Where the breed should be heading for maximum efficiency

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When will you “get there”?

- Cows currently pregnant in NZ will mostly calve in Spring 2021
- Their sons will be yearlings in Spring 2022 and some will become sires
  - They may be used for several years
- Those matings in 2022 will produce calves born in 2023
  - Most of those will be harvested in 2024, 2025 or 2026
  - Some will be replacement females and will calve in 2025
    and may continue producing calves for another 10 years or so
- Any within-breed change in selection practices
  will take 5 or so years to influence terminally-sired beef market
  and 10 or more years to influence maternal attributes

It’s the direction of the journey – you never actually get there….

We must therefore take a long-term view on “where the breed should be heading”

And I would expect this direction to change over time and with technology (eg new phenotypes)

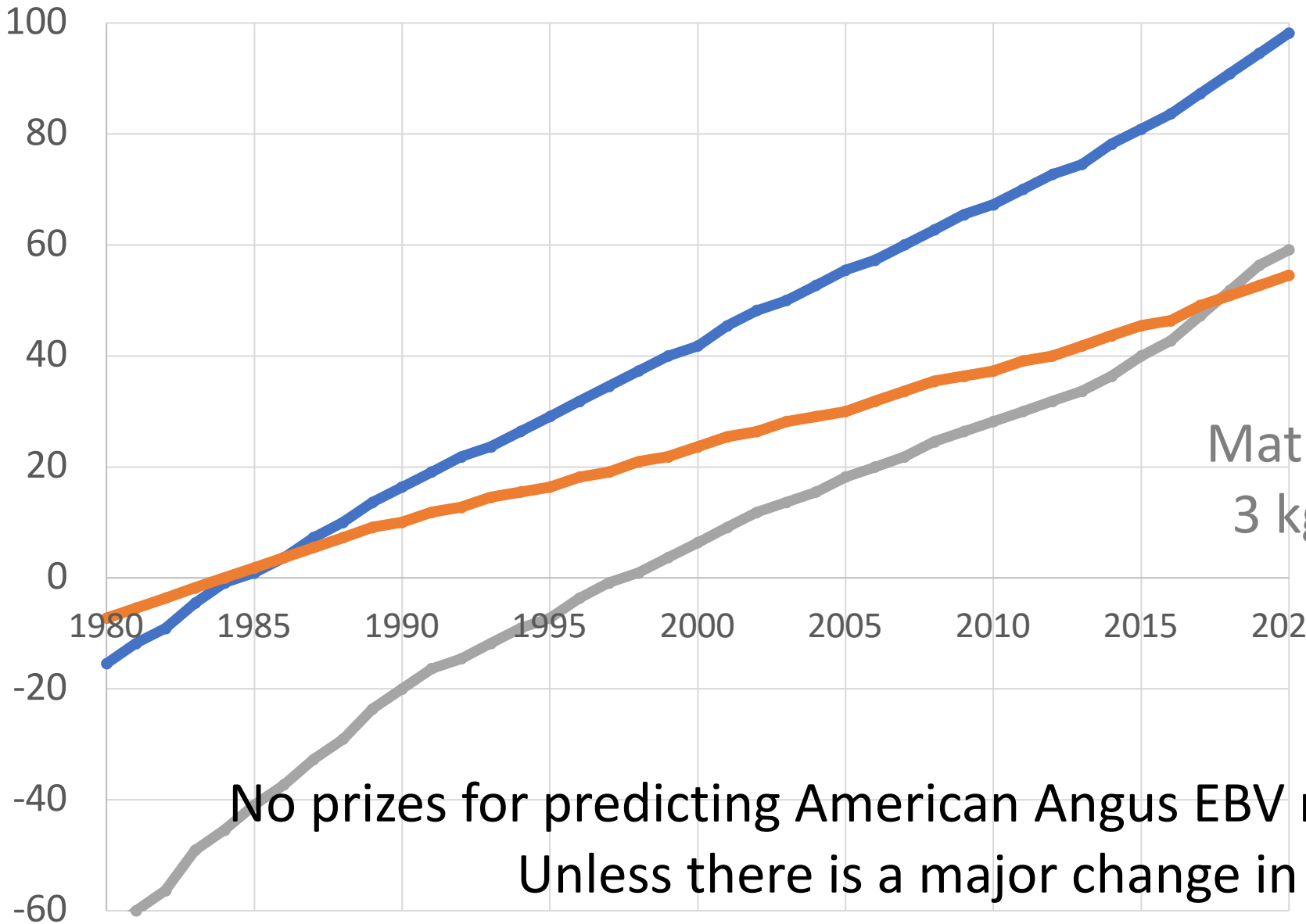
Where are you headed?

(Who knows – not even you?)

Where have you come from?

(You leave hoofprints)

American Angus Association Genetic Trends (EBV in kg)



