

SELECTING YOUR NEXT ANGUS BULL



Careful selection of the most appropriate bulls offers a considerable opportunity to increase productivity and profitability within a beef breeding enterprise, with each bull having the potential to produce hundreds of progeny during its breeding life.

Considered bull selection using all the information available on each bull offers the potential to best utilise the genetic differences between Angus bulls and maximise the genetic improvement that is achieved within a beef herd.

SETTING A BREEDING OBJECTIVE

The key elements of the success in any breeding program are no different when using Angus bulls to those when using bulls of any breed, being careful planning, the use of good information to assist in decision making, and, above all, consistency and patience in the pursuit of desired breeding goals.

Before considering decisions regarding bull selection, it is important that producers develop a clearly defined plan of what they are attempting to achieve from their breeding program. This may be described as setting a breeding objective or breeding goals, and should consider aspects such as the relative economic importance of different traits, future customer requirements, future herd production targets and current herd performance.

Likewise, prior to any bull selection decisions being made, it is important that careful consideration be given to the design of the breeding system that will be utilised. There are many different strategies or systems that could be used when utilising Angus genetics within a beef breeding program. These range from straight bred breeding programs to simple crossbreeding systems to more complex composite breeding programs, with no one system being suitable for all breeding herds or enterprises.

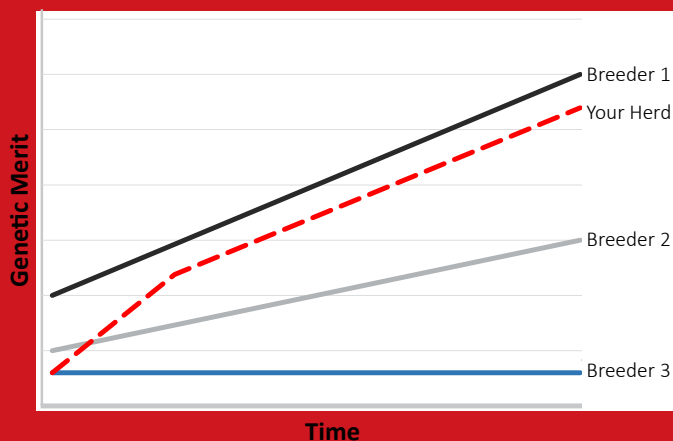


SELECTING A SEEDSTOCK BREEDER

When bull selection involves the purchase of bulls, identification of the seedstock breeder, or seedstock breeders from which Angus bulls will be purchased is an important consideration.

Care should be taken to select seedstock breeders who:

- Offer Angus bulls carrying genetics that are consistent with the breeding goals or objectives of the breeding program in which the bulls will be joined
- Offer Angus bulls that are of equivalent or superior genetic merit to the bulls used within the breeding program in previous years
- Offer Angus bulls with a full set of TACE EBVs and selection index information, particularly for the traits of major importance to the breeding program in which the bulls will be joined
- Offer Angus bulls with known status for genetic conditions
- Offer Angus bulls that have been subject to a Veterinary Bull Breeding Soundness Evaluation (VBBSE)
- Provide information about the vaccination and health treatments that have been provided to the bulls that are available for selection.



Genetic merit will be maximised by sourcing bulls from a seedstock breeder, like Breeder 1 above, who is offering bulls of high genetic merit and who is making genetic improvement year after year

NON-GENETIC INFLUENCES ON ANIMAL APPEARANCE AND PERFORMANCE

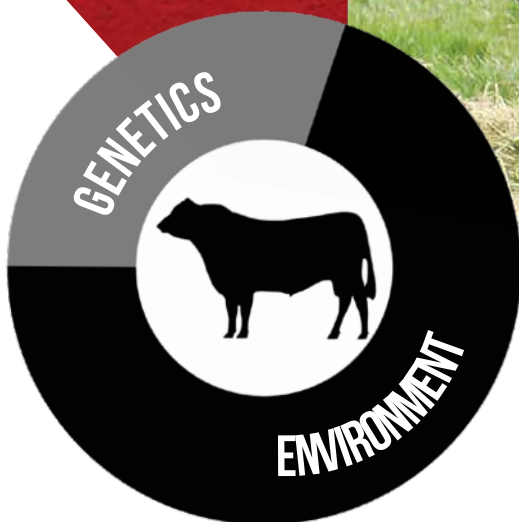
The appearance and performance of a bull is a combination of its genetics plus a range of non-genetic influences.

