Investigating the Use of Trace Element Profiles to Substantiate Provenance for the Australian Prawn Industry

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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Executive Summary

In 2015 industry stakeholders from the Australian Council of Prawn Fishers (ACPF) and the Australian Prawn Farmers Association (APFA) identified the potential for the "Love Australian Prawns" (LAP) campaign to be undermined by the practice of unscrupulous operators substituting Australian prawns with lower value product. Therefore it was proposed that, to support the national marketing strategy, a rapid and robust scientific method should be developed to verify geographical provenance. The trace metal authentication methods used by other primary production industries represented a possible opportunity to prove provenance. Should the technology prove suitable, a detailed and effective communication strategy (aligned with the LAP distribution channels) was considered mandatory to ensure whole of chain knowledge of the capability and aligned consequences for substitution offenders.

A project to investigate this technology, funded as FRDC 2016-261 (ACPF IPA/APFA IPA: Investigating the Use of Trace Element Profiles to Substantiate Provenance for the Australian Prawn Industry was supported, and activity was divided into two stages;

Part 1: Proof of Concept: To establish enforcement agency and supply chain support an potential use of the tool, to call for tenders from analytical laboratories against a defined brief (STOP/GO point)

Part 2: Database construction and extension: If project investors agreed that the proof of concept will meet the need (ie a project STOP/GO point), the technology would be trialled and, if successful, utilised with the plan to implement it as a provenance tool.

Stage 1: Proof of Concept.

Initially a steering committee was formed to oversee the project. Following, legal advice to underpin the project was sought from Food Legal in regard to:

a. definition of different types of food substitution and misrepresentation;
b. identification and application of the regulatory implications for food substitution and/or misrepresentation of the food in each Australian jurisdiction, including consideration of relevant legislation, industry standards and regulatory body materials;
c. identification of relevant examples of enforcement actions; and
d. development of a framework for successful regulatory enforcement of unlawful food substitution or misrepresentation of the prawns being provided to the buyer or consumer, including consideration of the standard of evidence required to support the scientific methods available to meet such a standard.

A stakeholder workshop was originally envisaged to settle other project details including agreement on objectives, scope, communication and extension and “legacy” planning. However, due to the ensuing white spot outbreak, it was decided to not hold the workshop, but rather undertake individual face to face consultation with relevant stakeholders. As detailed in the report preliminary feedback and support was therefore received from the farmed and wild harvest prawn industry, distributors, retailers and enforcement agencies. It was further decided to delay the development of the communication and extension plan and legacy planning, pending the outcome of the stop/go point at the end of Part 1 of the project. Due to the

seasonality issues however, a sampling program, based on a “chain of custody” protocol and aligned documentation developed by a forensic science laboratory, was enacted and in 2016/17, 120 samples were collected, collated and stored under those protocols.

The final stage of Part 1 was a tender/expression of interest process to select a suitable laboratory for the analytical work, should the project go to Stage 2. This process, undertaken by an ACPF/APFA industry committee with an independent Chair and technical expertise, was completed in February 2018. Source Certain International was the preferred analytical capacity.

On reviewing the Draft final report for Stage 1, the ACPF and APFA Boards agreed to take the project to Stage 2.

Stage 2: Database construction and extension

An assessment of the ACPF and APFA harvest and production areas resulted in the delineation of 35 wild harvest sources and 19 farmed prawn sources for the project. A source was defined as a particular harvest area and a single species harvested or farmed from that area. Hence if more than one species was harvested then one harvest area might be defined as several sources. As an example Shark Bay was one harvest area but three or potentially four sources due to Western Kings, Brown Tigers, Endeavours and Coral prawns all being harvested from that fishing area. A sampling and chain of custody protocol and documentation for prawn collection was developed, based on forensic sample collection and analysis. Using a variety of different collection methods and personnel, between 2016 and 2019, 273 wild harvest and 136 farmed prawn samples were collected from 21 wild harvest sources and 17 farmed prawn sources respectively and forwarded to SCI for analysis.

The subsequent analysis resulted in a statistically robust ability to separate prawns by fishery and by farm. Further work suggested that, with slightly less reliability, the Northern Prawn Fishery could be separated into eastern and western regions, and that individual pond identification was possible. The provenance ability was verified in an in market exercise conducted in late 2019.

On establishment of the capability and the aligned database, FRDC, in conjunction with ACPF, APFA and Curtin University have commenced development of commercialisation and extension planning. The commercialisation planning is around the continued use of the technology and database by ACPF and APFA for in market verification activity, but also supports stakeholder led investigations, as several companies, retailers and third party certification bodies have expressed interest in accessing the technology and the database. The goal of the technology commercialization is to enable the original research investors to receive quantifiable impact from the research and development investment by developing and implementing strategies to protect Australian prawn producers from infringements on the provenance. Agreements to support these commercialisation activities are currently in draft with the various project partner executives.

Throughout, the status of the prawn provenance project has been well communicated through industry fora, and media channels. This communication activity culminated with the capacity being launched by the Federal Assistant Minister for Forestry and Fisheries, Jonathon Dunham at an event attended by >80 prawn industry stakeholders in Melbourne in October 2019.

With a capacity to prove the geographical provenance of Australian prawns now established, post-project recommendations are summarised below.

- FRDC, Curtin, ACPF and APFA to finalise, endorse and implement all commercialisation arrangements to allow ACPF, APFA and agreed external stakeholder use of the database and analytical technology.
- Phase 2 projects to maintain currency of the database and undertake regular verification activities be considered and agreed to by ACPF and APFA individually and jointly as appropriate. It is expected these activities will also be targeted to fill some existing and future sampling gaps, and answer any emerging research questions, such as impact of extreme environmental conditions or change of feed.
- Further and ongoing communication of the existence and capability of the technology and database be managed either through LAP or ACPF/APFA joint and/or individual sector initiatives.
- The technology is to be routinely adopted through domestic and export supply chains, as agreed by either LAP or ACPF and/or APFA jointly, to confirm and verify geographical provenance of Australian prawns.

1. INTRODUCTION

1.1 Background

Since 2013 the APFA/ACPF have co-invested in a joint national marketing strategy for Australian prawns "Love Australian Prawns" (LAP). However, an ongoing industry concern is the practice of substitution of Australian prawns with imported or lower value/quality/uncertified product, and the negative impact this may have on the national Australian prawn branding. Satisfactory resolution of the substitution issue is considered to be extremely important to underpin the national strategy associated with selling Australian prawns, both at home and abroad. Implementation of robust traceability systems through the length of the chain to the consumer, coupled with effective Government audits, would satisfy the industry's truth in labelling needs. But this implementation is many years away and is not a widespread goal. The prawn industry must devise an interim method for addressing substitution. The substitution may be with the same prawn species, thereby rendering DNA and aligned provenance profiling less effective. The use of trace metal profiling based on geographical provenance was suggested as a robust and scientific provenance method. Such an analytical method and initiative, branded as Physitrace, has been used by pork and other industries for a number of years.

A preliminary trial study using the trace metal technology on ~150 prawn samples has already been conducted (Determination of the provenance of Australian commercial prawn species using variations in their natural trace element distribution pattern Unpublished MSc Charlene Tan University of Western Australia in collaboration with the University of Strathclyde (UK) 2013) with promising results. The analytical methodology and interpretive algorithms were capable of identifying specific sites for the cultivation of Australian prawns and for distinguishing these from samples of prawns imported from overseas (China, Indonesia, Malaysia, Thailand and Vietnam). The preliminary trial indicated that the technology was one that could be used to allow the prawn industry to manage product integrity cases such as substitution and provide the basis for possible prosecution. However, the survey was of limited scope and a detailed survey needs to be undertaken to ensure that the technique is robust enough to withstand scrutiny.

1.2 Need

Industry stakeholders from ACPF and APFA have identified the potential for the "Love Australian Prawns" campaign to be undermined by the practice of unscrupulous operators substituting Australian prawns with lower value product. Therefore it has been proposed that, to support the national marketing strategy, a rapid and robust scientific method must be developed to verify compliance and, ensure product integrity, including food safety, truth in labelling and traceability. The trace metal authentication methods used by other primary production industries represents a possible opportunity to prove provenance. Should the technology prove suitable, a detailed and effective communication strategy (aligned with the LAP distribution channels) is considered mandatory to ensure whole of chain knowledge of the capability and aligned consequences for substitution offenders. This project is broken into two parts;

Part A: Proof of Concept: To establish enforcement agency and supply chain usage of the tool, to call for tenders against a defined brief
Part B: Database construction and extension: If project investors agree that the proof of concept will meet the need (ie a project STOP/GO point), the technology will be utilised with the plan to implement it as a provenance tool.

2. OBJECTIVES

1. To investigate and pilot a cost effective, legally enforceable method to establish the provenance of prawns and ensure robust identification of source harvest areas for the Australian prawn industry.

2. Investigate and confirm with stakeholders how the method can be used as a basis for preventing/discouraging the substitution currently impacting the LAP national strategy and other accreditation/branding initiatives (eg MSC).

3. To communicate the outcomes of the project results to supply chain partners and regulators and evaluate such that is can be shown that they aware that such a method exists and how it can be used to manage product integrity issues.

3. STAGE 1: PROOF OF CONCEPT

3.1 Method, Results and Discussion

The first part of the project application contained a stop/go point to ensure that all stakeholders were agreeable to moving to the analytical (Part 2) of the project. Part 1 of the project was used by stakeholders to determine the enactment or not of the stop/go point.

Part 1 of the project had four activities, as summarised below. Methods, results and discussion for each activity will be discussed in detail in the relevant section.

Part 1 Project Activities

a. Stakeholder Consultation
b. Develop and circulate "policy statement"
c. Tender process to select the laboratory.
d. Submission of Part 1 Draft Final Report.

3.1.1 Stakeholder Consultation

An initial objective was consultation to agree on project objectives, scope, communication and extension and “legacy” planning.

A steering committee was formed for the project and laboratory tender process: this steering committee included Rachel King (ACPF), Brett Hogan (ACPF), Dylan Skinns (ACPF), Dr Richard Smullen (APFA), Warren Lewis (APFA), Kim Hooper (APFA), Dr Len Stephens, Mark Boulter and Crispian Ashby (FRDC).

As per the original methodology, a desktop study was to be undertaken (by an independent expert) to assess;

- use, barriers to adoption, legality and enforceability of trace metal profiling technology in other sectors (eg pork) and supply chain members (MSC, supermarkets)
- the comparative analytical capabilities tested in the seafood sector
- the policy and process of enforcement agencies and their potential use of the technology
- in the case of prosecution which party absorbs testing costs and the frequency of testing.

Following consultation with ACPF and APFA this desktop (legal) brief was altered to the below objectives:

- definition of different types of food substitution and misrepresentation;
- identification and application of the regulatory implications for food substitution and/or misrepresentation of the food in each Australian jurisdiction, including

consideration of relevant legislation, industry standards and regulatory body materials;
- identification of relevant examples of enforcement actions; and
- development of a framework for successful regulatory enforcement of unlawful food substitution or misrepresentation of the prawns being provided to the buyer or consumer, including consideration of the standard of evidence required to support the scientific methods available to meet such a standard.

The desktop study was undertaken by Food Legal and the advice is presented as Appendix 1. This advice was circulated to members of the steering committee.

The next stage of the methodology was to hold a stakeholder workshop (with ACPF/APFA members, down chain prawn retailers and supermarkets, processors, government regulators, certifying bodies (eg MSC/BAP). The workshop was to be used to gain whole of industry commitment to the project (farmed and wild harvest prawns) with specific attention to a range of defined parameters/discussion points.