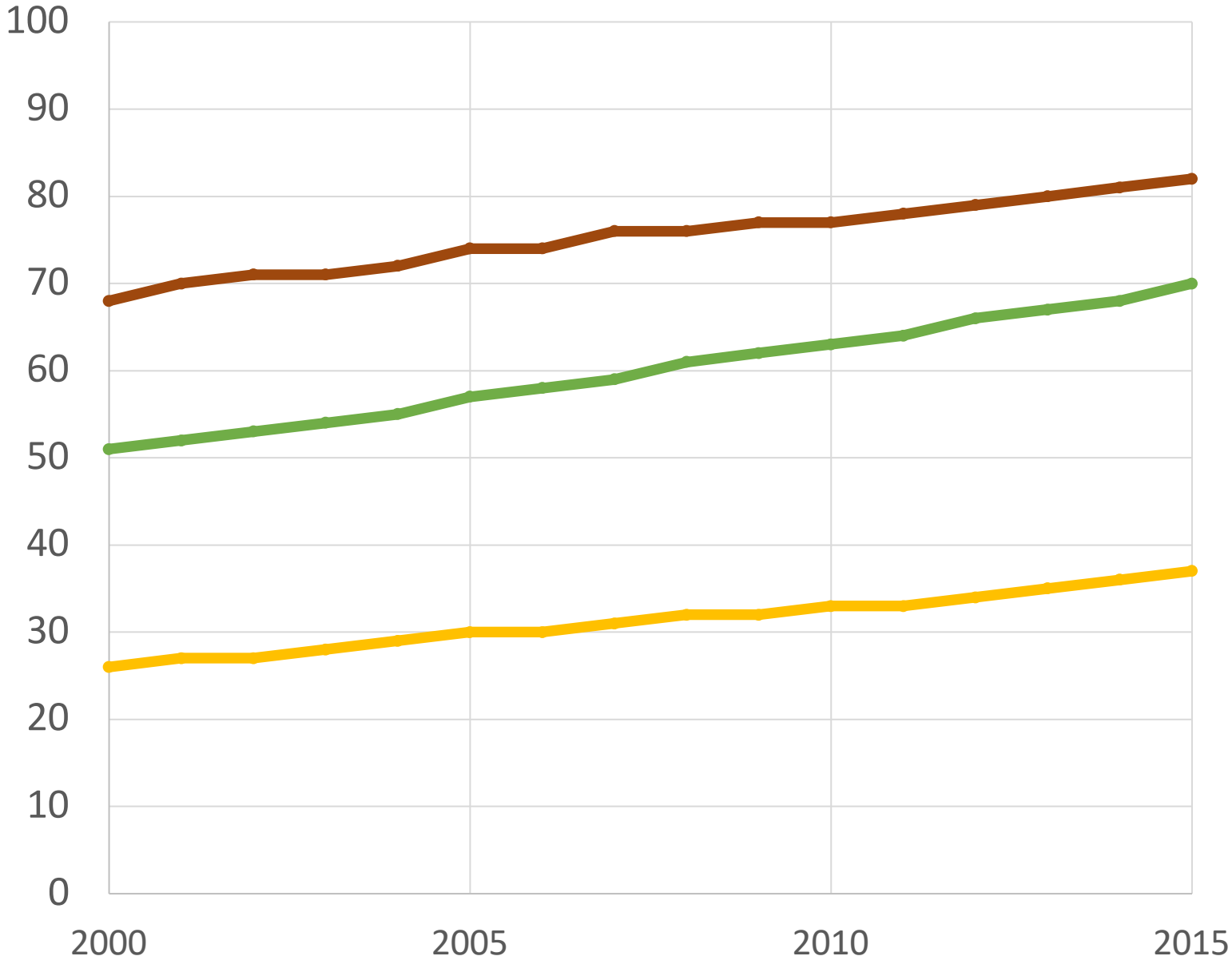
Yearling Weight
3 kg per year

Weaning Weight
1.5 kg per year

Mature Weight
3 kg per year

No prizes for predicting American Angus EBV means in 2030 or 2040!
Unless there is a major change in behaviours

NZ & AUS Angus Genetic Trends (EBV in kg)



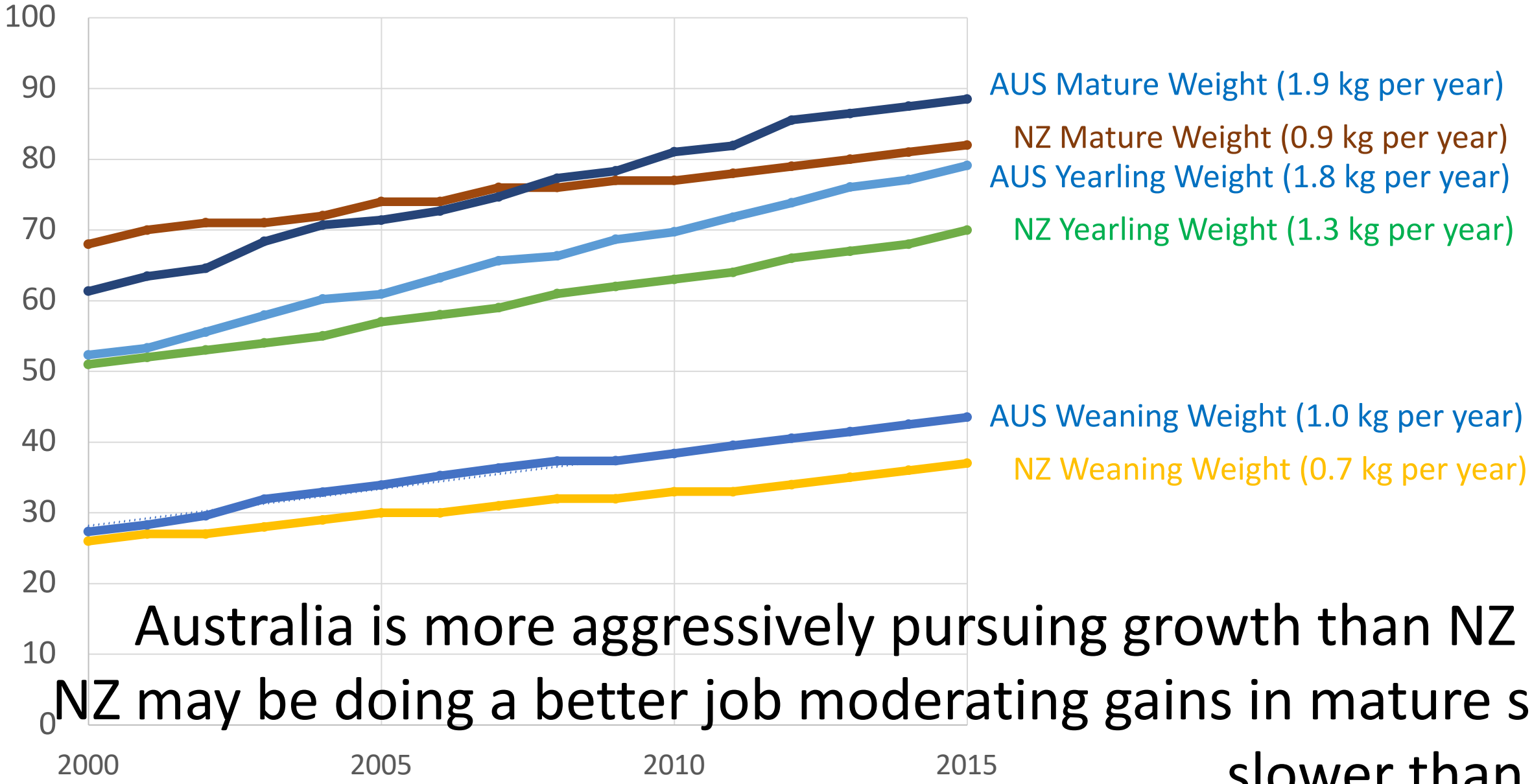
NZ Mature Weight (0.9 kg per year)

NZ Yearling Weight (1.3 kg per year)

NZ Weaning Weight (0.7 kg per year)

Angus NZ website trends don't go beyond 2010!!!???