Non-genetic influences are numerous and include such things as:

- the environment in which the bull has been raised
- whether the bull has been supplementary fed, both in recent times and in the past
- how the bull has been managed
- the bull's health status
- whether the bull has previously been sick or injured
- the age of the bull
- whether the bull was reared by a mature cow or a maiden heifer
- whether the bull has been fighting excessively or has been bullied
- whether the bull has been previously joined.

When selecting Angus bulls, it is important to avoid the distraction of any non-genetic influences on the appearance or performance of the bulls that are available for selection.

Ensure selection decisions are focused on identifying bulls that are carrying the genetic package that is most aligned with the breeding objective of the individual breeding program in which the bulls will be joined.



CONSIDERING TACE INFORMATION

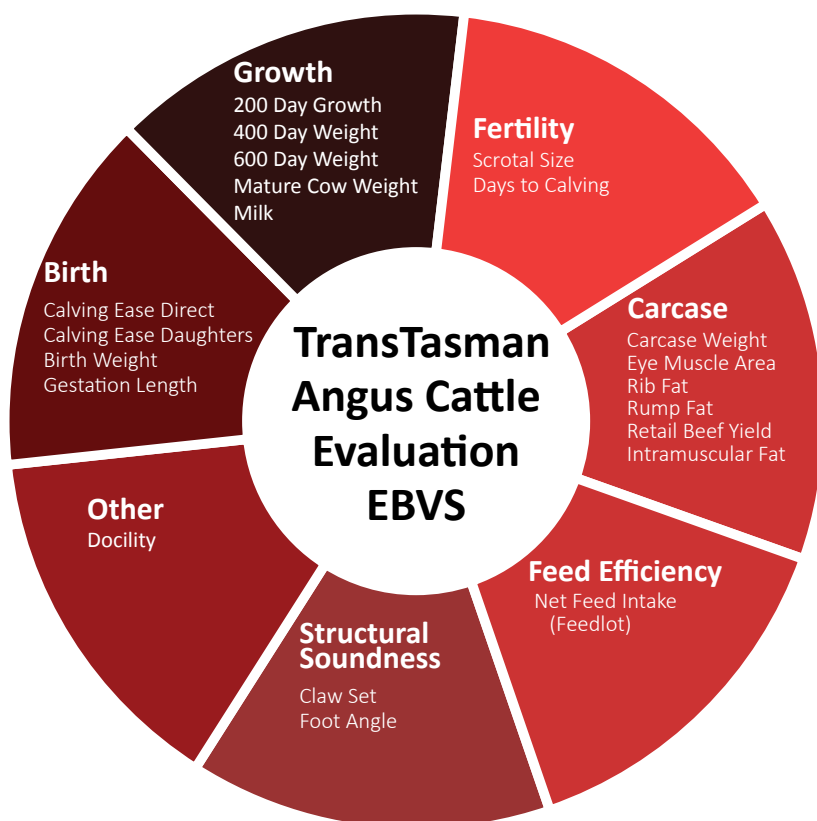
A range of information is provided on Angus bulls that describes the genetics of each bull that is available for selection.

The TransTasman Angus Cattle Evaluation is the genetic evaluation program adopted by Angus Australia for Angus and Angus influenced beef cattle. The TransTasman Angus Cattle Evaluation uses Best Linear Unbiased Prediction (BLUP) technology to produce Estimated Breeding Values (EBVs) of recorded cattle for a range of important production traits (e.g. weight, carcase, fertility).

TACE EBVs consider pedigree, performance and genomic information that is available on a bull and/or its relatives to provide an estimate of the bull's genetic merit (or breeding value) for each trait.

