Final report

Goat Pet treats – Proof of Concept development and testing

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Abstract

The Gourmet Goat Lady (TGGL) has demonstrated that there is an opportunity for significant value-adding to goat components excluding the carcass, through targeting pet food opportunities. Farmed goat-based offerings from TGGL are marketable on several fronts: being a high-welfare, fully traceable Australian product with no additives and minimal processing, as well as an uncontaminated single-protein source. This proposition was tested with two different components (ears, liver) targeting two distinct usage occasions (as a treat to relieve boredom and a sprinkle to make food more appealing.) Testing showed it was possible to achieve significant value-adding for components that are currently deemed worthless, (ears), or have value but would benefit from broadening the customer base (livers).

Executive summary

This project sought to determine if it were commercially viable to utilise goat parts, other than the meat. As such, components like the hide, horns, ears, offal and ligaments were considered for this endeavour. The focus became the development of pet treats, in particular for dogs. This market was viewed as the most likely able to convert these by-products, currently seen as waste, into desirable goods with real value. Ears and livers where chosen for this exercise.

A second objective was to demonstrate that the market could support products manufactured from the components of high-welfare, pasture-raised goats. It was anticipated that this could be achieved by leveraging the health and nutritional properties, as well as the goats' Australian or local provenance and product traceability from "paddock to pet".

Dog owners were recruited and surveyed regarding their prior experiences with using the category in focus, with a view to discovering any barriers to uptake that might exist. Some prototype offerings were then trialled by these dog owners.

The goat offerings were well received by the target dog owners. Goat based pet treats are able to be successfully value-added, making them attractive market opportunities. Further work is required to increase efficiencies in the manufacturing process and refining the marketing of the products to increase the chances of commercial success.

It is hoped that this work will forge new ground for the whole goat industry, as this enterprise demonstrates that value can be found in components currently seen as waste. By disseminating this information, it is hoped that the possibility of realising diversified income streams would encourage all who participate in the industry to continue and expand this sustainable mindset.

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1. Background - The Gourmet Goat Lady Business Model

The Gourmet Goat Lady (TGGL) is leading the Australian market in establishing a premium, farmed Boer goat product. The consistency of flavour and quality is valued by high-end butchers and cosmopolitan, award-winning restaurants, that seek to broaden their offerings to provide an exceptional customer experience. This is a remarkable achievement in a country where the word "goat" is often associated with "feral" and "goat meat" as "something eaten by other cultures in curries", if it is to be considered as food at all.

TGGL has built relationships with premium retailers (e.g., Feather and Bone Butchery) and deliver to them directly. This approach has been made economically feasible by collaborating with two local non-competitive producers whose target consumers are aligned with those of TGGL.

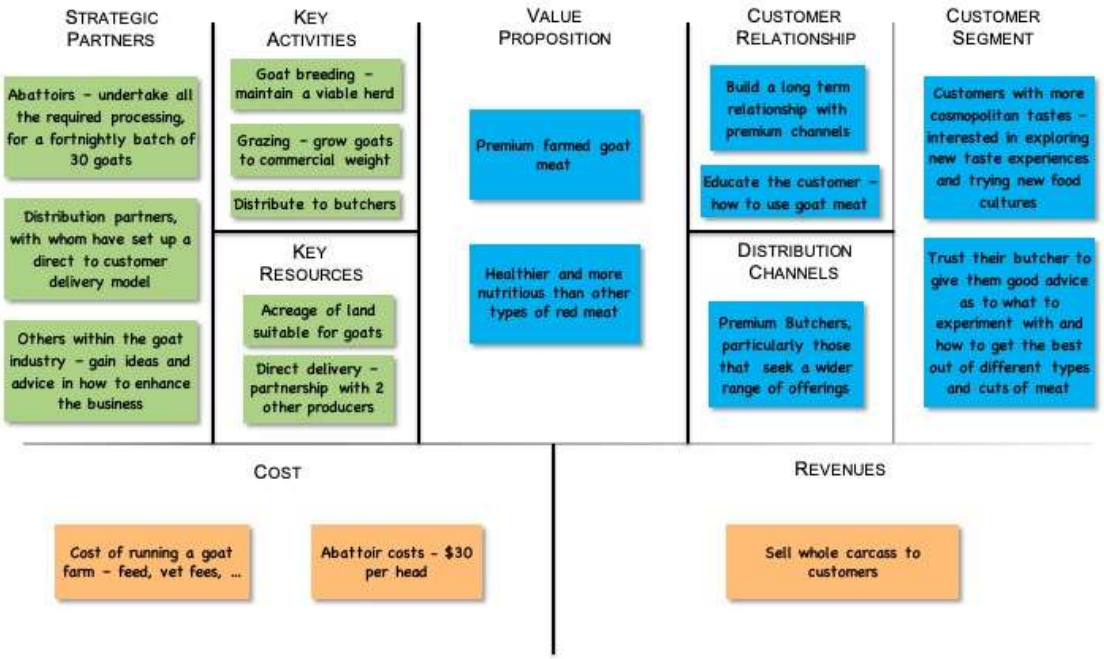
Other than outsourcing the processing of the goats to an abattoir, TGGL is a vertically integrated operation from breeding to distribution. This includes marketing and educating consumers as to the merits of farmed goat meat. We are industry advocates and aim to help other producers and prospective producers. We are also involved with the Australian Good Meat Schools program. We strongly believe in teaching children from pre-school upwards, about the benefits of Australian red meat. Particularly goat meat!

We believe that the sustainability of our planet hinges on a reduced level of waste. No one in the 1800's had a wheelie bin. Nothing was wasted that could be used, especially from an animal carcass. There is more pressure than ever before to be efficient and profitable in farming, and we aspire to add value to every part of a carcass. Traditionally the abattoir is where all the extras are utilized or sent to land fill.