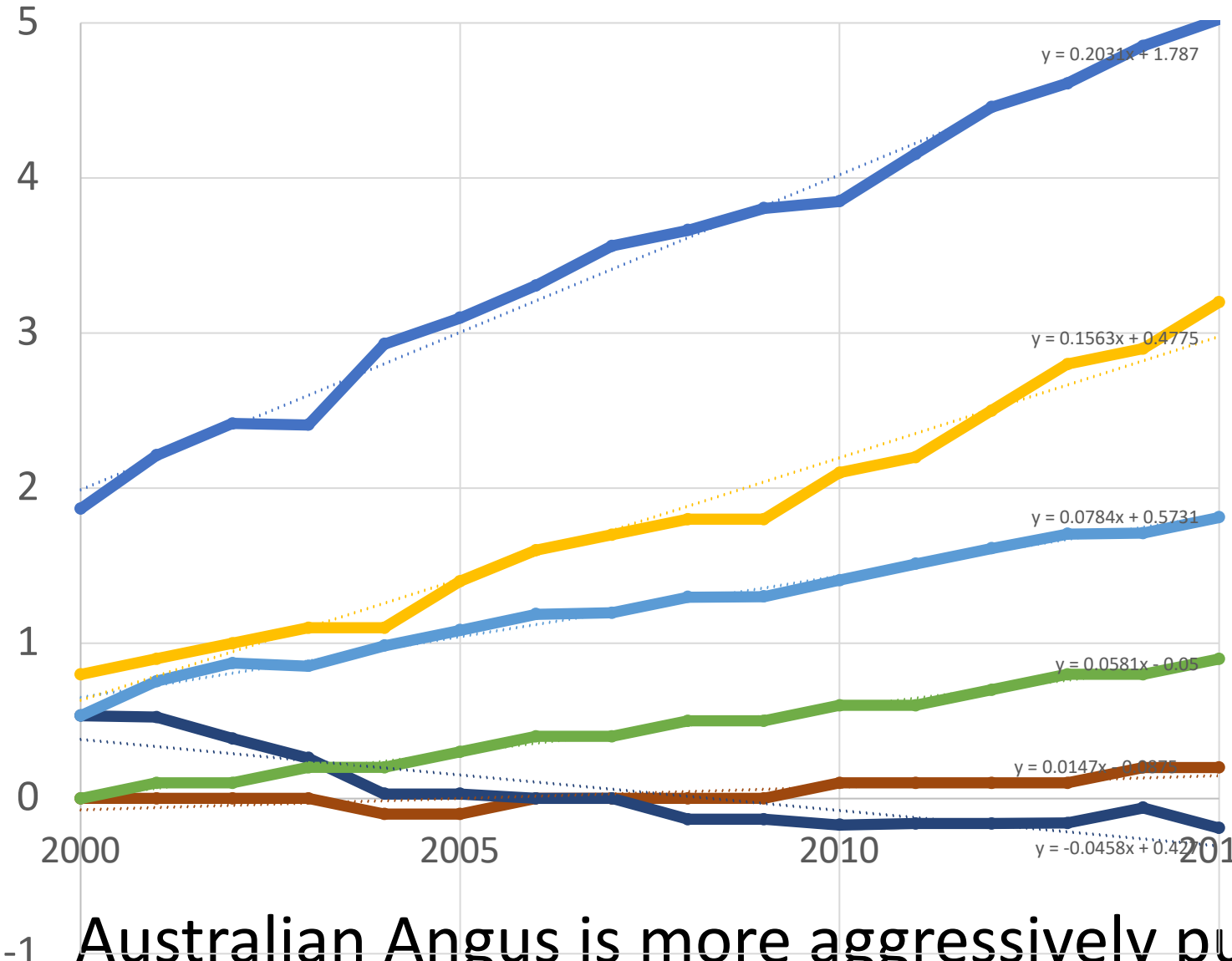
NZ & AUS Angus Genetic Trends (EBV in kg)



Australia is more aggressively pursuing growth than NZ

NZ may be doing a better job moderating gains in mature size slower than US

NZ & AUS Angus Genetic Trends (EBV for carcass)



AUS Eye-Muscle Area (0.20 per year)

NZ Eye-Muscle Area (0.16 per year)

AUS Intra-Muscular Fat (0.08 per year)