In addition, ten selection indexes are calculated for Angus bulls within the TACE analysis, being Angus Breeding, Angus Breeding Low Feed Cost, Domestic, Domestic Low Feed Cost, Heavy Grain, Heavy Grain Low Feed Cost, Heavy Grass, Heavy Grass Low Feed Cost, AngusPRO and Angus Terminal Indexes

The selection indexes assist producers using Angus bulls in making "balanced" selection decisions, taking into account the relevant growth, carcase & fertility attributes of each bull to identify animals that are most suitable for use within their particular commercial enterprise. The selection indexes calculated for Angus bulls reflect both the short term profit generated by an animal through the sale of their progeny, and the longer term profit generated by their daughters in a self-replacing cow herd.



SELECTION INDEX DESCRIPTIONS

Angus Breeding Indexes	Domestic Indexes	Heavy Grain Indexes	Heavy Grass Indexes	Angus Terminal Sire Index	AngusPRO Index
<ul style="list-style-type: none"> • Self replacing herd • Daughters are retained for breeding • Identifies animals that will improve overall profitability in the majority of commercial, self replacing, grass and grain finishing beef production systems. • \$A includes an objective of maintaining mature cow weight, whereas the \$A-L does not include this objective 	<ul style="list-style-type: none"> • Self replacing herd • Daughters are retained for breeding • Steer progeny are either finished using pasture, pasture supplemented by grain, or grain (eg. 50-70 days) • Steer progeny slaughtered at a carcase weight of 280kg at 16 months of age • Eating quality traits important to suit MSA program • \$D includes an objective of maintaining mature cow weight, whereas the \$D-L does not include this objective 	<ul style="list-style-type: none"> • Self replacing herd • Daughters are retained for breeding • Steer progeny pasture grown with a 250 day feedlot finishing period • Steer progeny slaughtered at a carcase weight of 455kg at 24 months of age • Targeting high quality, highly marbled markets with a significant premium for superior marbling • \$GN includes an objective of maintaining mature cow weight, whereas the \$GN-L does not include this objective. 	<ul style="list-style-type: none"> • Self replacing herd • Daughters are retained for breeding • Steer progeny finished on pasture • Steer progeny slaughtered at a carcase weight of 350kg at 22 months of age • Eating quality traits important to suit MSA program • \$GS includes an objective of maintaining mature cow weight, whereas the \$GS-L does not include this objective 	<ul style="list-style-type: none"> • Terminal breeding program where Angus bulls are being used as a terminal sire over mature females • All progeny, both male and female, are slaughtered • Focus on increasing growth, carcase yield and eating quality. • No emphasis is given to female fertility or maternal traits. 	<ul style="list-style-type: none"> • New Zealand production system • Self replacing herd • Daughters are retained for breeding • Steer progeny are finished on pasture for the AngusPure programme. • Steer progeny slaughtered at a carcase weight of 290 kg at 20 months of age • Significant premium for steers that exhibit superior marbling

USING TACE INFORMATION

Step 1 - Identifying the Selection Index of Most Relevance

The first step when considering the TACE information that is provided on Angus bulls is to identify the selection index that is consistent with the breeding objective for the individual breeding program.

The Angus Breeding Index and Angus Breeding Low Feed Cost Index are a general purpose selection indexes that are suitable for use in the majority of commercial beef operations, whereas the Domestic, Domestic Low Feed Cost, Heavy Grain, Heavy Grain Low Feed Cost, Heavy Grass, Heavy Grass Low Feed Cost and AngusPRO selection indexes are specific to beef operations targeting a defined production system and market endpoint.

If none of the selection indexes calculated on Angus bulls are deemed to be relevant, the development of a customised index using herd-specific production information and marketing goals should be considered. For further advice regarding the development of a customised selection index, contact staff at Angus Australia.

Step 2 - Ranking Bulls on Selection Index

Having identified the selection index of most relevance, the bulls available for selection can be ranked on that particular selection index.

When ranking animals on a selection index, it is important to note:

- TACE selection indexes can only be used to rank bulls analysed within the TACE analysis. As with EBVs, the selection indexes calculated for animals in different genetic evaluations are not directly comparable.
- In addition to ranking the animals available for selection, producers can use selection indexes to benchmark where an animal ranks compared to other animals analysed within the TACE analysis by comparing its selection index value to the TACE reference tables.