As livestock producers, we believe that if we can realise the potential gains from using the entirety of our animals, their current value can double. That is a win for the farm, with a reduced stocking regime, and a win for the environment with lower grazing pressure and less landfill. Every small increment adds to the whole.

Figure 1: Goats enjoying Buena Vista Farm

Figure 2: Georgie



2. Objectives

Whilst a market has been established for our farmed goat meat, this does not extend to all parts of the animal, for example, hide, horns and organs. Whilst some offal is sold, ideally the product line should be expanded to include any other component that could yield reasonable revenues. The lack of established market for these components results in a considerable loss of value for branded goat producers and others involved in the goat value chain.

This project aims to determine if there is an opportunity to value-add to these components, in order to extract maximum returns from our animals, via broadening the customer base beyond direct human consumption. At this stage, TGGL has an open mind as to whether any proven market prospects are pursued directly, or, having demonstrated proof of concept, commands some value for the raw ingredient (i.e., by selling horns, ears, etc., to a third party who would then realise further incremental value).

The following approach was adopted:

1. Develop proof of concept goat pet treats – identifying potential products and process specifications, yields and indicative costings. The chosen test treats were dried goat ears and a dried liver sprinkle product.
2. Recruit a select number of dog owners whose pets could reasonably be expected to have additional nutritional needs, such as those with ageing canines or with whelping bitches and puppies.
3. Complete a series of interviews with customers to test the prototype offering and obtain feedback. This would be used to support further development and refinement of this Australian goat-based treat proposition.
4. Determine if goat treats made from other parts of the overall carcass offer a meaningful advantage over existing dog treats.

5. Upon considering the full spectrum of costs, a decision would then be made if it were possible to realise a value-adding opportunity. Ideally, this would demonstrate that there is incremental value in the whole carcass, beyond the meat. This would not only have economic benefits for producers, but would also improve the environmental sustainability of the goat-farming industry.

3. Methodology

3.1 Goat Ears – Pet Treat

3.1.1 Category & Key Competitor

Dog treats are a well-established category, with some Coles stores now going so far as to feature a Pet Treats Bar, to maximise visibility and access to this growing market segment. In Australia, 40% of households have a pet dog (1), making it the leading form of pet ownership. People's relationship with their dogs has shifted from a utilitarian one to viewing them more like a family member. This shift brings with it the desire to spoil the dog and ensure it receives the "best of everything".

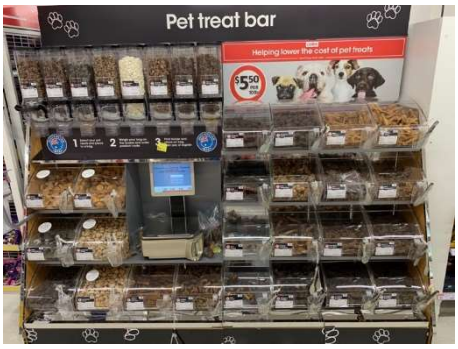


Figure 3: "Pet Treat Bar" at Coles Supermarket

The benchmark offering in this category is pig ears. Due to their ubiquity and historical advantage they have very high customer recognition as dog chews and are the most popular offering in the market.

There is a smaller, but growing, niche segment in this space, which include sheep and deer ears. It was felt that the market potential for goat ears may be leveraged from existing customer awareness of ears as chew treats for dogs.

3.1.2 Hypothesised Value Proposition

For many dog owners, the hardest part of ownership is leaving their dog alone for the day, when they go off to work. Giving one's dog a dried ear appeals to a dog's natural instincts – that is, to chew on something other than your favourite shoes – and also relieves the owner's feeling of guilt towards the animal. Dried ears are also a relatively safe treat to provide without supervision. A dried ear keeps some dogs occupied throughout the day.

It was felt that goat ears would fulfil a similar role, but with several key advantages:

1) Australian-farmed goat ears are a traceable product. This would appeal to owners who were concerned about the country of origin when exercising their purchasing power. From our research the majority of pig's ears are not labelled with a country of origin.
2) Goat ears from a high-welfare farm would be viewed favourably by customers who are uncomfortable with factory-farming production methods. Most pork is produced using intensive farming methods. (2)
3) Minimal processing with no additives. These goat ears have been simply dried, with or without an added step of hair removal. Many pig's ear products appear to undergo bleaching, and some contain added salt and preservatives

4) Goat ears are a nutritious, single-protein option, particularly for pets that have exhibited allergies to other treats with common and mixed-meat ingredients. As pig's ears have dominated the treat market for so long, it could be expected that a pet displaying allergies would have to avoid this protein when starting an elimination diet
5) Goat ears are higher in protein and lower in fat than pig's ears (3), (4) which, coupled with their generally lower overall mass, provide a treat that is lower in calories per unit. This is a significant consideration as owners tend to offer one treat per animal, with little regard to the size of the dog or its calorific needs.
6) High levels of collagen found in our goat ears (See Appendix 1) could be promoted as assisting the joint and overall health of the dog.
7) Two variants of ear can be produced: the familiar "hair off" style as well a new "hair on" offering.

3.1.3 Process for Producing the Product

The key stages in turning these raw goat ears into a dried offering suitable for sale to dog owners are:

1. Trim the buds off the ears.
2. Soak the ears in a caustic soda bath, rinse well.
3. Place in a dehydrator until sufficiently dry.
4. Package ears for sale.

Notes: 1) For the "hair on" version, Step 2 is omitted.
2) Dried ears are sold by unit, not by weight, so no consideration is given to weight loss through this process.

3.1.4 Challenges in the Production of Dried Goat Ears

Figure 4: "Hairy" Ear

Shelf Life: One of the key challenges in producing a dried goat ear was that the ear bud was much thicker than the rest of the ear, and drying it out was problematic. As a result, a small percentage of what appeared to be suitably dried goat ears went mouldy in the bud area over a period of a few months. It is possible that a dog treat could be stored for extended of time before being offered for consumption. The solution was to exclude the ear bud from these investigations. We are seeking an alternate usage for the ear bud.