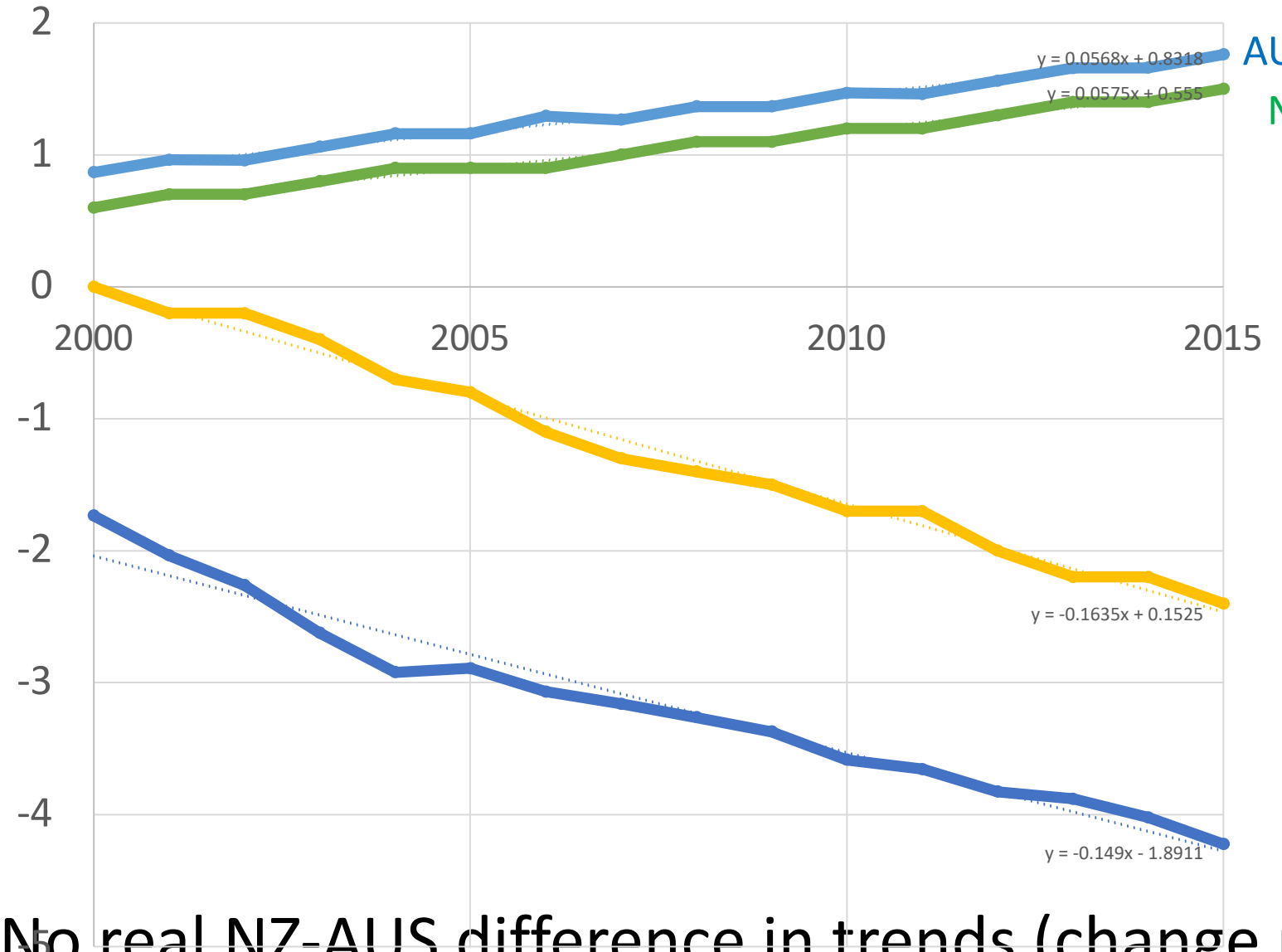
NZ Intra-Muscular Fat (0.06 per year)

NZ P8 fat (0.01 kg per year)

AUS P8 fat (-0.05 per year)

Australian Angus is more aggressively pursuing EMA and IMF than NZ

NZ & AUS Angus Genetic Trends (EBV for reproduction)



AUS scrotal size (0.06 per year)

NZ scrotal size (0.06 per year)

NZ days to calving (-0.16 kg per year)

AUS days to calving (-0.15 days per year)

No real NZ-AUS difference in trends (change per year) for reproduction

Where are NZ Angus breeders currently investing their selection pressure that is not being reflected in the TransTasman Breedplan EBVs?

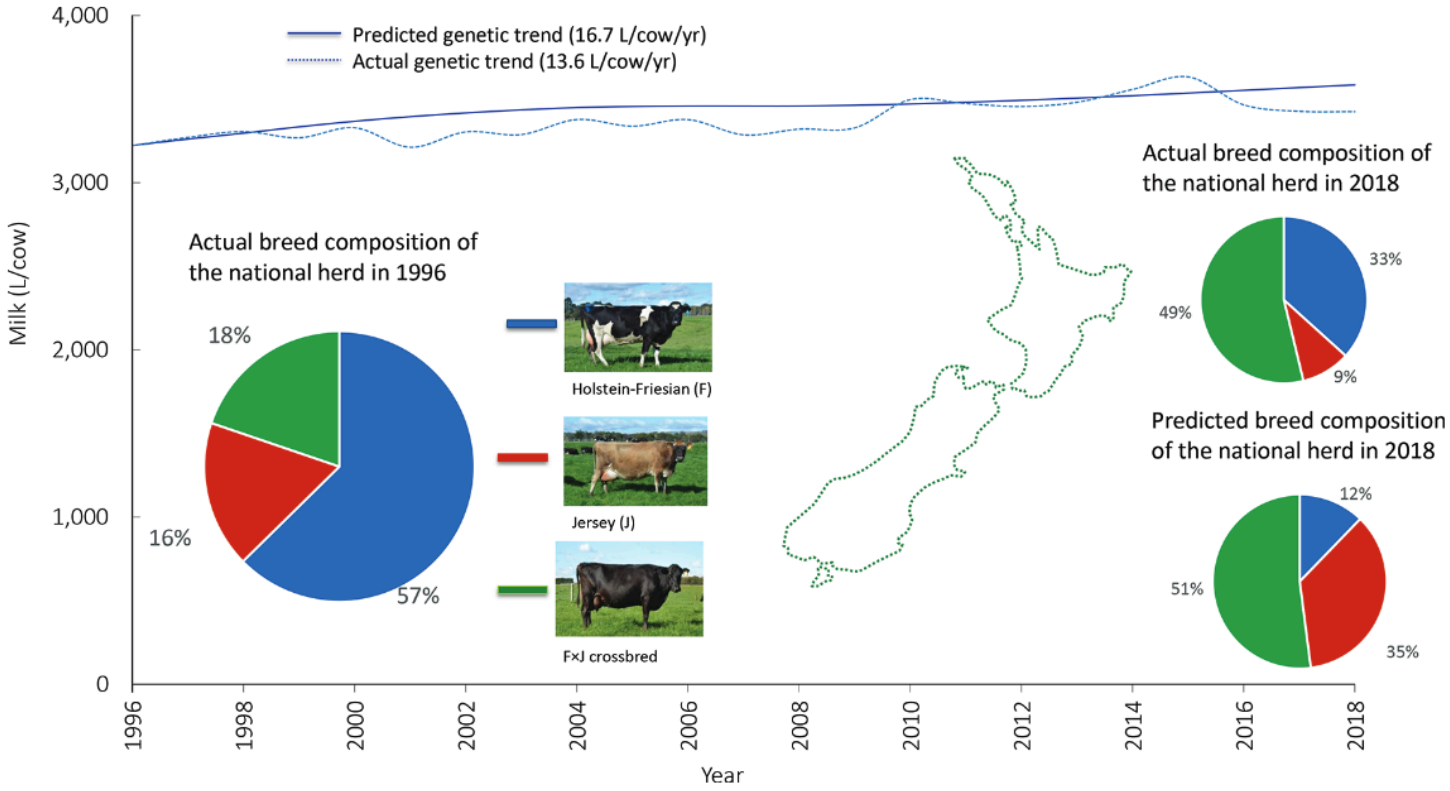
Maybe curve-bending?