Current reference tables (breed average and percentile bands table) for each selection index can be accessed from the Angus Australia website (www.angusaustralia.com.au) and are routinely provided in sale and semen catalogues.

Step 3 - Consider Individual EBVs of Importance

Having ranked the Angus bulls available for selection on the selection index of relevance, it is important to pay attention to each animal's EBVs to ensure they are carrying appropriate genetics for individual traits of particular importance in the breeding program.

For example, producers may pay particular attention to:

- Higher 400 Day Weight & 600 Day Weight EBVs if trying to decrease the age of turnoff
- Higher Scrotal Size EBVs and lower Days to Calving EBVs if trying to improve weaning rates
- Moderate to positive Fat EBVs if trying to improve the ability of progeny to fatten earlier or to increase MSA compliance
- Higher 600 Day Weight, Carcase Weight, IMF & Docility EBVs if trying to increase eating quality and MSA Index
- Moderate Milk EBVs if trying to moderate milk production in a sire's daughters

A simple way of considering an animal's individual EBVs, is to set acceptable ranges for the individual EBVs of particular importance. In this scenario, the bulls available for selection would initially be ranked on the selection index of relevance but any animal whose individual EBVs fall outside of the acceptable range would be excluded from selection.

EXAMPLE TACE REFERENCE TABLE

		BREED AVERAGE EBVs																	
		Carving Case		Birth		Growth				Fertility		Carcase		Other		Structure		Selection Index	
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
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		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
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		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
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		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
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		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W	W	W	W	W	WT	WT	WT	WT	WT	WT	WT	WT
		CEW	CEW	WT	WT	W	W												

CONSIDERING GENETIC CONDITIONS

Genetic conditions, or defects caused by DNA abnormalities, are present in all breeds of cattle. These conditions range from poor growth performance, structural unsoundness through to lethal conditions where all affected animals are not born alive.

The status of Angus bulls is routinely reported for several genetic conditions, including: Arthrogryposis Multiplex (AM), Neuropathic Hydrocephalus (NH), Contractural Arachnodactyly (CA) and Developmental Duplications (DD).

The importance placed on the genetic condition status of an animal when selecting bulls for use in a beef breeding program will depend on the genetics of the cow herd in which they will be used (in particular, whether carrier bulls have been used previously and consequently whether some females may be carriers) and whether some female progeny will be retained or sold as breeders.

Summary	Basic Details	Semen Details	Ownership	Pedigree	Progeny	EBVs	EBV Chart	ASBP	Genet
Animal ID									
Tattoo									
Date of Birth									
Sex									
Status									
Colour									
Register									
DNA Profile Stored									
Parentage									
Verification									
Genetic Conditions									
AMF, CAF, DDF, NHF, MAF									



As a general recommendation, only Angus bulls that have been tested free or calculated to be free of known genetic conditions should be considered for use in commercial beef breeding programs. Seedstock breeders may opt to use carrier bulls and undertake a genomic testing program of the resultant progeny to identify those that are free of the genetic condition.

Irrespective of the breed, it is high risk to use bulls with an unknown status for genetic conditions.



BREEDING SOUNDNESS

It is important that all Angus bulls selected for use within a breeding program are sound and capable of getting their allocation of cows in calf within a given time frame. When evaluating bulls for soundness, it is important to focus on components that will adversely affect the function of the bull, and avoid the distractions of aesthetic features.

The recommended procedure for evaluating bulls is the Veterinary Bull Breeding Soundness Evaluation (VBBSE) examination as developed by the Australian Cattle Veterinarians. A full VBBSE assessment of an animal includes individual identification, history (including vaccinations) plus five key components, namely:

- A general physical examination including structure (conformation) and upper reproductive tract
- An examination of the testes and measurement of scrotal size
- Collection and assessment of a semen sample
- A serving assessment to evaluate libido and mating ability
- Laboratory examination of sperm morphology.

A pass on a VBBSE assessment is not an express guarantee of breeding soundness, but rather an indication of potential soundness in a normal mating situation. Angus bulls should only be joined within a breeding program if they have been subject to and have passed a VBBSE examination for as many as possible of the components listed above.

