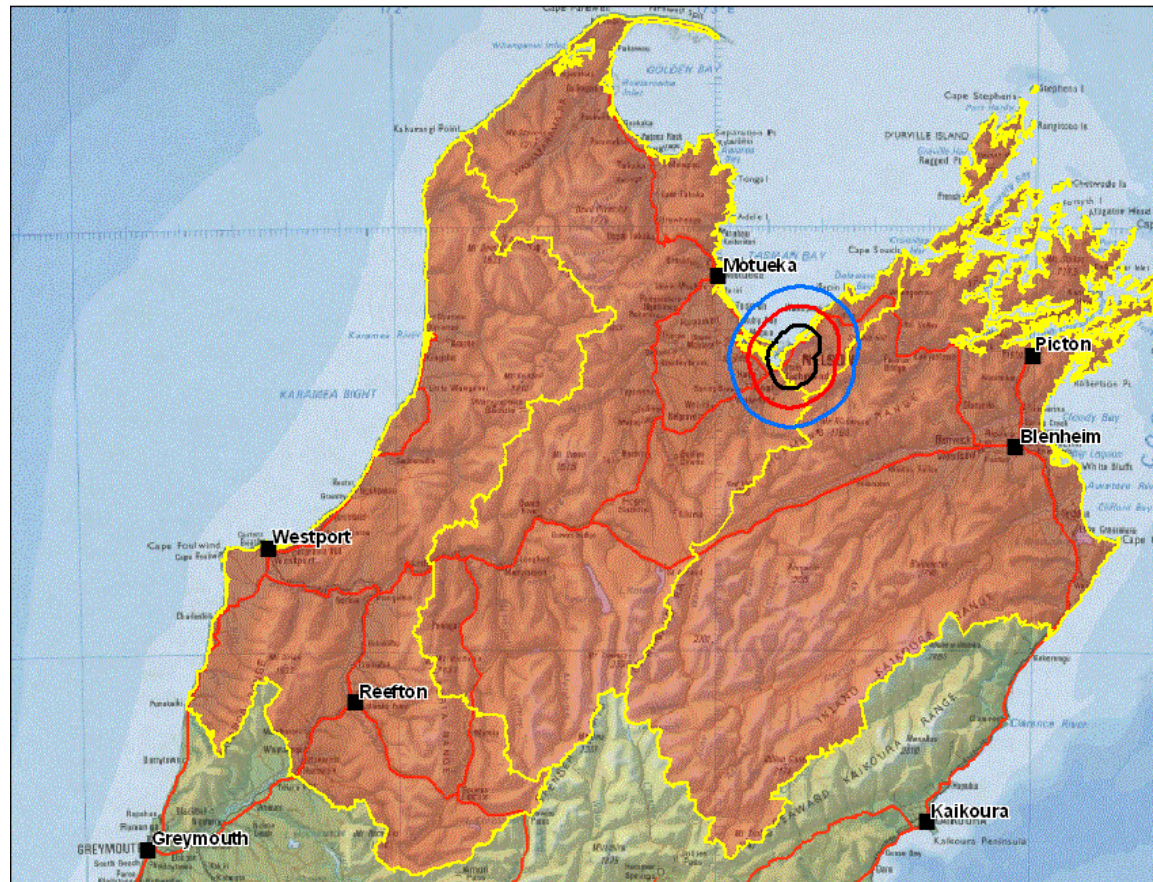


# Treatment Registration



- Apistan approved July 2000
- Bayvarol approved September 2000
- Oxalic acid, formic acid, thymol (generics) approved 2001
- Apivar (amitraz) approved 2003
- Apiguard (thymol) approved 2004
- Thymoal (thymol) approved 2006

# South Island 2006



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# South Island varroa

- Varroa reached upper South Island in 2006
- Found in apiary linked to port
- Likely introduction by swarm from North Island
- Varroa has spread southwards
- Some southern regions finding first varroa spring 2011

# Impacts on bee industry

- Beekeeping industry has survived
- Industry has restructured, with some beekeepers leaving
- Management more professional
- High honey prices (incl. manuka) have helped
- Some costs passed on to pollination sector (kiwifruit, apples etc)