Due to the intervening white spot disease issue, it was decided in consultation with ACPF and APFA Executive Officers that it was inappropriate at that time to try and hold another industry workshop for the trace metal profiling work. Rather it was agreed to seek feedback/action on the various salient issues (as summarised below). Table 1 provides a summary of the out of session consultation that occurred informally amongst the identified entities, and which led to the information provided against the defined issues.

Table 1: Project Communication with Stakeholders

Stakeholder	**Who did they talk to**	**Outcomes**
NSW Food Authority	Mark Boulter	Officers were interested in the technology and keen to collaborate as development proceeds. Pending veracity etc willing to discuss at national fora.
Marine Stewardship Council	Austral/Mareterrum	Supportive
DAWR (Commonwealth)	Brett Hogan	Supportive in regard to domestic biosecurity and borderline protection
State govt fisheries agencies (WA, NSW, Qld, SA)	Various	Supportive (in some cases assisting with sample collection). Domestic biosecurity connotations
Supermarkets (Coles and Woolworths)	Various	Supportive (but not financial support)
Overseas markets (Qingdao Trade Show)	Various	Discussed in relation to traceability/brand protection of Aust prawn products

Local wholesalers and retailers	Various	farmed and fished prawn suppliers/distributors have discussed to advise some operators that this new technology may change the current status of pawn mislabelling.
CRC Fight Food Fraud and Waste (FFFW CRC) bid partners	Current Project (and potential aligned future projects incorporating hand-held, more user friendly advances) was raised in several CRC bid meetings.	Support and industry interest with a range of other seafood and primary production sectors.
NPF, SG, Exmouth and SB pre-season briefings to industry	Various	Supportive (sample collection)
ACPF members Presentation (Sept 2017)	PI	Update on project previously supported
Possible analytical laboratories	FRDC and Chair (Mark Boulter)	Interested in undertaking analysis and took part in tender process.

The following sections summarises the stakeholder intent with regard to a range of comments/discussion points.

Issue 1: Logistical and financial responsibility for sample collection, storage and transport of samples by industry to the selected laboratories. Industry was also to commit to assisting the selected laboratories to design robust sampling locations.

Communication to industry raised no objections to the project development and indeed >150 prawn samples were collected during Stage 1 under defined and rigorous "chain of custody" sampling procedures and these samples transported, stored and collated for future analysis. This collection was taken to be an indication of industry commitment to sampling for the project. Further sampling was to be undertaken once the laboratory to undertake the analyses was selected.

Issue 2: Scope (degree of separation of source of origin)

The scope was discussed with the steering committee and it was agreed that in the tender documents to the interested analytical laboratories they would be asked to provide indication of

- *Provenance analysis with 95% accuracy between farmed Australian product from different farms (brand protection).*

- *Provenance analysis with 95% accuracy between product from different wild harvest fisheries (brand and MSC protection).*
- *Provenance analysis with 99.5% accuracy between Australian product and that produced overseas.*

Issue 3: Review and Finalise Objectives (original objectives summarised below).

1. Use as a "stick" to deter substitution by unscrupulous operators.

2. Use as verification of substitution in situations where the relevant authority is going to develop a case against an operator.

3. Use as verification in an annual surveillance survey to benchmark where/if substitution is occurring if substitution was seen to be occurring then the results could be forwarded to the relevant authority so they can decide whether to undertake a prosecution.

The objectives were discussed with the steering committee and, in line with the legal advice, Objectives 1 and 2 were still relevant to the project. Mark Boulter, Chair of the steering committee met in mid-December 2017 with the NSW Food Authority to better understand how such a regulatory authority would work with the prawn industry on substitution issues. NSW Food Authority in previous meetings with Warren Lewis and Dr Len Stephens, had indicated they would welcome the opportunity to collaborate on such a project, and it was hoped, if that opinion was still current, that later the NSW Authority could assist with NSW relevant cases and also raise the project, technology and aligned issues in national food regulatory fora.

Issue 4: Communication, extension and monitoring/evaluation protocols.

It was agreed that more formal communication strategies (eg as part of 2018 Love Australian Prawn) activity would be discussed and implementation commenced if Phase 2 went ahead.

Generally however in discussion individual steering committee members remain open to the original communication strategies outlined in the original application

- Media release and description of project in newsletters/industry publications to ensure retailers/processors etc are aware of the project technology development and implications. AT this stage it is advised to not develop a consumer strategy as it may cause confusion in the market.
- Development of QR code, logo or similar which will be linked to LAP labelling and LAP website page section which explains the science/capability/history etc.
- Development of other hard copy communication/information material for distribution.

It is further proposed that development and communication of information about the database and any brand/logo etc to retailers and other stakeholders be managed through

the LAP committee/website/ distribution activities. The nature of the activities was to be discussed and agreed in the LAP MC and respective Boards following recommendation from the project steering committee.

Issue 5: Legacy planning: As this project would only cover initial research and development if the methodology was successful and applicable it would be necessary for ACPF and APFA to develop longer term funding plans for continuation of the analysis and database activities.

It was agreed that these protocols would be developed pending the later stages of the project.

3.1.2 Develop and circulate "policy statement"

This statement (defined as Food Legal advice) was circulated to the EO's of APFA and ACPF and to the project steering committee. There have been no objections raised to continuing with the project.

ACPF and APFA Executive and the steering committee have therefore agreed the project should continue past a minor milestone stop-go point, prior to the significant stop-go point associated with this report.

3.1.3 Tender process to select laboratory.

An expression of interest process to select the laboratory was undertaken between November 2017 and February 2018. Three laboratories expressed interest and were invited to develop a submission. The industry members of the steering committee for the project, Brett Hogan (ACPF), Dylan Skinns (ACPF), Dr Richard Smullen (APFA) (replaced by Michael Salini) and Warren Lewis (APFA), as well as technical expert Dr Len Stephens and independent Chair Mark Boulter oversaw the laboratory selection process. Rachel King (ACPF), Crispian Ashby (FRDC), Kim Hooper (APFA) and Dr Janet Howieson were observers.

A report on the selection process was developed and can be requested on application to FRDC, but due to confidentiality issues is not appended to this report. Source Certain International (SCI) was selected as the preferred laboratory.

3.1.4 Draft Final Report (Part 1) and Enactment of Stop/Go Point Decision.

ACPF and APFA considered the results of Stage 1, presented as a Final Report and, in seeking opinion from their respective boards, agreed the project should proceed to Stage 2.

4. STAGE 2: DATABASE CONSTRUCTION, EXTENSION, COMMERCIALISATION AND LEGACY

4.1 Methods

4.1.1 Development of Sampling Program

Following the appointment of Source Certain International (SCI) as the analytical laboratory in early 2018, a sub-contract was developed and signed between SCI and Curtin University to deliver the analytical service. Following consultation with the Industry Steering Committee, it was decided that the initial contract would include analysis of samples from 35 wild harvest sources and 19 prawn farms. A source was defined as a particular harvest area and a single species harvested or farmed from that area. Hence if more than one species was harvested then one harvest area might be defined as several sources. As an example Shark Bay was one harvest area but three or potentially four sources due to Western Kings, Brown Tigers, Endeavours and Coral prawns all being harvested from that fishing area. A summary of the initial wild harvest prawn sources is shown in Table 2. The 19 nominated prawn farm sources covered all prawn farms that were operational at that time, these are also listed in Table 2.

It was decided that initially all samples analysed would be green, as the impact of cooking on the trace metal analyses was not well understood. However it was also decided to analyse a selection of green and cooked samples from at least one location so that any differences could start to be elucidated. It was also decided to compare analysis of samples dipped in preservative to prevent melanosis (metabisulphite or derivative) and those not dipped to ensure this preservation treatment also did not impact on the analyses (noting SCI did not expect a difference as only the edible portion of the prawn was being analysed).

A process for collecting the prawns, including sampling bags and envelopes and forms for detail of samples and instructional videos/powerpoints had previously been developed in consultation with Chemcentre. Chemcentre regularly analyse forensic samples for legal proceedings so have experience in sampling where protection of chain of custody needs is mandatory. It is noteworthy that, in order to ensure temporal as well as spatial variation in source sampling, even before the laboratory selection process, some 2016 and 2017 samples had already been collected under the defined protocols from the Northern Prawn Fishery, Shark Bay, Exmouth and Spencer Gulf and from one prawn farm.

4.1.2 Implementation of Sampling Program

For the wild harvest fisheries the samples that have been collected are summarised in Table 2. A variety of sampling methodologies were used….and this variety is perhaps reflected in the number of samples collected from each source. For example in the Northern Prawn Fishery (NPF), in 2016, 2017 and 2018, skippers were briefed on the project during the pre-season briefings and provided with sampling kits. These samples were then collated and despatched when the vessels returned to port. As the NPF is a very large fishing area, and is further divided into 15 statistical zones for fisheries management purposes, after each collection existing sample locations were analysed according to statistical harvest zones, and

gaps were targeted where possible at later samplings. This targeted sampling was to try and ensure collection from as wide a geographical area in the NPF as possible, and also to establish with SCI whether NPF samples could be further divided into smaller geographical provenance zones. Sampling sites in the NPF are shown in Figure 1.

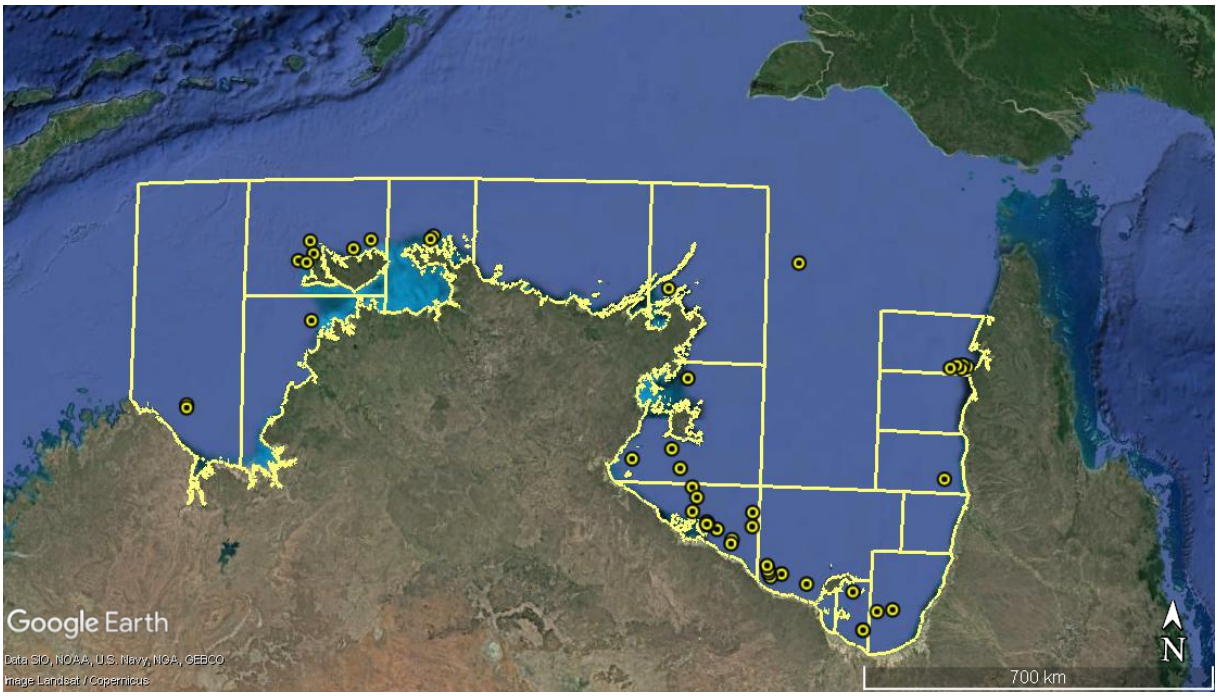

Figure 1: Sampling sites and zones in the Northern prawn fishery.