Figure 5: "Nude" Ear

Hair Removal: Initially, the abattoir used was asked to remove the hair from the ears but at a cost $1 per ear it was decided to explore further hair-removal methods.

Other approaches were trialled – using an Epi-lady device (which uses a coiled wire and mechanical action to trap and pluck individual

hairs)! This ultimately failed along with scalding and scraping, as none of these produced a satisfactory result.

It turned out that the best method of hair removal was also one of the simplest, and a standard one: the use of a caustic soda bath. Since any hair removal would involve extra cost in time and materials, it was decided to test a "hairy" ear option for dog treats along with the more familiar "nude ears".

3.1.5 Processing Costs and Efficiencies

Table 1: Costs incurred in processing 60 ears.
Note that scaling up this process will reduce the unit cost

Inputs	Cost of 60 Units	Cost per Unit
Materials and Energy	$8.00	$0.133
Labour Costs	$60.00	$1.00
Total cost	**$68.00**	**$1.13**

Whilst initial abattoir costs for hair removal seemed expensive, this work proved that small-scale home-based hair removal costs were comparable, depending on how much one values one's time. Increasing the batch size will increase the efficiency of the process and lower the relative costs of production.

The abattoir process may ultimately prove to be a viable option going forward, but searching for an alternative has enabled us to hypothesise that caustic soda may be the preferred method for hair removal from the hide as well as the ears. This exploratory investigation has provided us with two options for products (hairy and nude ears) and opened another path for further development (hides).

3.2 Liver Dust – Nutritionally Dense Flavour Enhancer

3.2.1 Category & Key Competitor

Liver-based treats for dogs have numerous commercial versions in what is essentially a saturated market, e.g., Schmackos. In this market price is the major driver, followed by ubiquity of presence and acceptance by the pet. The proposed offering will not be competing in this space.

It is the naturally dried liver treats commanding a significant premium, e.g. Blackdog, which would be the greatest competition for this proposed offering.

By exploring consumers' needs during the development stage, it was decided to pivot to a nutritional sprinkle for meals, rather than a snack or treat.

Goat liver dust can distinguish itself in a busy market by the promotion of five core qualities:

1. It is a single-protein food, uncontaminated by other types of proteins which may cause allergic reactions
2. It is produced free from preservatives, hormones or any additives
3. It is a guaranteed Australian product, harvested from goats which can be traced from "paddock to pet"
4. It is produced from top-quality animals which are destined for human consumption, and hence uses "human grade" ingredients
5. It may be marketed as a health supplement that dogs actively enjoy.

3.2.2 Hypothesised Value Proposition

We originally believed that a dried liver offering would work best as a treat, in a small pellet form. The most common usage is for dog training and maintaining control of one's dog in public. Dogs love liver, so concerns about palatability and acceptance were never an issue. However, the hand-cut style gave rise to challenges in drying the product. In order to eliminate the risk of mould without resorting to salt or harsher preservatives, it was decided to target a different market segment altogether.

As mentioned earlier in this report, there is a continuing and growing trend for people to view their pets as part of the family. They are prepared, therefore, to spend significant sums ensuring their four-legged friends are happy and comfortable. As a result, pets are living longer and many owners continue to support them well into decrepitude.

Aged pets can suffer from various aliments, e.g., kidney failure, fur loss, digestive disorders etc, which often result in the need for a prescription diet. These are generally bland and tasteless, resulting in loss of appetite and condition.

A small sprinkling of a densely nutritious, highly palatable and strongly aromatic liver dust would likely suit dogs with a low drive or ability to eat. It may also assist with recalcitrant cats, which are notorious for disliking any change in their human-provided diets but also are well-known to be generally highly accepting of liver (from any of the commonly available protein sources).

3.2.3 Process for Producing Liver Dust

The liver dust was produced in batches of 45kg.

The key stages in turning these raw goat livers into a dried powdered product are:

1. Grind livers, as a pre-pulverising step to aid the drying process
2. Dehydrate until sufficiently dry to enable Step 3
3. Blitz into a "dust"
4. Return to the dehydrator to ensure maximum moisture removal
5. Package liver dust for sale

3.2.4 Challenges in the production of Liver Dust

Figure 4: Raw liver preparation

Once the decision was made to develop a nutritional sprinkle, the focus shifted to food safety and the creation of a sufficiently finely-ground result. The mincing of the livers prior to dehydration solved both the former and the latter. The resultant dried mass could be easily blitzed in a domestic blender to create a coarse powder, which was ideal for an additional round of drying for maximum moisture extraction.

Our aim was to produce a preservative-free product, meaning the drying process was crucial to shelf-life and food safety. Samples of the liver dust were sent to Symbio Laboratories for tests on mould, yeast and water activity. It was heartening to see the results for mould and yeast were lower than the laboratory's Limit of Reporting (Appendix 2). In addition, the Water Activity of the liver dust was quoted as 0.569 at 25.08°C (Appendix 3). This was an excellent outcome when a result of 0.6 or less indicates that no microbial activity is to be expected at all (5). Naturally, long-term storage would depend on those storage conditions, and this product may benefit from being supplied with an oxygen-absorbing sachet, as is often found in bottles of vitamins or powdered supplements.

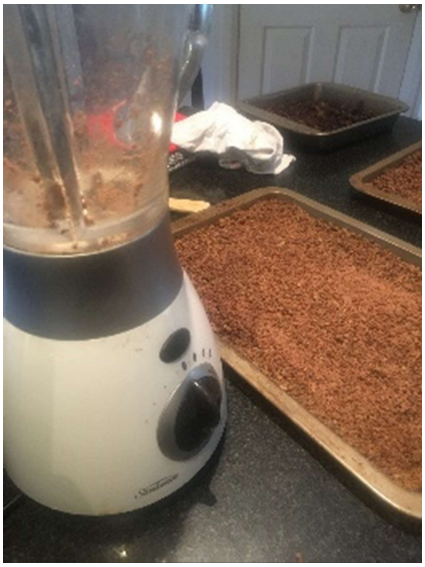


Figure 5: Blitzing liver dust

A second challenge that was not so easily solved was the smell created by the drying livers. Given the extended processing times involved and the fact that the test laboratory was a home kitchen, it cannot be understated that this process generated an undesirable environment.