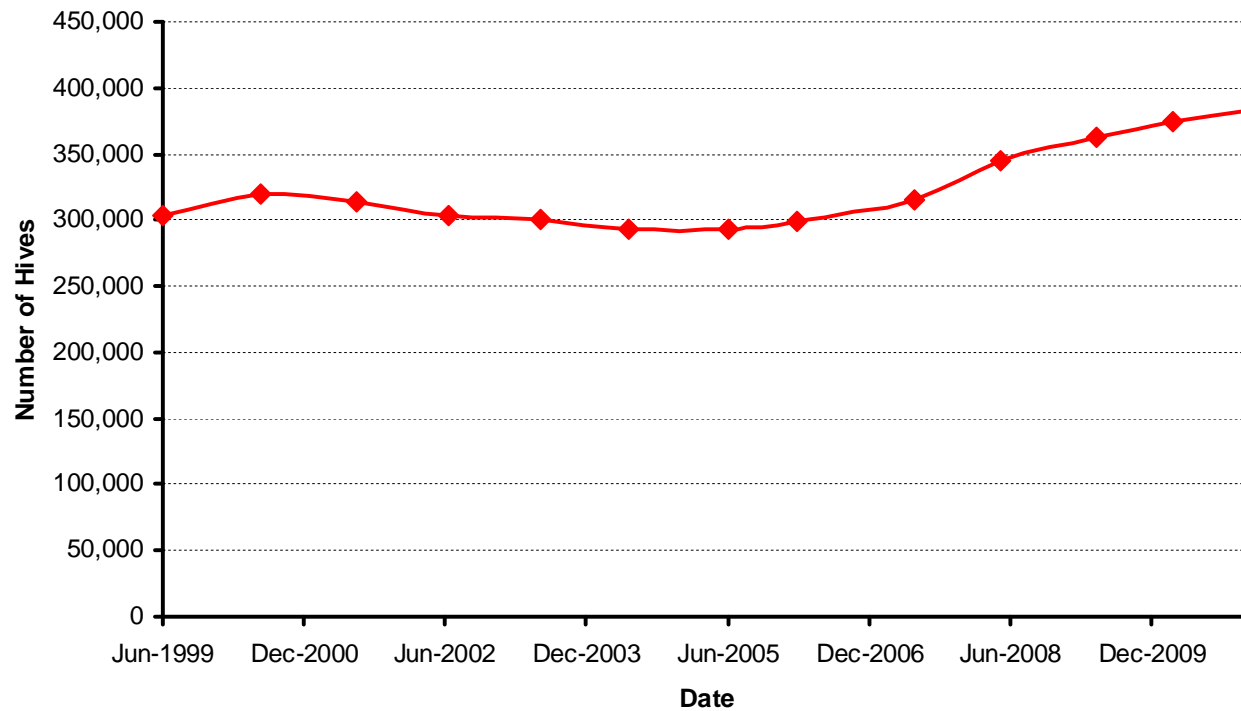


# Impacts on bee industry (continued)

- Beekeeping more labour-intensive due to treatment and monitoring requirements
- Beekeepers without access to manuka honey or pollination contracts are struggling
- Industry in upper North Island (manuka area) has expanded
- South Island industry struggling as varroa spreads south
- Industry vulnerable to world honey price declines

# NZ hive numbers

Total Number of Hives in New Zealand  
30 June 1999 to 28 January 2011



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# Impact on other industries

- Pollination costs have increased for horticulture sectors
  - Kiwifruit pollination 1999 USD\$60 per hive
  - Kiwifruit pollination 2001 USD\$90+ per hive
- Possible long-term impact on animal production from reduced pollination of pasture legumes by feral bees
- This is likely to be the major impact on NZ of varroa

# Miticide resistance

- Many beekeepers have relied on Apistan/Bayvarol
- Chemical rotation recommended, but not practiced by all beekeepers
- Evidence of pyrethroid-resistant varroa emerging
- Thymol or acid-based treatments have had variable results to date
- This is major issue facing industry

# NZ industry strengths

- Skilled professional beekeepers
- Ability to learn from other countries
- Rapid registration of control products
- Initial support from government with education and research
- Strong demand for pollination hives
- High value of honey, especially manuka