In Shark Bay, Exmouth and NSW oceanic harvest areas the samples were collected by the fisheries regulatory authority during the pre-season and through season surveys. In Spencer Gulf, West Coast and Gulf St Vincent harvest areas the samples were organised by the local industry association with help from the fisheries management authority. In Victoria, sample collection from various vessels was organised by a helpful industry member. For the NSW estuarine, sample kits were despatched to the local Fisher co-ops and then were to be collected from the Co-Ops by the Principle Investigator (PI). Sample collection using this methodology was low.

Similarly it was difficult to organise Queensland samples, two skippers provided samples but despite positive conversations with several industry members by the PI and ACPF executive officer and Board members, and despatch of sample kits, further Queensland sample collection has not been undertaken. The white spot issue was considered an important issue impacting Queensland sample collection due to movement restrictions and workload for industry and regulatory stakeholders. Not surprisingly this project was low in priority for many Queensland regulators and operators and without a dedicated Queensland prawn industry association it was difficult to organise sampling.

In summary for the wild harvest sector 273 samples were collected from 20 of a possible 31 sources (see Table 2). Temporal variation was available with at least two sets of samples, separated in time, collected in Shark Bay, Exmouth, Spencer Gulf and the NPF. With the exception of Royal Reds from Deepwater NSW, the other sources missing samples were from Queensland, and include Moreton Bay, Torres Strait, Cairns/Innisfail and certain species from

Bundaberg and Cape Tribulation. Where samples have not yet been provided there may be the option to collect samples for analysis at a later date.

In 2018, 51 samples from 8 farms were collated for analysis. In late 2018, the APFA executive requested independent sample collection from all farms, hence in February 2019 the PI collected samples from each farm, and delivered to relevant cold stores on a day to day basis. 85 samples from 17 farms were collated and held in Brisbane freezer storage awaiting despatch to Perth. As some of the farms were in areas where prawn import to WA was restricted, it was necessary to await a DPIRD permit to develop conditions/protocols to allow those samples to come to WA to be analysed. This permit was issued in March 2019. In summary for the farmed prawn sector 136 samples were collected from 17 farms (see Table 2). Temporal variation was available with at least two sets of samples, separated in time collected from eight of the farms.

4.1.3 Analysis of Samples

Samples were analysed at Source Certain International using a commercial in confidence methodology and data analytic technique.

Data was then interrogated and results combined to develop statistical models for both farmed and wild harvest samples of:

a. Classification: A measure of how well the data classifies into defined groups.
b. Cross-validation: A measure of how robust the statistical model is.

4.1.4 Development of Database

An excel spreadsheet of samples has been developed, separated into fishery area or farm, with the following information added:

Wild harvest: sample number, fishery region of collection, date and time of collection, name of vessel and skipper, species, GPS location, depth and any relevant comments.

Farms: sample number, Farm, date and time of collection, Pond number, species, GPS location, and any relevant comments.

The database also contains a record of all envelopes that have been despatched, even if samples were not collected.

4.1.5 Verification by In Market Survey

In order to understand the potential impact of the technology it was decided to undertake an initial and exploratory “in market“ verification survey. This survey, conducted by SCI, included the collection, by independent samplers of 200 prawns from 35 LAP Listed retail outlets in 6 states during July-September 2019.

4.1.6 Commercialisation and Legacy Activities

ACPF and APFA Board opinion, as well as SCI, Curtin University and FRDC input, was sought on a range of commercialisation and legacy options.

4.1.7 Communication and Extension

A range of methods was used to communicate the results to the different stakeholder groups.

4.2 Results and Discussion

4.2.1 Sample Collection

For wild harvest fisheries 283 individual samples were analysed covering 20 sources, and 136 farmed prawn samples were collected from 17 sources. The samples analysed for each source were selected by SCI based on the granularity of the separation. Where separation was distinct from other regions but similar within a region, fewer samples were analysed

A summary of the samples analysed is shown in Table 2.

Table 2 FRDC 2016/261: Harvest Sources

Source	Harvest Area	Species	Representative samples collected? (number)
WILD HARVEST SOURCES			
1	Northern Prawn Fishery (NPF) (noting statistical regions Bonaparte, Fog Bay, Melville, Essington, Arnhem, Gove, Groote, Limmen, Mornington, Sweers, Bold, Mitchell, Edward, Weipa, Keerweer)	Banana	Yes (36) (4 species ID)
2		Grooved tigers,	Yes (2)
3		Brown tigers Green Tigers	Yes (29)
4		Endeavour.	Yes (15)
5	Torres Strait	Brown Tigers	no
6		Endeavours	no
7	Moreton Bay inshore	Bays	no
8	Moreton Bay oceanic	Eastern Deep water kings	no
9	Townsville	Eastern Deep water kings	yes
10	Mackay	Eastern Deep water kings	yes
11	Bundaberg	Bananas,	no
12		Brown Tigers	no
13		Endeavours,	no
14		Eastern Kings	Yes (12)
15	Cairns/Innisfail	Bananas	no
16	Cape Trib north including Princess Charlotte etc:	Brown tigers,	Yes (32)

Source	Harvest Area	Species	Representative samples collected? (number)
17		Kings (red sport and blue leg),	Yes (4)
18		Endeavours	no
19	NSW Oceanic	Eastern Kings	yes (24)
20	NSW Estuary	school	Yes (2)
21	NSW Deep water	Royal Red	no
22	Gulf St Vincent	Western Kings	Yes (8)
23	Vic oceanic	Kings	Yes (10)
24	Spencer Gulf	Western Kings	Yes (29)
25	West Coast	Western Kings	Yes (4)
26	Shark Bay	Western Kings	Yes (18)
27		Brown tigers,	Yes (11)
28		coral	Yes (3)
29	Exmouth	Brown tigers	Yes (10)
30		Endeavours	Yes (5) (one banana)(1)
31		Western Kings	Yes (10)
32	Nicholl Bay	Banana	No (ACPF request removed as source)
33	Kimberley	Brown tiger, banana	No (ACPF request removed as source)
FARMED PRAWN (APFA) SOURCES			
1	Mossman	Black Tiger prawns	Yes (16)
2	Cairns	Black Tiger prawns	Yes (5)
3	Kurrimine Beach	Black Tiger prawns	Yes (6)
4	Cardwell (1)	Black Tiger prawns	Yes (16)
5	Cardwell (1)	Banana	Yes (6)
6	Cardwell (2)	Black Tiger prawns	Yes (5)
7	Campwin Beach	Black Tiger prawns	Yes (2)
8	Ilbilbie (1)	Black Tiger prawns	Yes (9)
9	Ilbilbie (2)	Black Tiger prawns	Yes (14)
10	Calavos	Black Tiger prawns	Yes (5)
11	Rosedale	Black Tiger prawns	Yes (9)
12	Ayr	Black Tiger prawns	Yes (16)
13	Palmers Island (1)	Black Tiger prawns	Yes (6))
14	Palmers Island (2)	Black Tiger prawns	Yes (5)
15	Palmers Island (3)	Black Tiger prawns	Yes (3)
16	Woongoolba	Black Tiger prawns	Yes (10)
17	Alberton (1)	Black Tiger prawns	Yes (3)
18	Alberton (2)	Black Tiger prawns	Yes (5)
19	Mission Beach	Black Tiger prawns	No
20	Proserpine	Black Tiger prawns	No

4.2.2 Analysis of Samples

Separation by Farm or Fishery

The results indicated each fishing area and farmed area can be separated with high statistical reliability. Greater detail is provided in Table 3 below. Graphical representation of the data is shown in Figures 2-6.

Table 3: Summary of SCI Analytical Results

Partner and Outcome	**Number of samples**	**Classification**	**Cross Validation**	**Comments**
ACPF separation by Fishery	283 samples from 20 sources	98.7	96.2	Due to distinct environments in each fishery, product from each individual fishery can be separated (Figure 2 and Figure 3).
APFA : separation by farm	136 from 17 farms	99.7%	98.5%	Due to distinct environments at each farm, product from each individual farm can be separated (Figure 4).

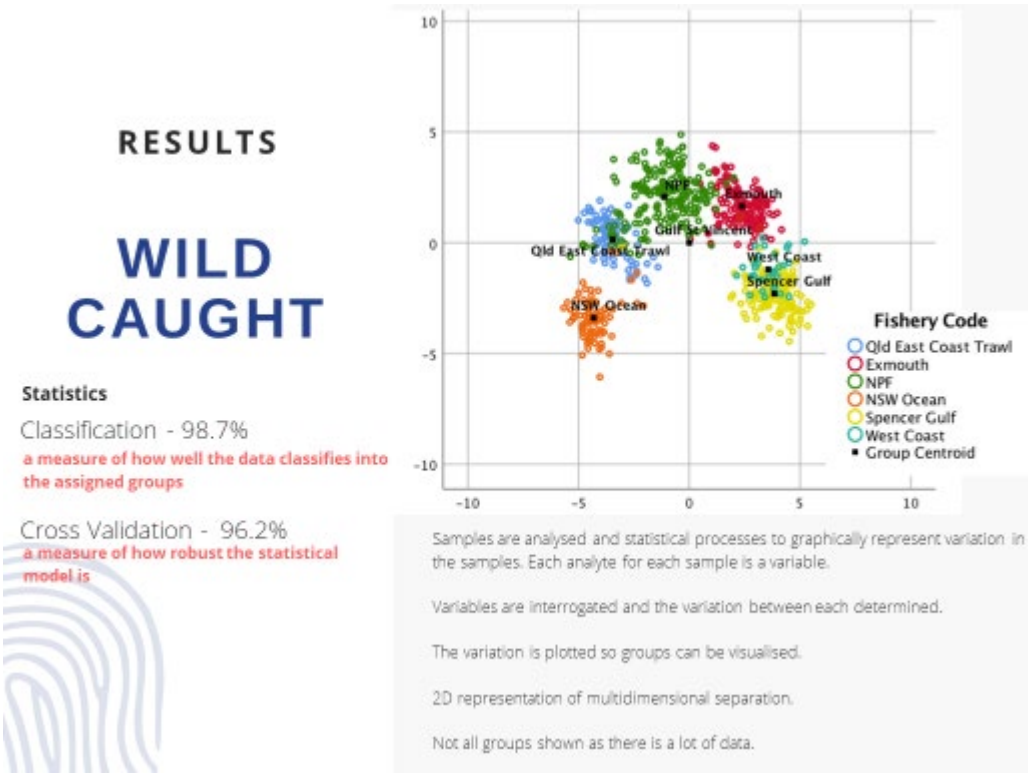

Figure 2: Graphic depicting separation of samples by fishery

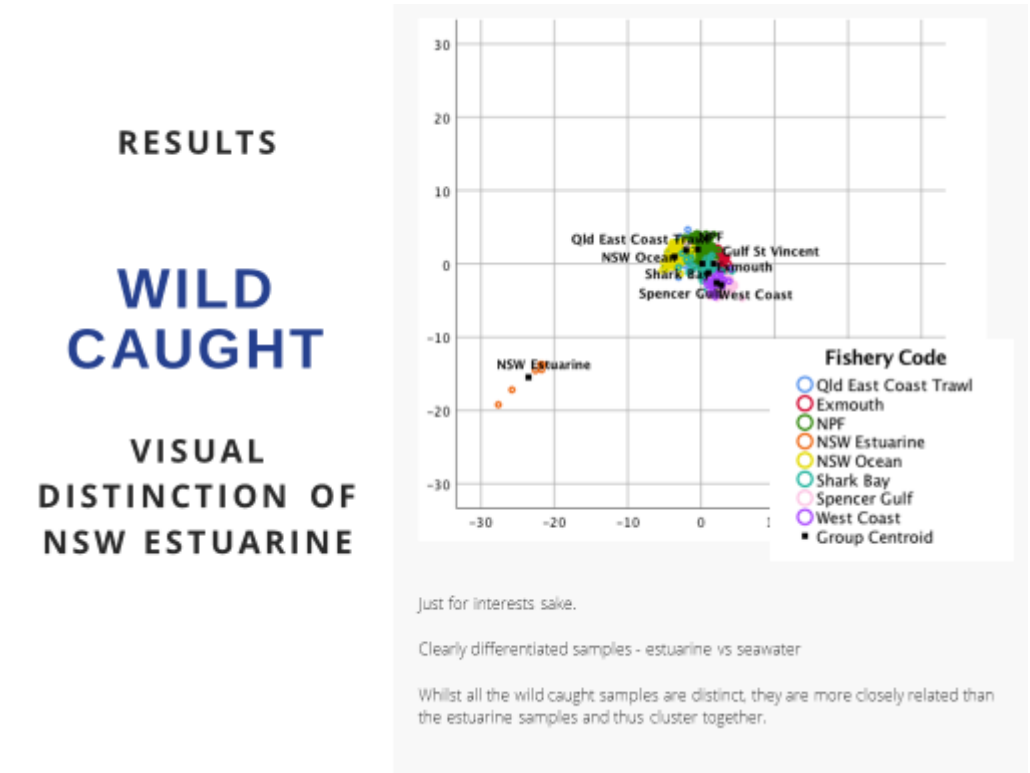

Figure 3: Graphic depicting separation of samples by fishery (including estuarine)