3.2.5 Processing Cost and Efficiencies

Overall, 45kg of fresh liver produced 8.1kg of liver dust (a loss of 82%). For this project fresh liver was valued at approximately $4/kg.

The estimated price point for the liver dust was $25 for a 150g sprinkle bottle. Thus, the value of the end product as liver dust is = 8.1kg x $167/kg = $1,350, equating to an incremental value of $1170.

Table 2: Costs incurred for processing 45kg liver.
Note that scaling up this process will reduce the unit cost

	Total Cost for 54 units	**Unit Cost**
Materials and energy	$69.45	$1.29
Labour costs	$120.00	$2.22
Subtotal labour and material costs	$189.45	$3.51
Opportunity cost of selling raw liver at $4/kg	$180.00	$3.33
Total Cost	**$369.45**	**$6.84**

4. Results

4.1 Dried Goat Ears

4.1.1 Offering

It was decided to have two versions for testing: one with the hair intact and the other with the hair removed. Both were given to the survey participants.

It is envisaged that the offering could be sold as a single treat, or in bags of 6, 8 or 10 ears.

4.1.2 Nutritional Proposition

The nutritional profile of goat ears is very positive, particularly when compared with other, more common dried ear offerings. At 82% protein and 12 % fat (3) it is significantly higher in protein and lower in fat than a typical pig's ear (60-70% protein and 25-30% fat) (6) or lamb ears (60% protein and 22% fat). (7)

Australian Proteome Analysis Facility (APAF) at Macquarie University was engaged to provide an amino acid analysis on the dried goat ears, with a special request for hydroxyproline. As hydroxyproline is rarely found in proteins other than collagen, this enables it to be used as a proxy molecule for the amount of collagen in animal tissue (8).

Whilst the average quantity of hydroxyproline found in animal tissues is around 4% by mass (8), the analysis of goat ears resulted in a value of 8% by mass (See Appendix 1). This value was an average of the "hairy" and "nude" ears. Thus, we conclude that goat ears are high in collagen. This would enable the product to be promoted as possibly beneficial for joint health and marketed to the owners of ageing dogs.

4.1.3 Real-world Target Customer Feedback

Figure 8: Sally has beaten Oskar to the ear

Owners' reactions were mixed about the dried goats' ears. Their dogs loved them, and on this basis, they would seek to buy them again. In was interesting to note that dogs tended to display preferences for one or other of either the "hairy" or "nude" ears. No dog refused both. Some were perfectly happy to consume both options.

Some dog owners find ears too confronting for their own sensitivities. Some already struggle with a dried pig's ear, even extruded ones aimed at the vegan market. For these owners, hairy ears triggered associations with the live animal which was an active discouragement to the purchase of such a product. However, given they had committed to participate in the test, they overcame their personal aversion and presented the hairy ear to their dogs. This was greatly appreciated by the authors and even more so by their dogs, who unhesitatingly accepted them. However, one can conclude that they would never likely have got the dried hairy ear home in the first place.

Figure 9: Sally has clamped her jaws and the ear is being held for the photo. She is not letting go!

Those owners who fed their dog a BARF (Bones And Raw Food) diet were much more comfortable with this offering and positively embraced it as being less processed and closer to what the animal would obtain in the wild.

4.1.4 Value Proposition

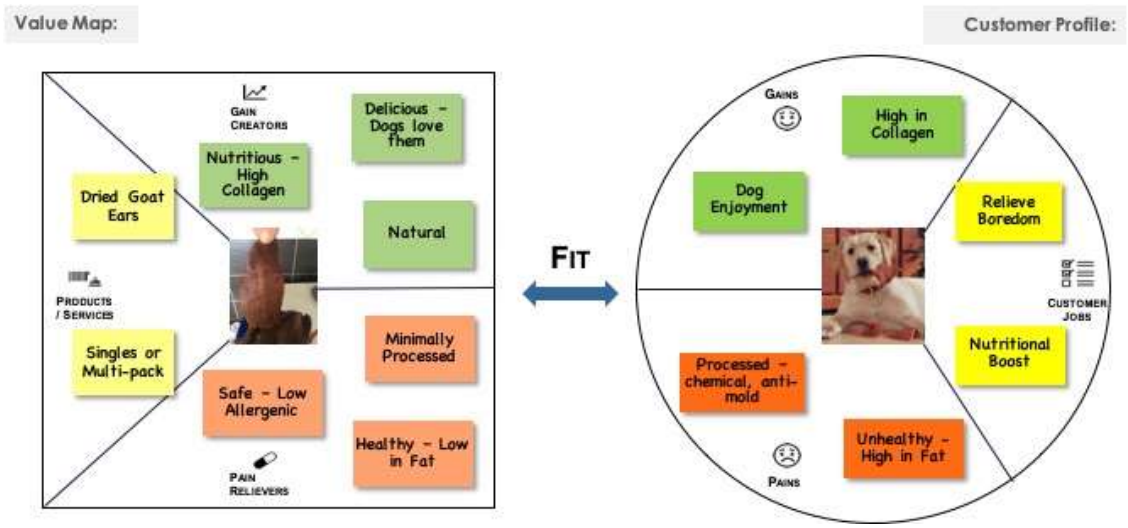
This product could be targeted to:

Dog owners who believe that a wholesome and natural diet, as close to what dogs would eat in the wild, is best for their dog's health and happiness and have the resources to seek out such products. The "hairy" ears would align with this ethos very well and the "nude" ears would suit those who prefer to be a step further away from the reality of the origin of animal products. Both products would suit a worldview preferring minimally processed and species-appropriate feeding.