(Or are they wasting selection pressure on phenotypic differences that are not inherited ?)

Cumulative dairy cow genetic change from selection and crossbreeding over the last 2 decades in New Zealand closely aligns to model-based predictions published in 2000

N. Lopez-Villalobos,* H. T. Blair, and D. J. Garrick

Graphical Abstract



We closely predicted
- annual gain
- popularity of the Kiwi-cross
But we predicted
a larger decline in the HF, and
a larger increase in J

Farmers prefer the HF breed over J
to a larger extent than
would be prudent for
profitability & efficiency

Journal of Dairy Science (2021)
Short Communications in Genetics

What to expect in NZ Angus for the next 10 years

- NZ Angus cattle will change their mean EBV by
  - +7 kg for weaning weight
  - + 13kg for yearling weight
  - + 9 kg for mature cow weight
  - + 1.6 units of eye-muscle area
  - + 0.6 units for intra-muscular fat
  - No change in P8 fat
  - - 1.6 days to calving
  - + 0.6 units of scrotal size
- Unless there is a sudden collective change in behaviour!
  - That hasn’t happened over the last 15 years at least…

What to expect for popularity of Angus….

….relative to competitive breeds….Hereford, Simmental, etc

- For sires in beef cow herds? Angus is likely secure at present
- For sires in dairy herds? Angus future is uncertain (+ve or –ve)

- With no across-breed evaluation decisions will not be based on facts!
  - The only sources of beef breed comparisons at any scale will have to come from dairy!

Traditional Roles of a Breed Association

- Breed Purity
- Breed Promotion
- Breed Improvement

} “Modern” view would include **Education**

- The order of these 3 (or 4) roles varies from
  - breed to breed
  - country to country

But part of the **long-term success** of a breed relies on the breed being easily recognizable from animals of other breeds

Recognizing Beef Breeds

- Used to be easy!
    - Angus, Hereford, Simmental, Charolais……Friesian and Jersey
- Now very difficult in the US – thanks to CAB
    - Many composite breeds that are black and similar in appearance
- Now also very difficult in the NZ dairy industry….

How many of these calves are Angus-cross?

Acknowledgements:
Lucy Coleman PhD

Angus in the Dairy Beef Sector

There is a significant opportunity
for an “Angus-like” sire
that produces **identifiable** offspring
when mated to NZ dairy cows

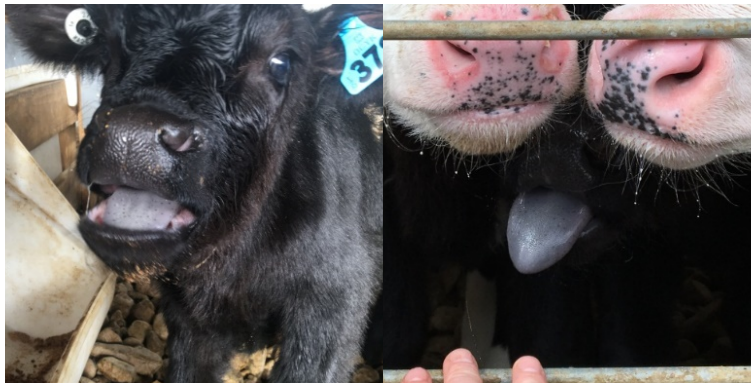
- Hereford-crosses = white face = easy
- Angus-crosses often looks like crossbred dairy calves

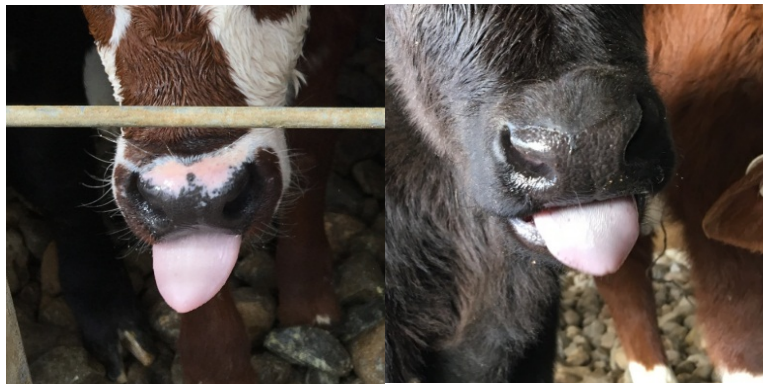
How might you identify an Angus-sired Kiwi-cross calf?

Calf identification

We know:

- Angus breed is polled, have a black tongue
- Dairy breeds still mostly have horns, HF = pink tongue, J = Black tongue, XB = Black/Pink/Spotted





Tongue colour and horn bud presence recorded within 48h of birth

Acknowledgements:
Lucy Coleman PhD

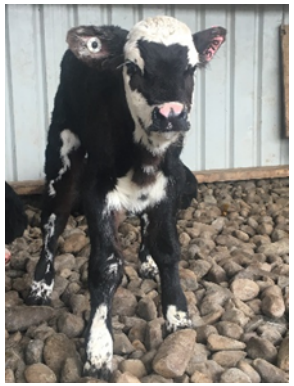
Lucy identified "**Right**" coloured calves

- Represent those which suggest **Holstein-Friesian** parentage,
  - Black coat
  - Hereford-sired calves – clean white face and four clean white feet

Acknowledgements:
Lucy Coleman PhD

And “**Wrong**” coloured calves

- Represent those with traits generally indicative of **Jersey** parentage
  - Brown, red or brindled coat
  - Patchy coloured feet
  - Hereford-sired calves, do not have a clean white face, or solid (non-white) coloured feet