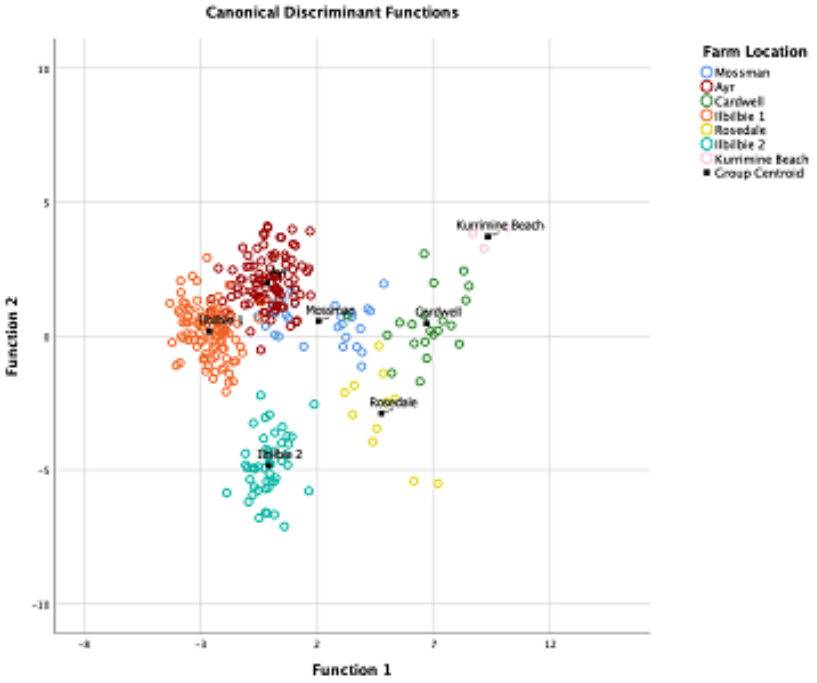

Figure 4: Graphic depicting separation of samples by farm.

Separation Within Farm or Fishery

The results indicated that within certain levels of statistical reliability, pond separation on farm could be achieved (see Figure 5).

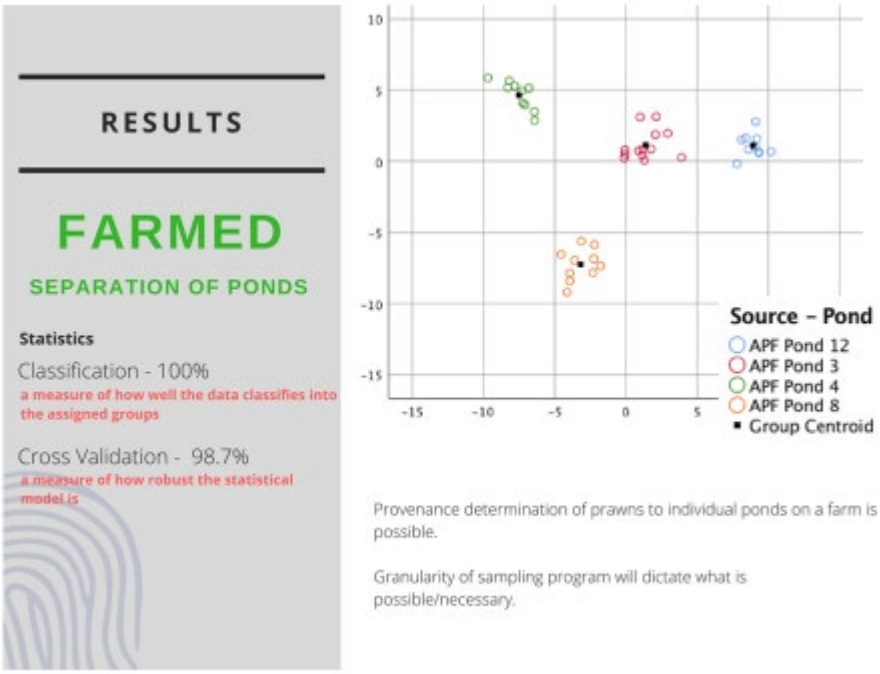

Figure 5: Graphic depicting separation of samples by farm.

Within the NPF within certain levels of statistical reliability the east and western areas in the NPF could be separated. (see Figure 6).

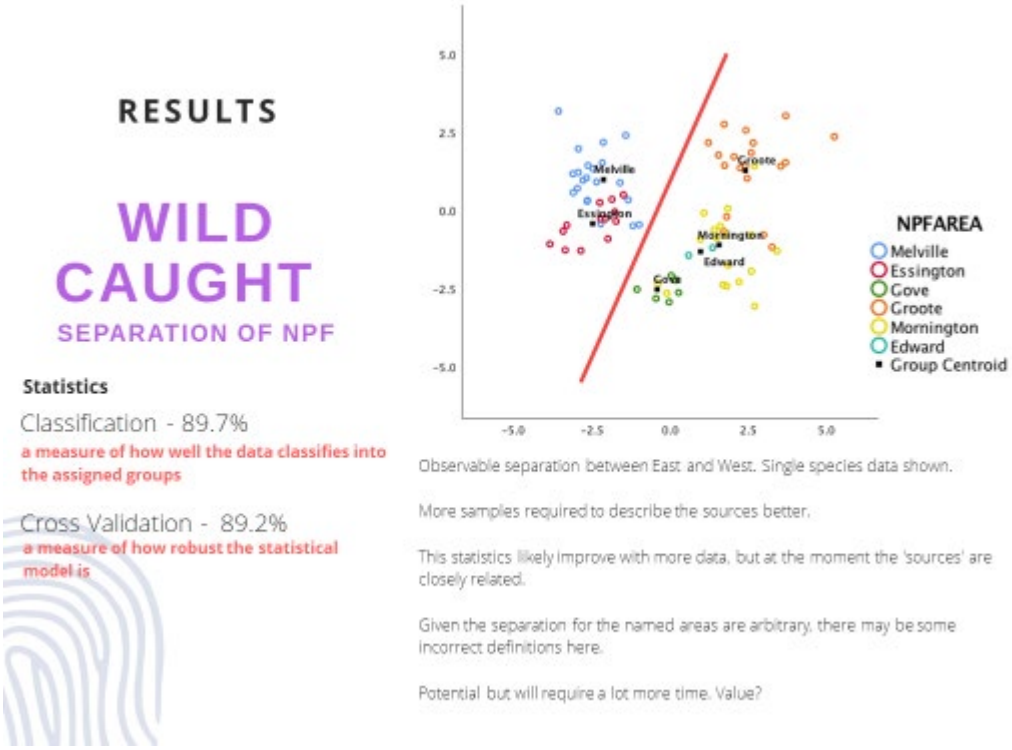

Figure 6: Graphical representation of separation of NPF into Western and Eastern areas.

The separation of the same species from NPF and Queensland trawl has also been demonstrated (see Figure 7)

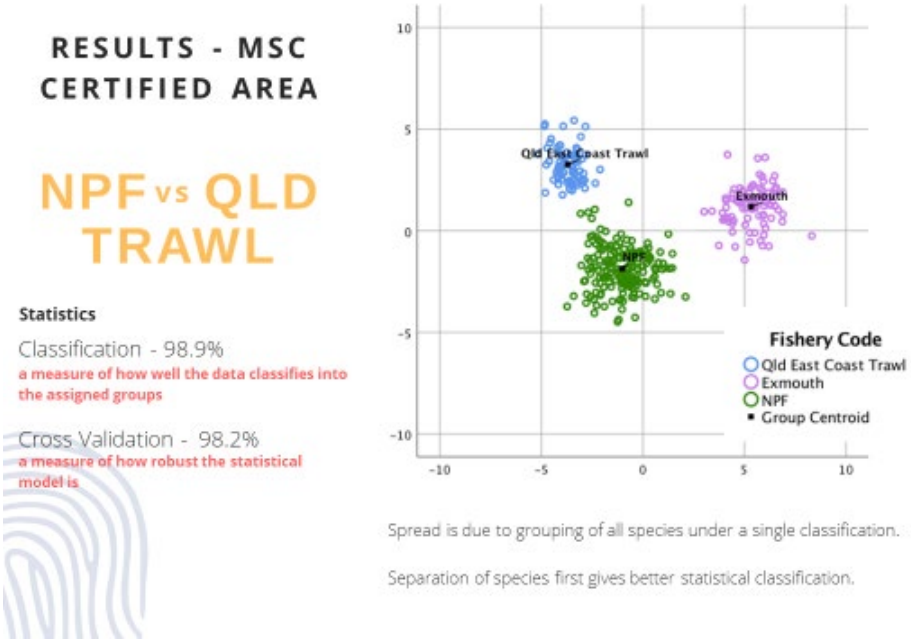

Figure 7: Graphical representation of separation of NPF and Queensland East Coast trawl.

Separation by species

It was of interest that the results indicated that the technology could also separate by different species (Figure 8).

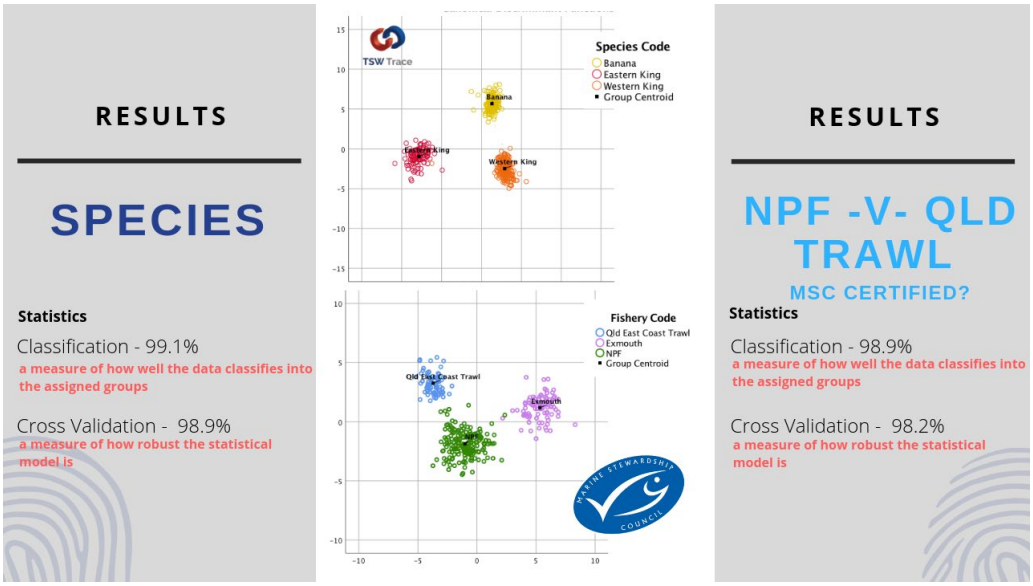

Figure 8: Graphic depicting separation of samples by species.