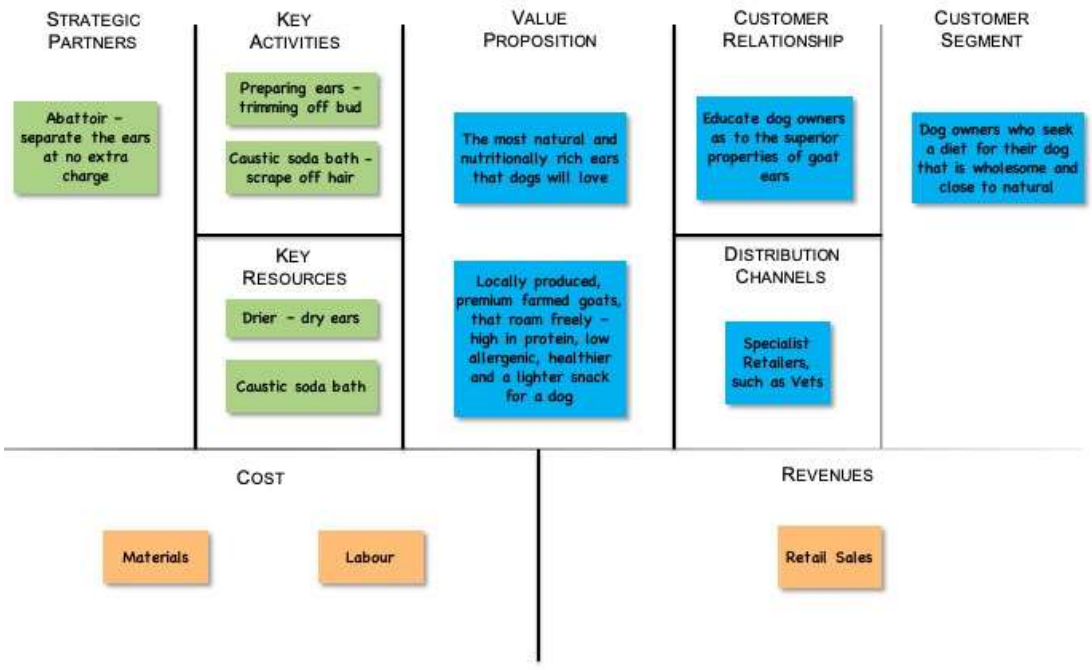
Those who unfortunately need to leave their dog alone for extended periods, such as for work, and wish to give them something to keep their pet occupied.

Those who are concerned not only for the welfare of their own pets, but also the welfare of the animals that feed those pets. These goat ears are from premium farmed goats that roam freely. They are a high-welfare, locally grown, Australian product that is traceable from "paddock to pet".

Dog owners who must manage an animal with allergies, weight issues or one that is aged. This product is a guaranteed single-protein source which assists with identifying and avoiding allergic responses, is lower in fat than many other offerings in this space and is high in collagen. An accepted health claim for collagen is that it may assist with joint health.



4.1.5 Business Model Canvas – Dried Ears



4.2 Liver Dust

4.2.1 Liver Dust Offering

Our proposed offering is a 150g sprinkle bottle of liver dust, with a retail price of $25. Our directions for usage is to sprinkle a small quantity (approximately 5g, depending on the size of the dog) on their food.

Other considerations were also taken into account. It was believed that medications or supplements for pets are more likely to be administered by females in the household. Whilst this is a broad generalisation, it is known that women are also more likely than men to pick up new products and bring them home to try out. (9) Hence, any bottle should fit comfortably in a woman's hand, without being perceived as too small a size.

Another consideration is mechanics. In order to successfully "shake" the granules out, an air space must be left in the bottle, therefore it cannot be filled to the brim. This means the packaging must be slightly oversized for the quantity therein.

Finally, a bottle of product should last a reasonable amount of time, otherwise it will be perceived to be overpriced, regardless of the actual value. A minimum of a month's worth was considered to be reasonable for the liver dust. In addition, a month's supply would encourage the idea of the dust being a supplementary and necessary addition to the dog's diet, with long-term purchasing required for the animal's well-being.

Tests were undertaken using bottles of various sizes and weighing the amount therein. It was found that a 250g shaker bottle would likely need to be too bulky for a female to comfortably shake. Whilst weight is no issue, it is the feel of the bottle in the hand as it is being used that is of note here.

Considering all the above parameters, it was decided that a 150g shaker bottle would be the best size on which to base estimates of cost and potential profits.

4.2.2 Nutritional Proposition

Symbio Laboratories was engaged to provide a nutritional profile of the liver dust, along with an analysis for iron and Vitamin A (Appendix 3).

The nutritional profile including protein, fats, and fibre were all within reasonable values, by comparison with data from other dried liver products on the market. (10)

Whilst it can be expected that all liver products contain significant quantities of both iron and Vitamin A, these can vary widely, depending on the source animal and overconsumption can lead to toxicity. (11) These data were used to estimate a recommended feeding rate of 5g per meal, which is well within the tolerance of even small dogs. Accidents do happen and dogs get into things, but even an entire packet (150g) were to be consumed in one sitting, this would still not be expected to cause any issues relating to Vitamin A or iron toxicity. Excessive overconsumption due to enthusiastic owners love for their fur-family members, by not following the recommended dosage rates, could lead to problems. The proposed product package (in a shaker bottle) and recommended labelling (5g per meal) would mitigate the problem of over ingestion.

For any owner whose dog requires a boost in Iron or Vitamin A levels, they would do well to consider, under veterinary supervision, a supplement such as goat liver dust.