Right and wrong coloured calves

- Using the Angus- and Hereford-sired calves in the experiment (593 calves)
- Calves born in a XB herd
  - Angus 76% right
  - Hereford 38% right

- Sale prices* derived from Frankton calf sales over 3 years (2018/19/20)

	Angus		Hereford		Jersey
	Bull	Heifer	Bull	Heifer	
'Right' colour	$110	$80	$210	$110	$28
'Wrong' colour	$70	$50	$110	$60	$28

> (Right' colour > Jersey; Wrong' colour = Jersey)

- Vast majority of calves from a HF herd would be expected to be "right" coloured
  - Not true for a crossbred Kiwi Cross herd

- "Right colour" Hereford-sired bull calves had $100/calf premium over "right colour" Angus-sired bull calves
- "Wrong colour" calves suffered a significant price penalty

Price penalties for Angus-sired
compared to Hereford-sired calves
transmit to lower demand/prices
for **Angus** bulls compared to Hereford bulls
for use in dairy herds

Does that matter? Or are you only breeding bulls for use as sires in beef cow herds?

Dairy Improvement in NZ

- Genetic improvement of the New Zealand dairy herd is cumulative and permanent and currently worth $300 million per year.

$300 million =

740,000 (heifer replacements) x
$10 (BW units gain per year) x
5.4 (expressions/heifer) x
7.5 (NPV of $1 cumulative gain)

Background

- These gains are the result of organised breeding schemes which involve multiple organisations providing a range of breeding and information services to farmers.
- Some of these services and the structures that support them are competitive while others, for good reasons, are without competitors.
- NZAEL was established, as a wholly owned subsidiary of DairyNZ, to provide these non-competitive services and structures – the Dairy Industry Good Animal Database (**DIGAD**), the National Breeding Objective (**NBO**) and independent Genetic Evaluations (**GE**).

Size of the Prize – Amer et al 30th September 2019

	Cattle				
Item	Dairy	Dairy-Beef	Beef	Sheep	**Totals**
Current industry value (NZ$ Billion)	16.7	1.5	1.3	2.2	**21.7**
Current benefits of genetic gain (NZ$ Million annualised)	300	0	7	125	**432**

Size of the Prize – Amer et al 30th September 2019

Potential value of extra genetic progress if annualised gains were to increase by 0.5% or 0.2% of current industry value

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Item	Dairy	Dairy-Beef	Beef	Sheep	**Totals**
Current industry value (NZ$ Billion)	16.7	1.5	1.3	2.2	**21.7**
Current benefits of genetic gain (NZ$ Million annualised)	300	0	7	125	**432**
Current benefits as % industry value	2%	0%	1%	6%	
Moderate impact scenario **(+0.5% of value)** (NZ$ Million annualised)	84	8	6	11	**109**
Low impact scenario **(+0.2% of value)** (NZ$ Million annualised)	33	3	3	4	**43**

Where are we currently heading ?

- Dairy Cattle gains are 2% industry value
- Dairy-Beef gains are nil
- Beef Cattle gains are 1% industry value
- Sheep gains are 6% industry value

The value proposition for genetic gain is not equal in all industries

It is best in sheep (hence BLG investment)

It is worst in beef cattle (hence lack of levy funds in purebred beef)

What's the Prize for doing a better job?

For a modest 0.5% improvement:

- Dairy Cattle $84 million p.a.
- Dairy-Beef $ 8 million p.a.
- Beef Cattle $ 6 million p.a.
- Sheep $11 million p.a.

Improving genetic gain in beef cattle would realize $8+$6=$14 million p.a.

Even with only a modest "improvement"

Two parts to realizing the Prize

- Improved rates of genetic gain (values shown)
  - More income (eg more and better beef)
  - Reduced costs (per unit production)
  - Reduced green house gases and environmental contaminants (eg N)
  - At least partly from an increased adoption of genomics
  - No evidence that genomics has changed NZ Angus genetic gains to date
- Improved information (values are in addition to those shown)
  - Data is crucial to genetic improvement
  - Information enables better decisions
  - There have been no real improvements in beef cattle information in last 15 years at least – (probably not since introduction of ultrasound scanning)

Capturing the Prize

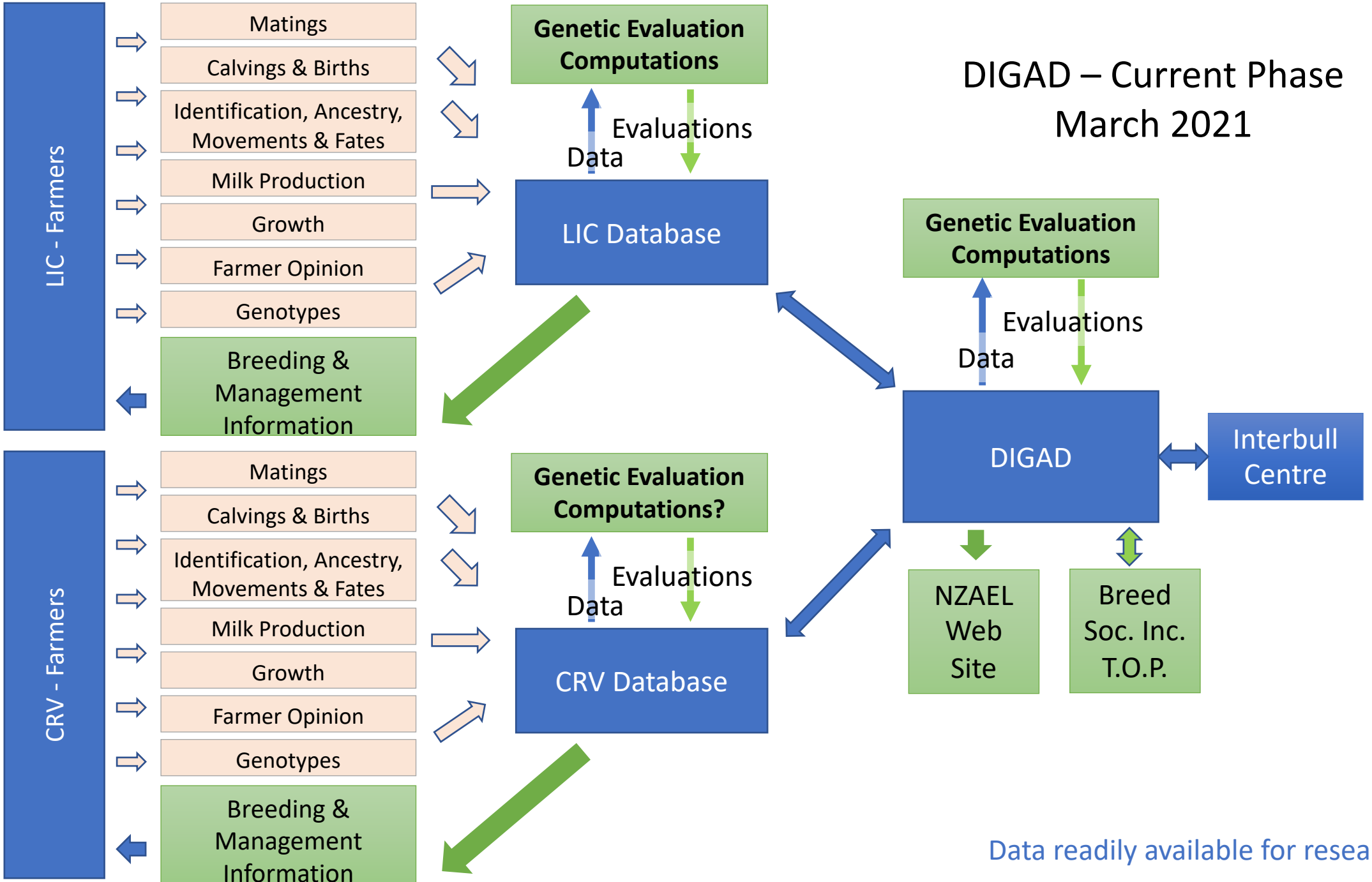
No evidence I have seen that NZ Angus breeders
or the NZ Angus Association
has invested any resources to try and capture some of the prize