Other Product Factors

At this stage, based on ongoing analytical results, there may be a difference between cooked and green samples, but analytical alignment between cooked and green samples has been demonstrated. Hence consideration may be given to developing a separate but aligned database focussing on cooked samples where appropriate.

4.2.3 Database Development

The database of results from all samples is currently stored at SCI.

4.2.4 In Market Verification Survey Results

In October-November 2019 SCI conducted a random in-market survey of prawns claiming to be Australian from Australian retailers.

The study was conducted under the following scoping outline.

Activity: Covert Retail Surveillance

Scope: Covert sampling and verification of Provenance.

Claim: Product is Australian

200 prawns from 35 LAP listed retail outlets in 6 states were collected by independent samplers during November/December 2019.

Verification Results indicated that 97% (193) passed the “Product is Australian” verification test.

Of the seven that failed, five were from one packaged frozen product. The remaining two samples that failed were amongst other samples in packages that were verified indicating possible dilution/mixing in of other samples. These failed samples have been informally investigated and mitigation activity undertaken.

13 samples were deemed under investigation. This indicated that whilst the product is Australian claim was verified, other provenance claims were under investigation.

Cam Scadding, SCI commented on the in market verification results.

"To summarise, the results are better than other exercises that have been conducted in the seafood sector.

The results provide a high level of verification of products that are marketed under the Love Australian Prawns brand.

The failed verification samples were both covertly purchased from retail outlets with two locations having what appears to be a dilution of authentic product with that which is not. This was subsequently investigated and this issue was not replicated indicating either an error or that it had been rectified.

The final set of samples were from a frozen pack that, based on the label, has been processed and packed offshore with the product ending up in the pack not being verified as Australian."

4.2.5 Commercialisation Activities

In mid to late 2019 four activities were proposed to the ACPF/APFA Boards for ongoing use the database and technology.

These proposed activities and Board decisions were:

a. No activity (not supported);
b. Market surveillance (supported);
c. Full Supply Chain Integrity Program (not supported)
d. Development of a Stakeholder Led Program and Governance arrangements for use of the database by agreed external stakeholders (supported).

Following these Board decisions the following further steps were undertaken.

Market Surveillance Activities (Supported)

Under this recommendation the verification in market survey was undertaken to validate the technology and the database ((Section 4.1.3 and 4.2.3). It is noted that this market surveillance activity was part of a proof of concept and therefore only a small (n=200) and targeted survey was conducted. .

Development of Stakeholder Led Program

The stakeholder led program was to be developed for when individual stakeholders (could be companies; MSC; supermarkets etc) wish, for an agreed fee, to contract SCI to use the methodology and/or database to validate/verify data specific to their own operation. A number of considerations in regard to the stakeholder led program were raised discussed at the October 2019 ACPF Board meeting.

The considerations raised were described below;

1. Data ownership

2. Stakeholder confidentiality

3. Preventing bad press

As a result of these discussions three legal documents to support a stakeholder led program were prepared by SCI for comment and consideration in March 2020.

The draft agreements were

1. Draft Database Licence & Services Agreement (DLSA) between SCI, APFA and ACPF which provided for ongoing license (beyond the project) for SCI to maintain the database and conduct verification work using it. This draft document raised two areas for resolution; 'proper use', partners and subsequent service fee.

2. Standard commercial agreement (x 2) between SCI and any third -party stakeholder in the event of a Business to Business (commercial in-confidence) engagement to address a suspected substitution case.

These agreements were reviewed by the ACPF Board in March 2020.

Subsequently in July 2020, a final project steering committee meeting was held with the intent to finalise the agreed commercialisation steps and allow the final reporting for the research project to be undertaken.

It was determined from that meeting that it was necessary to also draft a legal agreement transferring ownership of the project database from FRDC/Curtin to ACPF/APFA to ensure SCI could use the data for agreed investigations.

An agreed action from that meeting was for FRDC, who, under the project contractual arrangements (reproduced below), were tasked with managing the commercialisation process, to develop a commercialisation plan and manage finalisation of agreements.

- FRDC will assume responsibility for managing the:
    - commercialisation plan
    - conduct of an IP search during the first six months of the project to assess patents that may affect commercial use of project outputs in Australia and key international markets
    - commercialisation of any intellectual property created in the project
    - Curtin University will assist the FRDC in undertaking the above activities.

It must also be noted that commercialisation activities were also covered in Stage 3 of the Project Agreement (see below):

STAGE 3: Commercialisation Plan Development and Final Reporting

Following the completion of Stage 1 and 2, and during the second year of the project, a commercial plan for use of proposed project outputs is developed. This commercial plan is to be developed in collaboration with FRDC or an FRDC approved commercial consultant. The plan will include an economic assessment of the commercial viability of further analyses based on project outputs.

It was further agreed by ACPF and APFA, in the steering committee meeting and subsequently, that the final reporting for the research project could proceed and be finalized without concomitant finalization of the commercialization arrangements, referred to in the project contract, and currently being drafted by FRDC.

4.2 5 Communication and Extension

Stakeholder communication activity for the project is summarised below and in Table 3.

- A summary briefing was presented at the ACPF AGM in September 2018 with a similar briefing provided to the APFA executive at the same time.
- During mid to late 2018 an agreed statement on the project was developed and approved by ACPF/APFA executive and a list of stakeholders to receive communication also agreed.
- In November 2018 a joint media release on the project was developed and distributed by FRDC and several radio interviews (undertaken by Tricia Beatty, PFA) and print articles resulted.
- The project has been updated and featured in 2018/2019 ACPF and LAP e-newsletters.
- Some results from the project were presented by Cameron Scadding (SCI) at the 2nd International Conference on Food Analysis in Melbourne in November 2018. The presentation was entitled Food Fraud: Tools in Action. Mr Scadding also took part in a panel session Food Fraud Analysis at the conference.
- In mid-2018 SAFEFISH delivered a report entitled *Authenticity for the Australian Seafood Sector: A Review of Available Tools to Identify Substitution and Mislabelling* and this project was included as a case study in the report.
- In November 2018 a teleconference was held between Erik Poole (SFM), Rachel King (ACPF), Kim Hooper (APFA) and Janet Howieson to discuss the synergies between the current project and a SFM/ANSTO/NMU initiative looking at also identifying provenance in prawns (and other seafood products). It was agreed that continuing dialogue to prevent confusion about the two projects and to take advantage of synergies would be beneficial.
- In March 2019 discussions were held with DPIRD in regard to developing protocols to allow all samples to be analysed in Perth.

- The project won the R, D and E award at the WAFIC Seafood Industry Awards in July 2019 (see Figure 9)
- A presentation on the project entitled *Investigating the use of trace element profiles to substantiate provenance for the Australian prawn industry w*as delivered by Cameron Scadding and Janet Howieson at the 2019 APFA conference in Brisbane in late July.
- The current status and next steps for the project were delivered to the ACPF Board meeting in August 2019 and to the ACPF RD&E forum in October 2019.
- The capacity was launched by Federal Assistant Minister for Forestry and Fisheries, Jonathon Dunham at an event attended by >80 prawn industry stakeholders in Melbourne in October 2019. A media release was issued concurrently and >5 radio interviews and >10 electronic and hard copy media stories were generated (see Figure 10 and Figure 11).

Table 3: Communication and Extension Activities for the Project Outputs.

Publication/Product	**Detail**	***Status***
FISH magazine article	*As part of traceability article published April 2017.*	*Published April 2017*
FFFW CRC Bid: Project Proposal	*Investigate hand held analytical device if possible*	*Submitted as part of FFFW bid*
ACPF AGM	*Update of project by PI*	*Delivered September 2017.*
ACPF AGM	*Update of project by PI*	*Delivered September 2018.*
APFA executive	*Update of project by PI*	*Delivered (written) September 2018.*
APFA e-newsletter	*Update of project*	*Ongoing 2018/2019*
LAP e-newsletter	*Update of project*	*Ongoing 2018/2019*
SAFEFISH report	*Project included as case study*	*2018.*
Media release and follow on interviews and media articles	*Project current status and objectives*	*October 2018.*
Conference Presentation (ICFA)	*Food Fraud tools : Cameron Scadding (SCI)*	*November 2018.*
APFA ANNUAL CONFERENCE	*FRDC 2016.261: Summary of Results*	*July 2019*
ACPF Board Presentation	*Update on project status*	*August 2019*
ACPF RD&E members forum	*Update on project status*	*October 2019*
Conference Presentation (Seafood Directions)	*Update on project status*	*October 2019*
Media release on project launch and follow on interviews and media articles	*Launch of capability with >80 attendees . Multiple radio interviews and print media articles.*	*October 2019*
Project Launch Event	*By Federal Assistant Minister*	*October 2019*
ACPF AGM	*Update and next steps of project by PI and Cameron Scadding*	*October 2019.*
FISH magazine article	*Summary article published*	*Published September 2019*
ACPF Board Meeting	*Presentation by Cam Scadding and Janet Howieson*	*March 2020.*
Project Steering Committee meeting	*Update and Final Actions*	*July 2020.*

Figure 9: Geoff Diver, Janet Howieson, David Carter and Brett Hogan at the WAFIC Awards July 2019.

- A presentation on the project was delivered by Cameron Scadding at the Seafood Directions conference in Melbourne in October 2019. Dr Scadding then was part of a panel session at the conference.
- PI/SCI have been approached by MSC/ASC to investigate using the technology as part of MSC/ASC Chain of custody and truth in labelling outcomes.
- As per the project application a consumer communication strategy has not been developed due to the potential to cause confusion in the market.
- At the final steering committee meeting for the project held in July 2020, the agreed final communication steps was to develop, endorse and circulate a general letter to supply chain stakeholders explaining the existence and capability of the analytical technology and database. This letter is currently under review.

Figure 10: APFA Chair Matt West, ACPF Chair Annie Jarrett, D Cameron Scadding, Federal Assistant Minister for Forestry and Fisheries, Jonathon Dunham and FRDC MD Dr Patrick Hone at the October 2019 Launch.

Figure 11: Federal Assistant Minister for Forestry and Fisheries, Jonathon Dunham, ACPF Chair Annie Jarrett, Dr Cameron Scadding, ACPF EO Rachel KIng, PI Dr Janet Howieson and APFA Chair Matt West at the October 2019 Launch.

5 CONCLUSIONS

Conclusions and summary of activity, under the original project objectives, is described below.

- To investigate and pilot a cost effective, legally enforceable method to establish the provenance of prawns and ensure robust identification of source harvest areas for the Australian prawn industry.

The legal opinion states that this analytical method if sampled, developed and applied appropriately, and with aligned robust and statistically valid benchmarking data, could be used in a legal context for incidences of substitution. Results have confirmed that separation of harvest source areas by this method is feasible and statistically robust.

- Investigate and confirm with stakeholders how the method can be used as a basis for preventing/discouraging the substitution currently impacting the LAP national strategy and other accreditation/branding initiatives (eg MSC).