4.2.3 Real World Target Customer Feedback

Excellent results came in from the survey participants.

Figure 6: Molly (L) and Tess not waiting to share liver dust

The dog owners we tested this offering with, were all incredibly positive towards it. They reported that "their dogs loved this product".

Participants who found the greatest benefit in using liver dust, were the dog owners whose dogs were fussy eaters. They found it challenging to get their dog to eat the variety of food that they sought to give them. Another similar group were owners of older dogs, whom typically had lost their appetite. For both of these groups, the addition of liver dust sprinkled over their regular dog food, meant that the dog was much more interested in eating it.

We had a participant who additionally trialled the liver dust for her cat, with an excellent outcome. Her cat is old and must eat a prescription diet. Whilst it was easy to find treat products aimed at cats, they typically were of a small, pre-cut size or of the thin, "snap-to-break" style. If these were mixed with the food, the cat was invariably able to pick out the liver bits and avoid the rest. Mixing the goat liver dust with the prescription diet solved this problem. The owner believes her cat's healthspan will be extended by the prescription diet, thus it was a relief to see the cat enthusiastically consume its meal, which has vastly improved palatability with a small sprinkle of liver dust.

Figure 7: Kandie getting some quality time on her own... with liver dust

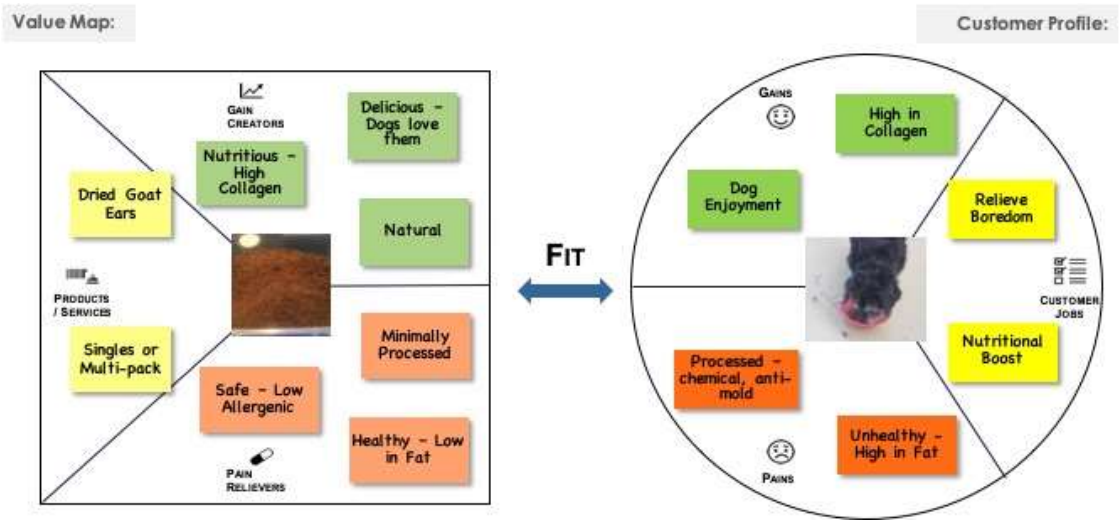
4.2.4 Value Proposition - Liver Dust

For owners, whose dogs (& cats) are fussy eaters, or who are getting old and losing their appetite liver dust, sprinkled over their regular meal, can be the difference between the animal choosing to eat or not.

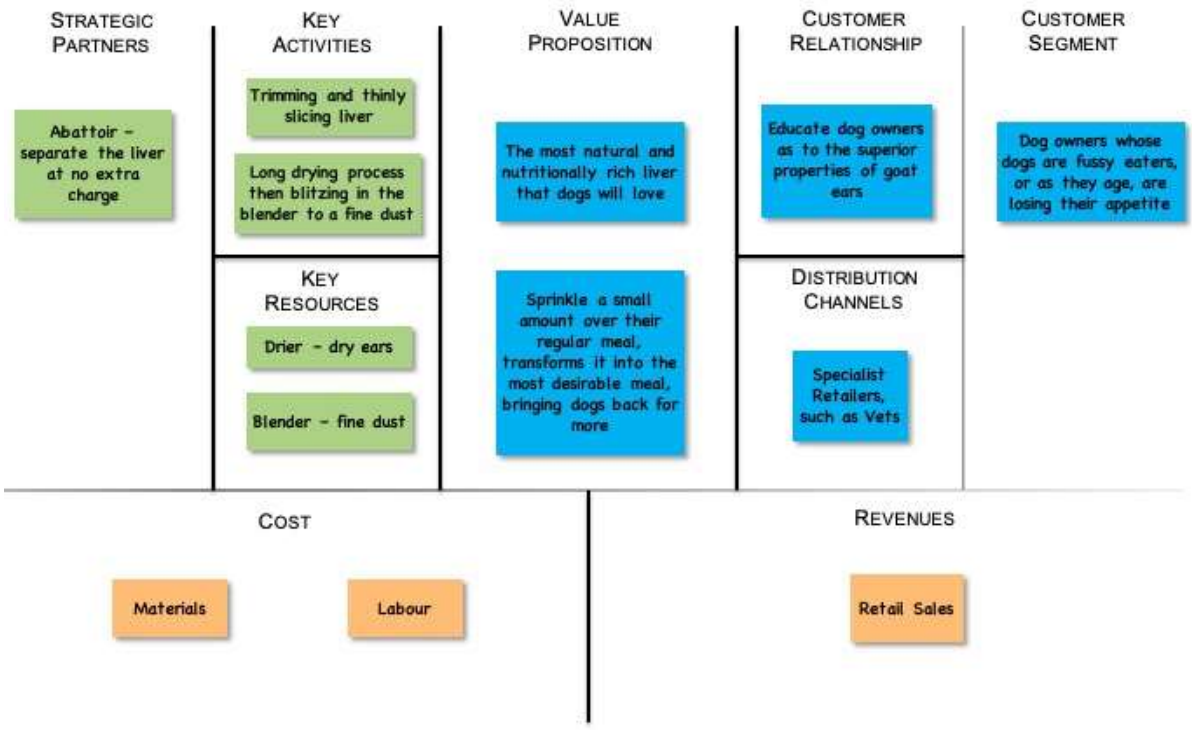
As only a small amount of liver dust would be required each time, this product can be packaged in modestly-sized shakers and marked up accordingly, increasing the value-add of the goods.