The Australian Cattle Veterinarians (ACV) recommends all five components be used for higher value bulls, or in intensive situations where bulls will be single sire mated, or subject to heavier mating loads.

In situations where VBBSE is not conducted, it is important to assess bulls visually and/or consider any assessment of structural soundness that may be available. Information from independent assessment of structural soundness by an accredited assessor is often provided on Angus bulls.

Key considerations include assessment of:

- testicle size and consistency
- sheath
- hind leg structure
- front leg structure
- feet conformation



Further information on assessing breeding soundness is available from the Australian Cattle Veterinarians (ACV) website: www.ava.com.au/cattle

BREEDING HEALTH

A number of diseases are prevalent in Australia that result in reduced weaning rates due to lower conception rates and/or increased rates of abortion. These diseases can be avoided or minimised through vaccination.

It is important to only select Angus bulls for use within a breeding program that have received the appropriate vaccinations and health treatments, with Angus bulls being routinely vaccinated for clostridial diseases, pestivirus (bovine viral diarrhoea virus), vibriosis, leptospirosis and in some environments, 3-day sickness (bovine ephemeral fever), tick fever and botulism.

The vaccinations and health treatments that should be conducted will vary with each breeding enterprise and a local veterinarian should be consulted if there is any doubt as to what is appropriate for the breeding program in which the bulls will be joined.



CONSIDERING OTHER SELECTION CRITERIA OF IMPORTANCE

Other selection criteria of importance that may also be considered when selecting Angus bulls for use in beef breeding programs include:

Temperament: In all situations, only bulls with acceptable temperament should be selected.

Pedigree: Maintaining genetic diversity is an important consideration in any breeding program and the pedigree of the bulls that are available for selection should be carefully compared to the pedigree of the females to which they will be joined. Any bulls that are too closely related should not be considered for selection.

Coat and hide characteristics: When selecting bulls for use in Northern Australia, selection for bulls with slicker coats may improve their adaptability and performance post relocation, particularly in areas where there are high tick burdens or a very high heat load.

Other: Any other traits of specific importance to the individual breeding program should also be considered. For example, many people selecting Angus bulls will consider traits such as muscularity (as assessed visually), maturity pattern, or various assessments of animal type. It is important to balance selection of any traits of specific importance based on their influence of the profitability of the beef enterprise, and avoid the distractions of aesthetic features.

CHECKLIST WHEN SELECTING ANGUS BULLS



- 1. Establish a clearly defined breeding objective**
- 2. If bull selection involves the purchase of bulls, identify the seedstock breeder or breeders from which bulls will be sourced**
 - Select seedstock breeders who offer bulls carrying genetics that are consistent with the breeding goals or objectives of the breeding program in which the bulls will be joined
 - Select seedstock breeders who offer bulls that are of superior genetic merit to the bulls used within the breeding program in previous years
 - Give preference to seedstock breeders who offer bulls with a full set of TACE EBVs and selection index information, are of known genetic condition status, have been subject to VBBSE examination, and have been subject to appropriate vaccination and health treatments
- 3. Consider the TACE information of the bulls that are available**
 - Rank bulls on the selection index of most relevance
 - Disregard any bulls with individual EBVs in undesirable ranges
- 4. Consider the genetic condition status of the bulls that are available**
 - Disregard any bulls with undesirable genetic condition status
- 5. Consider the breeding soundness of the bulls that are available**
 - Disregard any bulls that are not sound and capable of getting their allocation of cows in calf within a given time frame
- 6. Consider the health status of the bulls that are available**
 - Disregard any bulls that have not received appropriate vaccination and health treatments
- 7. Consider other selection criteria of particular importance to the breeding program**
 - Disregard any bulls with poor temperament
 - Disregard any bulls that are too closely related to the females to which they will be joined
 - Disregard any bulls who possess undesirable genetics for traits of specific importance to the individual breeding program.
- 8. Do not be distracted by aesthetic features or the influence of non-genetic factors on the appearance and performance of bulls**

FURTHER INFORMATION

For further information regarding the selection of Angus bulls, please contact staff at Angus Australia.

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