An initial in market verification survey was conducted to test future use of the database. Two approaches have been suggested for future use of the database. The first is an industry led (ACPF/APFA) process, incorporation an ongoing database maintenance and in market survey verification program for each organisation potentially through the respective IPA. The second approach is for when individual stakeholders (could be individual companies; MSC; etc) wish to use the methodology and database to validate/verify data specific to their own operation. Draft legal agreements for such a stakeholder led process, ensuring fair recompense and ACPF/APFA protection of the database and any results have been developed for comment and consideration by the ACPF/APFA Boards.

- To communicate the outcomes of the project results to supply chain partners and regulators and evaluate such that is can be shown that they aware that such a method exists and how it can be used to manage product integrity issues.

Stakeholder communication has continued to be undertaken across a variety of fora/formats as summarised in Section 4.2.6. The capacity was launched by Assistant Minister for Forestry and Fisheries, Jonathon Duniam at an event in Melbourne during Seafood Directions, October 2019 and attended by >80 people. Media statements were issued and there was considerable media attention (print and radio) associated with the launch. A draft general letter to supply chain stakeholders explaining the existence and capability of the analytical technology and database is currently under review prior to circulation.

6 RECOMMENDATIONS AND FURTHER DEVELOPMENT

Post-project Recommendations are summarised below.

a. FRDC, Curtin, ACPF, APFA and SCI to finalise, endorse and implement all commercialisation arrangements to allow ACPF, APFA and agreed external stakeholder use of the database and analytical technology.
b. Phase 2 projects to maintain currency of the database and undertake regular verification activities be considered and agreed to by ACPF and APFA individually and jointly as appropriate. It is expected these activities will also be targeted to fill some existing and future sampling gaps, and answer any emerging research questions, such as impact of extreme environmental conditions or change of feed.
c. Further and ongoing communication of the existence and capability of the technology and database be managed either through LAP or ACPF/APFA joint and/or individual sector initiatives.
d. The technology is to be routinely adopted through domestic and export supply chains, as agreed by either LAP or ACPF/APFA jointly, to confirm and verify geographical provenance of Australian prawns.

APPENDIX

Appendix 1 Food Legal Advice

FOODLEGAL
AUSTRALIAN LAWYERS & CONSULTANTS

Privileged & Confidential

FOODLEGAL ADVICE
PREPARED FOR CURTIN UNIVERSITY

A Legal Framework for Using Trace Metal Profiling Technologies against Prawn Substitution and Misrepresentation in Australia

Current as at 16 November 2017

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1. YOUR INSTRUCTIONS

1.1 You have instructed FoodLegal to provide you with legal advice regarding enforceability of trace metal profiling to demonstrate provenance of Australian prawns (wild harvest and farmed) and the likely parameters that would need to be addressed in method development and validation.

1.2 FoodLegal agreed to provide you with a report that would also address each of the following legal issues:

- definition of different types of food substitution and misrepresentation;
- identification and application of the regulatory implications for food substitution and/or misrepresentation of the food in each Australian jurisdiction, including consideration of relevant legislation, industry standards and regulatory body materials;
- identification of relevant examples of enforcement actions; and
- development of a framework for successful regulatory enforcement of unlawful food substitution or misrepresentation of the prawns being provided to the buyer or consumer, including consideration of the standard of evidence required to support the scientific methods available to meet such a standard.

2. INTRODUCTION AND SCOPE OF ADVICE

2.1 This document provides advice on the legal framework for using trace metal profiling technologies against prawn substitution or misrepresentation in Australia.

2.2 Such a legal framework is particularly required with respect to:

- food that is either packaged or unpackaged and is sold by retailers such as in supermarkets, fish shops and retail markets (collectively called "**the Retail sector**"); and
- food that is served cooked at food service premises such as restaurants, cafeterias, takeaway, hotel, hospitality, entertainment and prisons. (collectively called "**Foodservice sector**"). It is believed that a significant portion of seafood consumed in Australia is consumed in the Foodservice sector.

2.3 There are potential differences in the possible approaches for legal protective mechanisms in these different sectors and parts of the prawn supply chain. As we discuss in detail below, there might also be scope for improving the regulatory framework to detect and prosecute prawn substitution and misrepresentation.

2.4 Having an effective legal framework for enforcement is crucial given that food substitution, misrepresentation and contamination has potential to:

- cause public a public health and safety concern;
- cause major food scandals which can reduce public confidence and trust in Australia's food regulatory system; and
- undermine Australia's international reputation in the food industry.

2.5 For example, an outbreak of hepatitis A resulted in the recalling of Nanna's frozen berries in February 2015. This event not only involved a food safety issue but also adversely impacted a market-leading product in frozen berries in Australia leading to an immediate AUD $14 million reduction in its profits for that same financial period and wider public concerns about the safety of particular products and ingredients imported from the relevant source countries.

2.6 The 2010 action by the New South Wales Food Authority against smallgoods manufacturer Primo Meats is another case which highlights the legal importance of proper and scientific traceability systems. In this instance, the issue of traceability and lack of adequate record-keeping protocols resulted in substantial penalties. Primo was found to have made a "100% Australian" claim on meat products that contained ingredients sourced from Canada and Denmark, among other countries. The court in that case commented that Primo's ability to source and trace the ingredients in its products meant that the "100% Australian" claim could not be substantiated.[1] The inadequacy of traceability systems resulted in an expensive court action, substantial fines, bad publicity and the need for relabelling and relaunching of products.

2.7 This Advice is divided into four main sections:

A. The **problem with using the word "fraud"** in the context of the different parts of the supply chain or different sections of the market. FoodLegal is of the opinion that usage of the words "fraud" or "food fraud" are problematic and should not be used to describe the offences that the prawn industry wishes to prevent occurring. This is because fraud connotes deliberate intention. Evidence of deliberate intention is difficult to adduce for proof in a court because it usually requires analysis of the subjective state of mind of the offender. Prosecution for offences under the Food Act do not necessarily require proof of any intent. Similar to a traffic infringement offence, many of the applicable statutory offences mentioned in this Advice are governed by "strict liability" meaning that the elements of the offence are all met without the additional need to prove intent. It will also be easier to prosecute an offence if the law applies strict liability to the offence. (See Part 3 below)

B. The **existing powers** and **legal provisions** which may be used for enforcement. The emphasis here is laws governing the scenarios of substitution and misrepresentation on labelling, signage, food menus, advertising and marketing material because this is where and how the consumer may lose out. In this section we will also discuss the various **agencies and government departments** assigned with enforcing the current legal framework and their respective powers. (See Part 4 below)

C. The **evidentiary requirements** relating to the taking and testing of samples and how they may be used in prosecutions. (See Part 5 below)

D. **What can be done** using the existing legal framework and the various legislative amendments which could further improve the framework to support the usage of the technologies of trace metal profiling beyond stopping and preventing prawn substitution and misrepresentation in

[1] *NSW Food Authority v P & M Quality Smallgoods Pty Ltd t/as Primo Smallgoods* (2010)

Australia. Here we also include the usage of certification trade marks, which can also act as a useful deterrent against food substitution and misrepresentation, and the implementation of a mandatory Code of Practice. (See Part 6 below)

2.8 Provided a sufficient legal framework exists, we envisage there are considerable opportunities to develop new and enhanced trace metal profile traceability testing technologies that need not "re-invent the wheel" but might expand the existing technologies especially for use in the Foodservice sector.

2.9 We note that we have undertaken our own research into relevant food substitution and misrepresentation cases in Australia and have included relevant examples in this Advice. Because prosecutions under the State and Territory Food Acts are done at the Magistrates' Court level (the lowest court in Australia), they are not recorded and made available to the public.

3. THE PROBLEM WITH USING THE WORD "FOOD FRAUD"

3.1 The term "food fraud" is usually broadly defined as the intentional mislabelling, substitution, unapproved enhancement and grey market production/theft/diversion for economic gain.[2]

3.2 FoodLegal believes that, in the prawn industry, the most prevalent issues are misrepresentation (usually in the form of mislabelling) and substitution, and therefore, this is the focus of our Advice.

3.3 We do not believe that unapproved enhancement or contamination[3] can be addressed using traceability technologies, and therefore, these are not relevant to this Advice. At the same time, grey market production, theft and diversion[4] would involve criminal forensic law that falls outside this brief.

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[2] http://www.pwc.com.au/pdf/pwc_food-fraud-vulnerability-assessment-guide.pdf. See also: J Spink and D C Moyer, *Backgrounder: Defining the Public Health Threat of Food*, National Centre for Food Protection and Defense, 30 April 2011 <http://foodfraud.msu.edu/wp-content/uploads/2014/07/food-fraud-ffg-backgrounder-v11-Final.pdf>.

[3] Unapproved enhancement is adding unknown and undeclared materials to food products to enhance the quality attributes. An example would be injecting prawns with a chemical ingredient to change their flavour or appearance. The main issue here is that this type of food fraud may be a safety hazard. Section 181 of the *Biosecurity Act 2015* (Cth) allows for the revocation of import permits and approvals where contamination creates a safety or biosecurity risk. This legal action is enforced by the Department of Agriculture and Water Resources. This type of enforcement action recently occurred with respect to Logan River prawn farms in Queensland where contaminated raw prawn imports have been blamed for an outbreak of white spot disease. See http://www.abc.net.au/news/rural/2017-05-24/white-spot-prawn-estimates-half-prawn-imports-infected/8554826. Prosecution of unapproved enhancement or contamination in relation to food may occur under the State and Territory Crimes Act and the Commonwealth Criminal Code 1995 (section 380.2) which make it an offence to contaminate goods to cause public alarm or economic loss in Australia or create harm or risk of harm to Australian public health. The Crimes Acts and Criminal Code are enforced by State and Territory Governments. The offences are punishable by up to 10 years imprisonment or a fine or both. The prosecution of criminal matters is done by the Commonwealth or State or Territory Director of Public Prosecutions (DPP). In order for this to occur, charges must first be made by police.

[4] Grey market production/theft/diversion covers the sale of excess unreported products. The various criminal statutes in Australia best deal with this type of fraud. The relevant offences would be theft or obtaining a financial advantage by deception.

3.4 A key element in the common definition of "food fraud" is that the conduct must be deliberate or intentional. The requirement of intent is derived from the traditional criminal definition of "fraud".

3.5 Therefore, using the expression "fraud" can present an enforcement challenge. Given that intent is an essential element of proving "fraud", if follows that, where intent cannot be proven, there will be no legal finding of "fraud".

3.6 The element of intent is required in many criminal offences. Offences which do not require the element of intent are known as "strict or absolute liability" offences. A simple example is speeding while driving – if you are caught you are fined regardless of your intention at the time.

3.7 In the context of "fraud", most offences that exist under the Food Acts and the Australian Consumer Law are "strict liability offences" because simply engaging in the prohibited conduct is enough to contravene the law regardless of any deliberate intentions. This option is preferable for anyone seeking to prove the offence as it will be easier from an evidentiary perspective than proving criminal fraud.

3.8 As a general rule, where an offence may be penalised by imprisonment, intention must be shown. Therefore, if one were to refer to "food fraud", the only time would be where one can demonstrate the illegal conduct was intentional so that the appropriate legal action may involve initiation of prosecution for a criminal offence.

3.9 Substitution

(a) Substitution covers replacing an ingredient or part of the product, of high value with another ingredient, or part of the product, of lower value.

(b) Another type of substitution is known as partial substitution (or dilution). This covers mixing an ingredient of high value with one of lower value. This most commonly happens with liquid ingredients in beverages or other foods. However it could occur with prawns. For example, prawns sold as "Australian prawns" might potentially be mixed with prawns from elsewhere, such as Thailand or Vietnam, or farmed prawns could be mixed with wild prawns.