Unlike anything else that exists in the market – there is currently appears to be no comparable product in this space.

Our goats are locally farmed in NSW, with high-welfare paddock-raised premium Boer-cross animals, resulting in liver dust that is both highly attractive and palatable to the pet, as well as being a nutrient dense, single protein source.



4.2.5 Business Model Canvas - Liver Dust



5. Conclusion

5.1 Value Creation – Dried Ears

We believe the dried goat ears will retail for $3.50 per ear. This represents a value-add of $3.50, given that goat ears effectively have a zero value currently. As is often the case, it is the labour during processing the major contributor of cost of a dried ear.

It is believed that ears could be sold to a distributor for $2.00 per unit, giving them a mark-up of $1.50 (75%), which works for all parties.

5.2 Value Creation – Liver Dust

Goat liver dust, for sprinkling on food, is a unique product in the market. Dried liver is a popular treat for dogs, most often used when dog training, or for recall, when out walking.

It is possible for this product to generate significant added value when processed into dust, as it currently commands minimum value as a raw product. There is sufficient margin in the offering to sell via a retailer who would have better access to the target customer, such as veterinarians, or possibly a large pet food outlet

6. Recommendations

6.1 Dried Ears

It is our belief that dried goat ears are a valuable opportunity to pursue, with significant value-adding possible.

However, it is desirable for TGGL to on-sell the entire process, having proven the inherent value. We also recognise the risks in trying attempting to sell goat ears ourselves, as we wish to concentrate on our primary business

Other considerations from TGGL's perspective are:

- Customers to whom goat meat is already sold, are buying it for their own consumption. Whilst it might be expected that some 40% to own a dog (1), it would be imperative to keep the TGGL brand completely separate from any pet food offering, as it may prove deleterious to the core business.
- The requirements for processing a batch of goat ears creates significant time-management challenges in attempting to manufacture these whilst we are running a farm administering the TGGL enterprise.

Thus, having demonstrated the value in premium, naturally dried goat ears, we are more inclined to sell them as a raw product to a business that already supplies BARF dog food and minimally-processed treats to its customer base. Such a business, with a dedicated processing

facility, would be expected to be able to produce this offering far more easily and economically than TGGL.

6.2 Next Steps – Dried Ears

There are few areas which need deeper investigation to provide more confidence in the recommendation we would make to a third party and underpin our value-adding claims

- Further investigation into target customers' usage of "hair on" dried ears. If it is desirable to our target customers, then it is a unique and strong proposition, supporting a "radically natural" claim.
- Discuss with our pet food contact whether they would be interested in taking this on as their own added value offering, with us as suppliers of the raw ears. They have the processing facilities and customer base to embrace the opportunity.

6.3 Liver Dust

It is our belief that dried goats' livers, sold as a sprinkle on food, is a valuable opportunity to pursue. There are potentially high levels of value-adding to be extracted, even when all costs are included. With a retail price of $25, we envisage a wholesale price of $15, giving the vet a mark-up of $10. We are currently trialling this offering through two local Vets who are supportive of our product. The majority of the products a vet sells have a health-based value proposition. This product would be able to be sold on both health and enjoyment claims.

The greatest downside is the lifestyle compromise from processing the liver in a domestic home kitchen. Drying liver emits a strong and pungent odour that lingers. Therefore, it is recommended that investment is made into building a separate, dedicated facility.

6.4 Next Steps - Liver Dust

- Assess whether it is worthwhile setting up a dedicated production facility, such as a shipping container onsite. This would contain the pungent smells well away from residential accommodation. Although a significant level of capital expenditure would be required, it would result in the creation of an employment opportunity in the local area.
- Identify a third party who would be interested in pursuing the opportunity. Existing pet food contacts have a core offering of BARF and associated (wholesome) products. We believe this would be of value to their business.

7. References

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8. Appendices – APAF Report

8.1 Appendix 1

MACQUARIE University
SYDNEY·AUSTRALIA

APAF Analytical Services Report

Macquarie University trading as Australian Proteome Analysis Facility ("APAF")
ABN: 90 952 801 237
APAF, Australian Proteome Analysis Facility
Level 4, 4 Wally's Walk, Macquarie University, Sydney NSW 2109
Ph: +61 2 9850 6201 Fax: +61 2 9850 8313
Email: info.apaf@mq.edu.au Website: www.mq.edu.au/research/APAF

APAF
australian proteome analysis facility

Final Report

Amino Acid Profile (including hydroxyproline) Analysis

Report number:	PC-R31607-1
Report date:	04th December 2020
Project number:	31607
Client name:	Jo Stewart
Client organisation:	CB & JE Stewart
Client address:	
Client contact number:	
Client email:	
Date sample(s) received:	06th November 2020
Number of samples:	One
Project leader:	
Authorised by:	
APAF email:	
Attachments	No

The results apply to the sample(s) as received.

As per APAF Terms and Conditions **samples will be retained for a period of thirty (30) days** and **testing records will be accessible for a period of three (3) years** from the date of reporting results unless other arrangements have been made; refer to Clause 11.1 (sample retention) and Clause 10.3 (test records) for conditions that apply.

Acknowledgment: To comply with our NCRIS (National Research Infrastructure for Australia) operating grant, we require that any publication arising from access to the facility acknowledge the contribution of APAF staff and include the statement "***This study/project/research used NCRIS-enabled Australian Proteome Analysis Facility (APAF) infrastructure***".