Capturing the Prize

So it looks like someone else
will need to provide the leadership
if anything is to happen!!!!

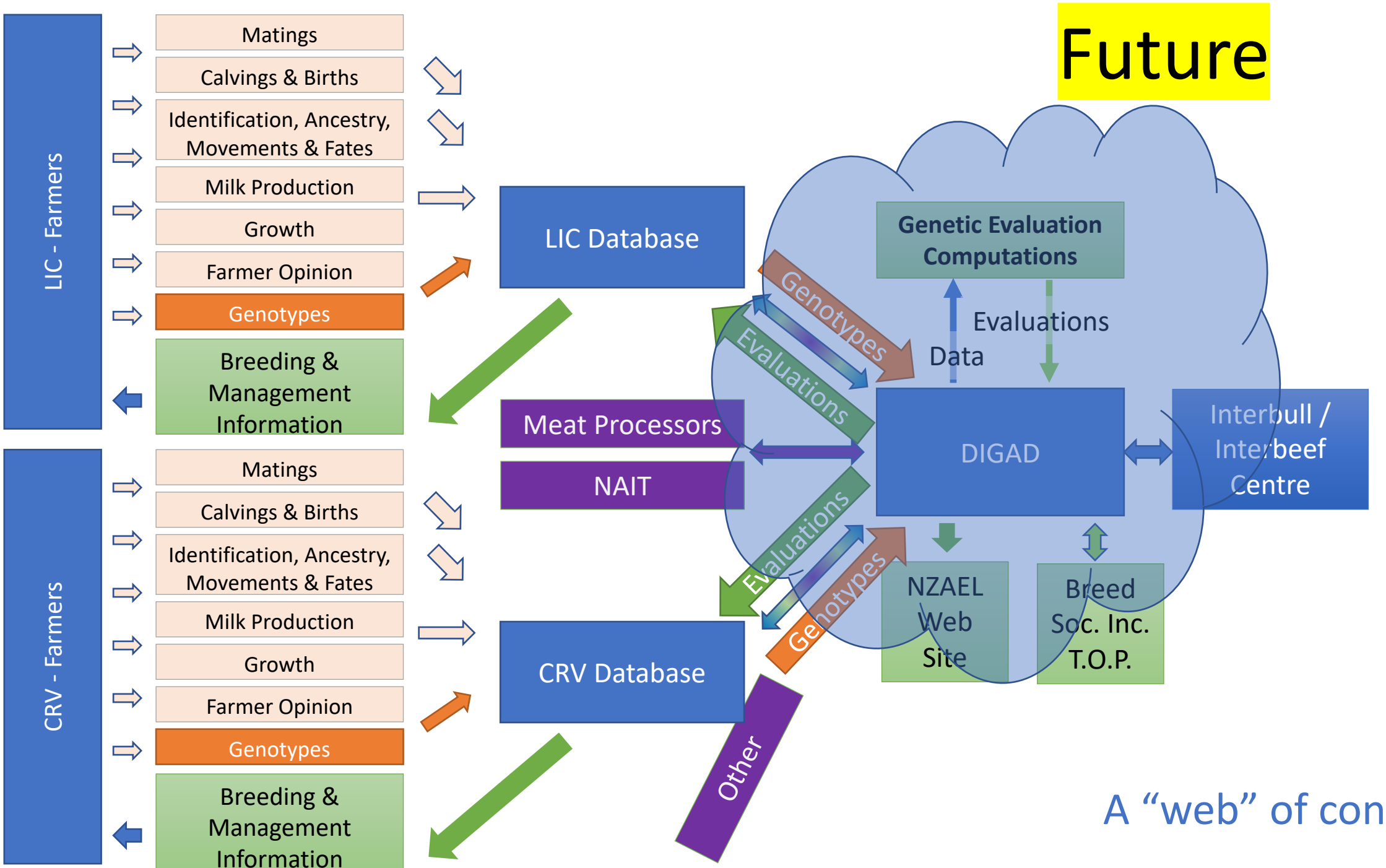
(or else it is a well-kept secret)