3.10 Misrepresentation

(a) Misrepresentation predominantly occurs through mislabelling. Misrepresentation occurs when false claims are made on packaging, labels, signage, food menus and advertising and marketing materials. This could occur in the Retail sector and the Foodservice sector. For example, prawns may be incorrectly labelled on a package or food menu as being "Australian" when in fact they have been farmed in Vietnam.

(b) A 2016 study into food fraud, testing 25,000 pieces of seafood across the globe, found that one in five pieces of seafood were mislabelled.[5]

(c) Misrepresentation can also occur in the form of concealment and counterfeiting. Concealment is hiding the low quality of food ingredients or product. Counterfeiting is copying the brand name, packaging concept, recipe, processing method etc. of food products for economic gain.

[5] The study was conducted by US-based conservation group, Oceana and can be accessed here: http://usa.oceana.org/sites/default/files/global_fraud_report_final_low-res.pdf

4. EXISTING POWERS AND LEGAL ENFORCEMENT MECHANISMS

4.1 We now move on to discuss the existing powers and legal enforcement mechanisms available to deal with prawn substitution and misrepresentation.

4.2 The legal enforcement framework exists through the following sources of law:

- State and Territory *Food Acts;*
- the *Country of Origin Food Labelling CoOL Information Standard 2016* (**CoOL Information Standard**);
- the *Australian* Consumer *Law* (**ACL**);
- *Seafood Safety Act 2003* (Vic) (**Seafood Safety Act**)*;*
- *Meat Industry Act 1993* (Vic) (**Meat Industry Act**);
- legal actions for breach of contract; and
- legal actions for deliberate torts.

4.3 Legal actions for misrepresentation and/or substitution under the Food Acts

(a) The various State and Territory Food Acts provide enforcement mechanisms when misrepresentation occurs. The Food Acts categorise certain conduct as offences, some of which are punishable by monetary penalties and sometimes, where individuals are involved, also by imprisonment. The most relevant offences are:

- falsely describing food where the consumer, relying on the description, will or is likely to, suffer physical harm;[6]
- falsely describing food to represent that it is of a particular nature or substance when it actually contains, or is mixed or diluted with, substances which are of lower commercial value or significantly diminish the food's value or nutritive properties;[7]
- misleading conducting relating to the sale of food[8]; and
- non-compliance with the Australia New Zealand Food Standards Code (**Food Standards Code**), unless the food is to be exported to another country.[9]

(b) The Food Acts are generally[10] enforced by municipal councils and offences are prosecuted at the Magistrates' Court or Local Court (meaning that they are essentially not reported and cannot be readily accessed).

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[6] *Food Act 2008* (WA) s 16; *Food Act 2003* (NSW) s 15; *Food Act 1984* (Vic) ss 10 and 10A; *Food Act* (NT) s 14; *Food Act 2001* (ACT) s18; *Food Act 2003* (Tas) s 15; *Food Act 2006* (Qld) s 34. This offence does not appear in the *Food Act 2001* (SA).

[7] *Food Act 2008* (WA) s 23; *Food Act 2003* (NSW) s 22; *Food Act 1984* (Vic) s 17A; *Food Act 2001* (SA) s 22; *Food Act* (NT) s 21; *Food Act 2001* (ACT) s 15; *Food Act 2003* (Tas) s 22; *Food Act 2006* (Qld) s 40.

[8] *Food Act 2008* (WA) s 19; *Food Act 2003* (NSW) s 18; *Food Act 1984* (Vic) s 13; *Food Act 2001* (SA) s 18; *Food Act* (NT) s 17; *Food Act 2001* (ACT) s 24; *Food Act 2003* (Tas) s 18; *Food Act 2006* (Qld) s 37.

[9] *Food Act 2008* (WA) s 22; *Food Act 2003* (NSW) s 21; *Food Act 1984* (Vic) s 16; *Food Act 2001* (SA) s 21; *Food Act* (NT) s 20; *Food Act 2001* (ACT) s 27; *Food Act 2003* (Tas) s 21; *Food Act 2006* (Qld) s 39.

[10] For example, in New South Wales, the Food Act is enforced by the NSW Food Authority

4.4 Powers available to authorised officers under the Food Acts

(a) Enforcement powers that could be used to detect and prevent food substitution and misrepresentation (particularly those pertaining to entry, inspection, sample procurement and seizure) exist under the State and Territory Food Acts. The purpose of the Food Acts is to ensure food for sale is both safe and suitable for human consumption, to prevent misleading conduct in connection with the sale of food and to provide for the application of the Food Standards Code.

(b) Under the Food Acts, authorised officers, who may be appointed by municipal councils, may, at any reasonable time, enter food premises or any other place where food is sold or handled for sale. Where the premises is being used solely for residential purposes, a warrant may be required.

(c) The powers of authorised officers under the Food Acts include:[11]

- investigating whether the Food Act has been complied with;
- opening and examining any packaging, labelling or advertising material;
- taking samples of the food and of anything which the officer believes may be used as evidence in a proceeding under the Food Act;
- **seizing the food, or any vehicle, equipment, package or labelling or advertising material, or anything** which the authorised officer believes, on reasonable grounds, to be evidence that an offence under the Food Act has been, or is being, committed; and
- taking photographs or audio or visual recordings where necessary.

(d) Since an authorised officer may seize anything they believe, on reasonable grounds, to be evidence, this could include food menus at Foodservice premises.

(e) Notably, in Victoria, the Seafood Safety Act provides that any police officer may assist an authorised officer in exercising their powers.[12]

(f) An authorised officer may, **on payment** or tender to the person in whose possession the food is, demand and procure food samples for the purposes of the Food Act. The food officer must inform the person from whom the sample was obtained that they intend to have the sample analysed. Generally, the sample is divided into three separate parts which are marked, sealed or fastened. One part is to remain with the person from whom the sample was obtained, one part is submitted for analysis, and one part is retained for future comparison. This rule does not apply where it is not possible to do this or where the separation would render the parts unsuitable for accurate analysis.[13]

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[11] See *Food Act 2008* (WA) ss 38, 40; *Food Act 2003* (NSW) ss 37-38; *Food Act 1984* (Vic) s 21; *Food Act 2001* (SA) s 37; *Food Act* (NT) ss 48, 50; *Food Act 2001* (ACT) Div 5.2; *Food Act 2003* (Tas) s 40; *Food Act 2006* (Qld) Chp 7 Pt 2.

[12] See *Seafood Safety Act 2003* (Vic) ss 30, 32 and 38.

[13] See *Food Act 2008* (WA) ss 74-75, 78; *Food Act 2003* (NSW) ss 67-68, 71; *Food Act 1984* (Vic) ss 22-23; *Food Act 2001* (SA) ss 53-54, 57; Food Act (NT) ss 85-86, 89; *Food Act 2001* (ACT) ss 73-74, 76; *Food Act 2003* (Tas) ss 69-70, 73. In the *Food Act 2006* (Qld), there are no provisions dealing with the procurement of food samples for analysis.

(g) This set of powers of entry, inspection, sample procurement and seizure is applied in relation to the offences listed in the Food Acts (as mentioned above at part 4.3 of this Advice).

(h) Although the State and Territory Food Acts do refer to how samples may be procured, the details in the law are not always sufficiently specific to every situation. In order to ensure that evidence of substitution or misrepresentation is credible and carries sufficient weight in prosecution cases, it would be desirable, particularly for the prawn industry, if there were additional regulations making clearer rules regarding the following matters:

- How the samples are collected and stored, especially because food deteriorates and any technology would need to be verified and validated for the veracity and accuracy of any tests for original cooked samples from a restaurant in order to be presented as evidence when the matter is listed for hearing in court.
- When the samples are collected. It ought to be at a point in time that is concurrent with the making of representations as to country of origin.
- How the samples can be tested to ensure accuracy and integrity.
- How the evidence is presented in court, having consideration to the principles of natural justice which require that there be no bias and that each party have the right to a fair hearing.
- Chain of custody to ensure that there can be no dispute as to the integrity of the particular food substance sample that has been tested.

4.5 Legal regulatory framework under the Food Acts

(a) The Food Acts also assign the task of regulation for food safety to regulators. Aside from municipal councils with similar (or concurrent powers), there are other relevant regulators, as listed below:

- Western Australia - West Australian Meat Industry Authority
- New South Wales – NSW Food Authority
- Queensland – Safe Food Queensland
- South Australia – Biosecurity SA – Food Safety
- Tasmania – Department of Primary Industries, Parks, Water and Environment – Food & Agriculture
- Northern Territory – Department of Primary Industries – Primary Industry (Meat Industries)
- Victoria – PrimeSafe

(b) It should be noted that Victoria is the only Australian jurisdiction which has an industry regulator specifically governing part of the seafood sector. PrimeSafe, was established on 1 July 2003 under the Seafood Safety Act and the Meat Industry Act which expanded the responsibility of the former Victorian Meat Authority to include seafood safety in addition to red meat and poultry food safety. PrimeSafe is also responsible for the regulatory management of pet meat and pet food in Victoria.

(c) PrimeSafe issues licences with conditions, with which seafood businesses must comply. (Similar licences apply to meat and seafood transport vehicles and meat inspector registrations pursuant to the Meat Industry Act). PrimeSafe also ensures compliance with food safety programs to achieve its objectives, namely ensuring the safety of all meat and seafood products for consumers.

(d) Pursuant to section 4 of the Seafood Safety Act, a "seafood business" is a business that involves the handling of seafood intended for sale (whether wholesale or retail) for human consumption. The definition expressly includes the following:

- the harvesting or collection of seafood;
- aquaculture;
- the maintaining of live shellfish, crustaceans and echinoderms for later processing;
- the depuration of shellfish;
- the processing of seafood including (but not limited to)—
    - the skinning, gilling, gutting, filleting or shucking of seafood;
    - the smoking, preserving, canning, curing or drying of seafood;
    - the extracting, mincing, blending or slicing of seafood;
    - the mixing of seafood with other substances;
    - the cooking of seafood (other than the cooking of seafood for immediate sale for human consumption without any further processing);
    - the packaging, storing and transporting of seafood.

(e) Therefore, many Victorian retailers and Foodservice premises which are selling or cooking prawns must comply with the Seafood Safety Act. However, in the case of some business in the Retail sector (e.g. supermarkets) and also in the Foodservice sector (e.g. restaurants), the applicable law can be the Food Act administered by the local municipal council or possibly the State health department.

(f) Pursuant to section 19 of the Seafood Safety Act, PrimeSafe may make Codes of Practice in accordance with Part 4 Division 1 of the legislation. According to section 23, where such a Code of Practice is made, all licensees must comply with it.

4.6 Legal actions against Country of Origin misrepresentation (such as mislabelling) – CoOL Information Standard

(a) As mentioned above, misrepresentation predominantly occurs in the form of mislabelling on food packaging, signs, food menus and advertising and marketing material. One of the most common forms of mislabelling relates to country of origin.

(b) The most important legal development is the CoOL Information Standard. The CoOL Information Standard is currently voluntary, however, will become mandatory from 1 July 2018. The Australian Competition and Consumer Commission (**ACCC**) will have enforcement powers to prosecute and prevent contraventions of the CoOL Information Standard. The ACCC's enforcement powers are discussed in more detail below at part 4.8 of this Advice.

(c) If a person or a business does not comply with the CoOL Information Standard, they may be engaging in conduct which breaches the ACL. Specifically, the contravening conduct may be misleading or deceptive, or likely to mislead or deceive,[14] or it may be making a representation that is false or misleading, including about the origin of goods.[15]

[14] See section 18 of the ACL.
[15] See sections 29(1) and 151 of the ACL.