NATA

Accreditation Number: 20344
Accredited for compliance with ISO/IEC 17025 interpreted for research using CITAC Guide CG2 "Quality Assurance for Research and Non Routine Analysis" (1998)

AUSTRALIA'S PREMIER PROTEOMICS PROVIDER SINCE 1995
A NATIONAL COLLABORATIVE RESEARCH INFRASTRUCTURE STRATEGY FACILITY

8.2 Appendix 2 – Symbio Analysis Report #1

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	B963001-A [R00]	Page	1/1
Client		Registering Laboratory	Brisbane
Contact		Contact	Customer Service Team
Address		Address	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone		Telephone	1300 703 166
Order Number		Date Samples Received	02/11/2020
Job Description		Date Analysis Commenced	02/11/2020
Client Job Reference		Issue Date	07/11/2020
No. of Samples Registered		Receipt Temperature (°C)	20
Priority		Storage Temperature (°C)	25

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request or via www.symbiolabs.com.au/login. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis| NA:Not Applicable| [NT]:Not Tested| LOR:Limit of Reporting| TBA:To Be Advised| ND:Not Detected| * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Laurel Mak	Laboratory Manager – Microbiology	Environmental and Food Microbiology

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Sample Matrix
B963001-A/1	Liver Dust	Pet Food
B963001-A/2	Goat Ear	Pet Food

Analytical Results

Compound/Analyte	Method	LOR	Units	B963001-A/1	B963001-A/2
Mould	M3.0 - AS 5013.29	100	CFU/g	<100	<100
Yeast	M3.0 - AS 5013.29	100	CFU/g	<100	<100

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Brisbane.

8.3 Appendix 3 – Symbio Analysis Report #2

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	B963001-B [R00]	Page	1/2
Client		Registering Laboratory	Brisbane
Contact		Contact	Customer Service Team
Address		Address	52 Brandl Street, Eight Mile Plains, QLD 4113
		Email	admin@symbiolabs.com.au
Telephone		Telephone	1300 703 166
Order Number		Date Samples Received	02/11/2020
Job Description		Date Analysis Commenced	02/11/2020
Client Job Reference		Issue Date	11/11/2020
No. of Samples Registered		Receipt Temperature (°C)	Room Temperature
Priority		Storage Temperature (°C)	Ambient (25 °C)

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request or via www.symbiolabs.com.au/login. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis| NA:Not Applicable| [NT]:Not Tested| LOR:Limit of Reporting| TBA:To Be Advised| ND:Not Detected| * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Hongmei Kuang	Chemistry Laboratory Manager, Brisbane	Environmental and Food Chemistry

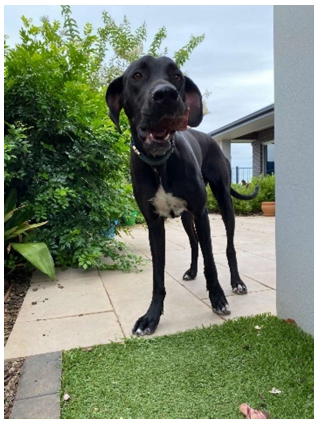
Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Sample Matrix
B963001-B/1	Liver Dust	Pet Food

Analytical Results

Compound/Analyte	Method	LOR	Units	B963001-B/1
Protein	CF003.1 - Determination of Crude Protein by Combustion	0.625	%w/w	62.2
Fat	CF004.2 - Determination of Crude Fats and Oils by Acid Hydrolysis	0.1	%w/w	16.2
Ash	CF007 - Determination of Ash Content by Muffle Furnace	0.1	%w/w	10.6
Crude Fibre	CF038.1 - Determination of Crude Fibre by Refluxing	0.1	%w/w	<0.1
Dry Matter#	CF006.1 - Total Solids (Dry Matter) by Air Oven	---	%w/w	86.3
Nitrogen Free Extract #*	CF037.1 - Nitrogen Free Extract	0.1	%w/w	<0.1
Metabolisable Energy #* (Pet)	CF037.4D - M.E.-Pet/Dog	0.1	MJ/kg	14.5
Moisture (air)	CF005.1 - Determination of Moisture Content by Air Oven	0.1	%w/w	13.7
Water activity	CF032 - Determination of Water Activity in Food	0.001	-	0.569@25.08° C
Iron (Fe)	ESI02 - Determination of Acid Extractable Elements by ICPOES	1	mg/kg	162
Vitamin A (Retinol)*	CFH062A - Determination of Vitamin A in Food by HPLC	0.5	IU/g	770

8.4 Appendix 4 – Survey Participants



Cosmo

Kandie

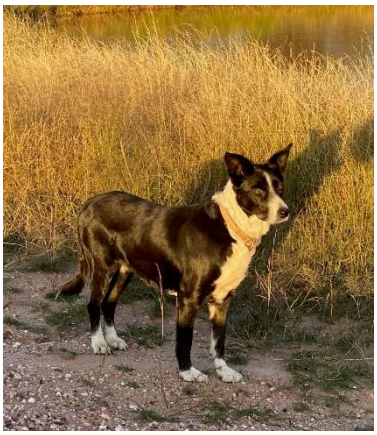
Molly and Tess

Sally

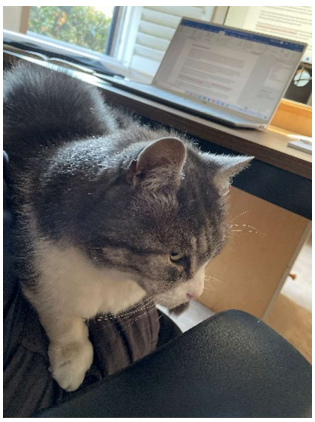
Oskar

Walrus and Snowy

Rosie with Trixie, Mac and Penny



Taz



Fritz