DIGAD – Current Phase
March 2021



Data readily available for research and education

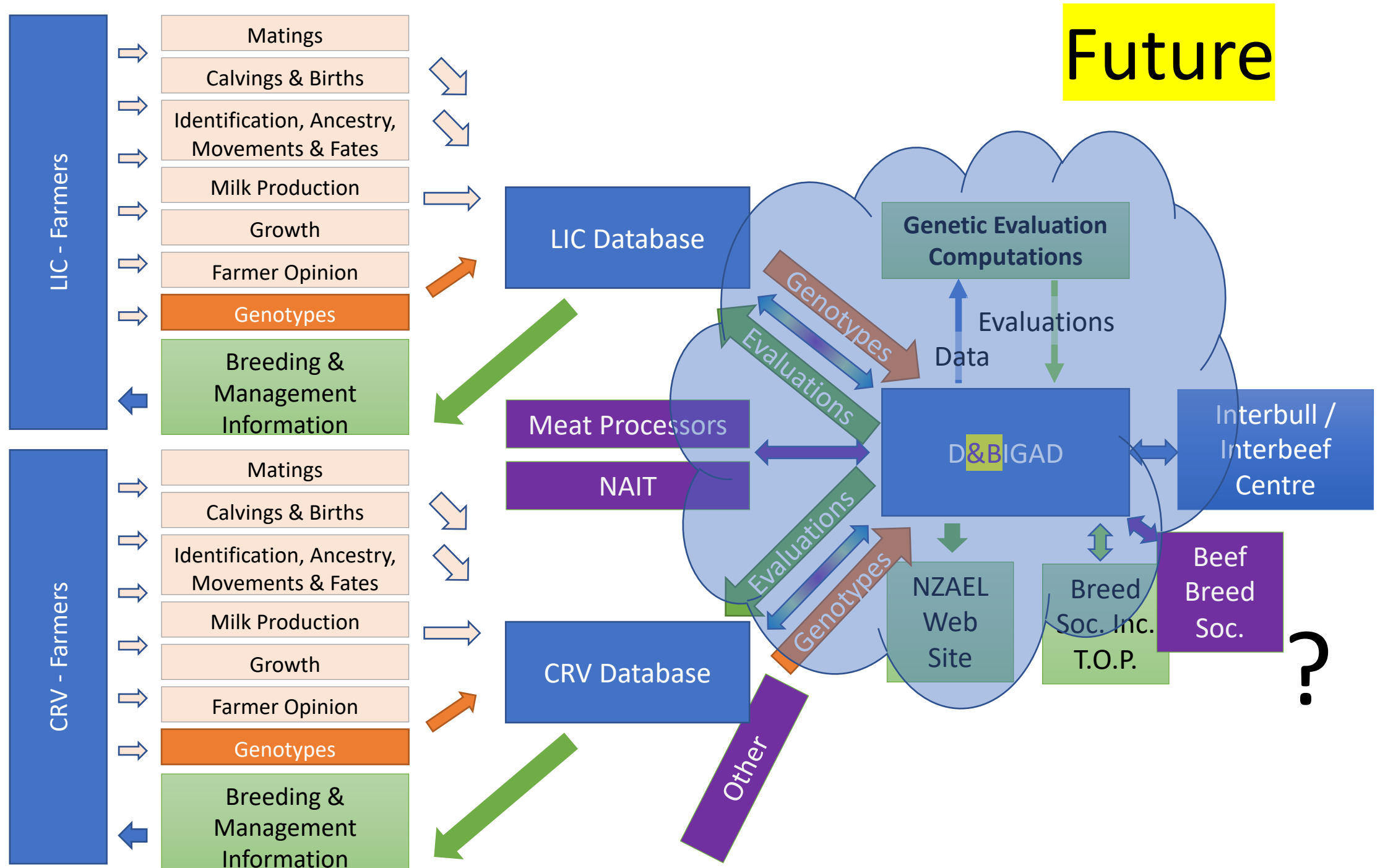
Future



A “web” of connections

Current DIGAD

- In the last 10 years alone, the dairy pedigree
  (60 million animals if all males included)
  recognizes the use of over 2,000 Angus sires in dairy herds
  - Reliable details of progeny counts and herd distributions still being compiled
- This is about the same number of sires (with at least 10 offspring) as appear in the NZ Angus pedigree over the same 10 year period


Future
LIC - Farmers
Matings
Calvings & Births
Identification, Ancestry, Movements & Fates
Milk Production
Growth
Farmer Opinion
Genotypes
Breeding & Management Information
CRV - Farmers
Matings
Calvings & Births
Identification, Ancestry, Movements & Fates
Milk Production
Growth
Farmer Opinion
Genotypes
Breeding & Management Information
LIC Database
Meat Processors
NAIT
CRV Database
Other
Genetic Evaluation Computations
Genotypes
Evaluations
Data
Evaluations
D&BIGAD
Interbull / Interbeef Centre
Evaluations
Genotypes
NZAEL Web Site
Breed Soc. Inc. T.O.P.
Beef Breed Soc.
?

Current Beef Databases (ILR2)

Individual Breeders

Individual Breeders

PBB

Individual Breeders

Data available in NZ for research or education only with great difficulty

Adding value from NAIT and meat plant data

- Meat plant data has little value unless contemporary groups that define cohorts from birth to slaughter can be identified
- Such data is collected routinely by NAIT
- Combining the NAIT data, the meat plant data, the DIGAD pedigree and with the addition of genomic data, a powerful new resource will exist
  - Allow better evaluations of liveweight in dairy cows (and beef cattle)
  - Allow evaluations on actual carcass data (rather than just based on ultrasound)
  - Allow evaluation of cattle for some diseases
    - Bovine Tb, liver fluke, facial eczema, etc
  - Allow better evaluation of sustained fertility (ie stayability/longevity)
  - Improve quality assurance schemes (especially with genomic data)

Summary

Where the breed should be heading for maximum efficiency?

Summary - Where the breed should be heading for maximum efficiency?

- There is a better direction than the current one
  - There is millions of additional dollars (per annum) at stake!
  - It involves making greater genetic gains
    - This requires accessing data sources that are currently being ignored
    - And making greater use of genomics
    - It involves making better use of information
  - It involves accepting that the dairy bull market is a significant opportunity
    - For offspring of kiwi-cross cows (the predominant NZ breed) it will require better systems for assurance that calves are Angus sired
- Where it ends up heading will reflect your collective behaviours in terms of seizing new opportunities (or not)