- In understanding what "misleading or deceptive" means, one must look at the reaction of the reasonable members of the class of people to whom the representation is directed.[16] Ordinarily, representations which "[convey] a meaning inconsistent with the truth" will be considered misleading or deceptive.[17]

- False representations are easier to understand, simply meaning representations which are not true.

(d) The CoOL Information Standard provides that food which has been grown, produced or made in Australia, for human consumption, may use the "Made in Australia" label and kangaroo logo. Food which contains imported ingredients may still be labelled as "Made in Australia" if the imported ingredients have undergone a last "substantial transformation" in Australia. In order for a food to be "substantially transformed" it must be fundamentally changed. Substantial transformation is outside the scope of this Advice, however we can happily provide you with advice on this should you request it.

(e) Importantly, in order to comply with the CoOL Information Standard, the portion of Australian ingredients in packaged foods must be clearly represented using a bar chart on the label. An example is pictured below.

Figure 1: Country of origin label food labels

(f) The CoOL Information Standard does not apply to food that is:[18]

- otherwise unpackaged (e.g. unpackaged cheese, bread, pastries or sandwiches);
- only intended for export to overseas markets;
- sold by restaurants, canteens, schools, caterers, self-catering institutions, prisons, hospitals, medical institutions or at fund-raising events (e.g. a cake stall at a school fete);
- made and packaged on the same premises where it is sold (e.g. bread in a bakery);
- delivered, packaged and ready for consumption, as ordered by the consumer (e.g. home delivered pizza);
- for special medical purposes; or
- not for human consumption (e.g. pet food).

[16] *Campomar Sociedad, Limitada v Nike International Ltd* (2000) CLR 45.
[17] *World Series Cricket Ltd v Parish* (1977) 16 ALR 181.
[18] See the ACCC Country of Origin Food Labelling Guide (April 2017).

4.7 Legal actions under the ACL against misrepresenting place of origin, quality, value or composition

(a) The CoOL Information Standard applies only to *country* of origin. However, origin misrepresentation also includes mislabelling as to the more specific place of origin of the goods (such as the State or Territory where the goods were derived).

(b) Substitution and misrepresentation may also occur with respect to the quality, value or composition of the food products.

(c) Where this occurs, the food business, whether at the Retail sector or Foodservice sector, may be engaging in conduct which contravenes the ACL because it is misleading or deceptive, or likely to mislead or deceive.[19]

(d) Alternatively, in misrepresenting or substituting its food products, the food business may be making a representation that is false or misleading about the origin, quality, value or composition of the food products.[20]

(e) Like the CoOL Information Standard, the ACL is enforced by the ACCC, whose enforcement powers will be discussed in more detail below at part 4.8 of this Advice.

4.8 Enforcement powers of the ACCC

(a) As mentioned above, breaches of the ACL and CoOL Information Standard are enforced by the ACCC.

(b) The ACCC may impose pecuniary penalties (i.e. fines imposed by civil courts), particularly with respect to contraventions of sections 29 and 151, which may warrant penalties of up to $1.1 million for companies or $220,000 for individuals. The ACCC may also issue infringement notices where it has reasonable grounds to believe a person's conduct is false or misleading. However, the payment of an infringement notice is not an admission of guilt. Note that for the purposes of the ACL a "person" is either a company or an individual.

(c) The vast majority of high-profile substitution and misrepresentation cases in Australia are prosecuted under the ACL. The reason for this is that:

- The ACL applies federally, meaning that proceedings do not have to be launched separately in each State or Territory jurisdiction.
- An action for misleading or deceptive conduct under the ACL can be brought by individuals or companies, including competitors, and does not have to be brought by an enforcement body.
- The ACCC is better resourced than food regulators in each Australian State and Territory. While State and Territory regulators are more likely to focus their resources on ensuring product safety, the ACCC is better able to prosecute misleading practices that may not have such a high impact on product safety.
- An action for misleading or deceptive conduct brought under the ACL need only be proven on the balance or probabilities, which is less stringent than the criminal standard of "beyond reasonable doubt".

[19] See section 18 of the ACL.
[20] See sections 29(1) and 151 of the ACL.

- It is only necessary to show that consumers have been misled and damage has been caused – there is no need to prove moral culpability (unlike in a criminal prosecution).
- Action under the ACL allows fines and other penalties to be levied against companies, while criminal actions may only be appropriate for individuals due to the requirement to prove moral culpability and the nature of the penalties involved (i.e. imprisonment).

(d) It is also worth noting that many actions initiated by the ACCC for an alleged breach of the ACL in relation to substitution or misrepresentation do not proceed to a trial. In many instances the ACCC and the food company in question agree on a statement of facts and the ACCC issues an infringement notice or seeks a court enforceable undertaking. In these cases, since both parties accept the facts in question, there is no need to prove matters before a Court and technologies used in the collection of evidence play a lesser role. However, it is unlikely that the ACCC would seek an infringement notice or court enforceable undertaking without believing that it had a reasonable prospect of success of proving its alleged facts at a trial.

(e) One example of ACCC involvement was in December 2015. Kailis Bros Pty Ltd (Kailis Bros) paid a penalty specified in an infringement notice in the sum of $10,800, issued by the ACCC. Kailis Bros was found to have breached the ACL by engaging in conduct likely to mislead the public about the manufacturing process used to produce its frozen 'Just Caught Prawn Meat'. The packaging contained an Australian flag as the backdrop on the front, a map of Australia in the bottom right hand corner with the words '*Australian Caught Raw Prawns'* and the words '*Australian Caught – Raw – Deveined – Tail Off – Prawn Meat'.* The ACCC believed the images and statements gave the impression that the prawns were packed and processed in Australia. A picture of the contravening product is pictured below.

Figure 2: Kailis Bros packaged frozen prawns which were the subject of the misleading conduct allegations

4.9 Private legal actions against food substitution and misrepresentation

(a) Another legal action which is likely to be available here is breach of contract. Often with the supply of food products there will be a condition which prohibits substitution, usually species substitution.

(b) By way of example, in the Australian case of *Adams v Eta Foods Ltd* (1987) 78 ALR 611, the defendant was charged with falsely representing the composition of its beef pies, which actually contained some sheep meat. Ultimately, Eta Foods was able to avoid liability through the defence of reasonable mistake – as it was not aware of species substitution by its supplier who it reasonably trusted. In this case the Court did note that 'species substitution would have been regarded as a serious breach of the contractual obligations of the supplier.'[21]

(c) However, if substitution or misrepresentation does exist, it is unlikely that it will be remediable merely by initiating proceedings for breach of contract, particularly where parties have had long standing relationships which they may be reluctant to disturb without the support of independent regulatory enforcement agencies (such as the ACCC or municipal councils).

(d) Therefore, actions for contractual breaches are strengthened and more likely to be enforced where there are concurrent regulations.

(e) This already occurs to an extent. For example the sale of goods legislation in each State and Territory prescribes a series of implied warranties or conditions relating to the quality or fitness of the goods for their disclosed purpose. However, these may be excluded by an express contractual term.

(f) On the other hand, the ACL, provides more concrete backing to contractual rights and obligations. Under the ACL, businesses must guarantee that the products and services they sell satisfy the consumer guarantees. These guarantees cannot be excluded by contract.[22] The most relevant consumer guarantees in relation to food are that they must:

- match the description on packaging and labels and in promotions or advertising;
- match any demonstration model or sample you asked for; and
- meet any extra promises made about performance, condition and quality.

4.10 Deliberate torts for substitution and misrepresentation generally

(a) In addition to the enforcement avenues explored above, substitution and misrepresentation may be enforced through deliberate torts. These are actions that allow civil enforcement of common "wrongs", meaning that action can be enforced privately without the need for police or regulatory involvement. These actions include fraud and deceit.

(b) Fraud and deceit are very similar and branch from the same concept of offering a legal remedy for those who have suffered loss as a result of deliberate misrepresentation. The following elements must be made out:

- a false representation of fact must be made;
- the person making the representation must know that it is false;
- the person making the representation must intend for it to be relied upon;
- the representation must actually be relied upon; and
- the plaintiff must suffer damage as a result of relying upon the representation.

[21] At page 623.
[22] ACL section 64.

(c) The fact that these torts are "deliberate" means that the party bringing the action must establish some degree of mental culpability (in the sense of intention or knowledge) on the part of the other party.

(d) In the case of fraud or deceit, it must be proven that the maker of the representation was aware that the representation is false, and that he or she intended that the other party rely upon that representation. It is sufficient if the maker of the representation: knows that the representation is false; does not believe if the representation is true; or is reckless as to the truth of the statement. This may be established by showing that the maker of the representation deliberately shut their eyes from the facts, abstained from investigation, or did not have sufficient information to make the statement that they made.

(e) Similarly to criminal prosecution for fraud, the bringing of a civil action in tort for fraud or deceit requires proof of subjective intention. This presents the same problem as discussed above in relation to fraud.

5. EVIDENCE REQUIRED IN PROSECUTION OF FOOD SUBSTITUTION AND MISREPRESENTATION CASES

5.1 To prove food substitution or misrepresentation using traceability testing technology, the results would, together with any other evidence, need to satisfy the requisite standard of proof.[23]

- The standard of proof which must be satisfied in civil proceedings is "**on the balance of probabilities**", which is commonly known to mean more probably than not (i.e. 51 per cent).

- The standard of proof which must be satisfied in criminal proceedings is "**beyond reasonable doubt**". Similar provisions exist in the Evidence Acts of each of the Australian jurisdictions.

5.2 Where evidence is derived from traceability testing, the way in which it may be adduced in court proceedings is through expert witnesses, also known as witnesses with specialised knowledge.

5.3 This type of evidence is known as "opinion evidence" and is generally not admissible in court because it is dependent on the credibility of the witness which may not always be clear. However, the legislation creates certain exceptions with respect to expert witnesses. The opinion of expert witnesses may be admissible as evidence where that opinion is based on the expert's specialised knowledge which has been based on their training, study or experience. In other words, evidence of an expert

[23] In Australia, there have been attempts to create uniform evidence legislation. This commenced with the introduction of the Evidence Act 1995 (Cth) which has been mirrored in various other jurisdictions, namely, New South Wales, Victoria, Tasmania, Australian Capital Territory and Northern Territory. However, Western Australia, South Australia and Queensland have not followed this path.

In the *Evidence Act 1995* (Cth), *Evidence Act 1995* (NSW), *Evidence Act 2008* (Vic), *Evidence Act 2001* (Tas), *Evidence Act* (ACT) and *Evidence (National Uniform Legislation) Act* (NT) the relevant sections are 140-142. In Western Australia, South Australia and Queensland the standard of proof is the same and is derived from common law (see *Briginshaw v Briginshaw* [1983] HCA 34; *Woolmington v DPP* [1935] UKHL 1).

witness, as "opinion evidence", may be used in court where the expert witness is credible.[24]

5.4 By way of example, in the Australian case of *Adams v Eta Foods Ltd* (1987) 78 ALR 611, the defendant was charged with falsely representing the composition of its beef pies, which actually contained some sheep meat. After a complaint by the Trade Practices Commission, the ACCC's predecessor, Eta started taking its raw meat to a food testing company and later incorporated testing kits. In order to ascertain the accuracy of the testing kit, expert evidence regarding the scientific method and the length of time for which it has been used in the industry was adduced. Ultimately, Eta Foods was able to avoid liability through the legal defence of reasonable mistake – as it was not aware of species substitution by its supplier who it reasonably trusted.

5.5 The Eta case referred to in paragraph 5.4 is an example of a strict liability offence. Intention was not considered but the defence of reasonable mistake was.

5.6 The application of these rules of evidence is complicated by the limitations in the Food Acts with respect to powers given to authorised officers in relation to sample procurement and seizure. These limitations were mentioned at part 4.4 of this Advice.

5.7 The question now becomes, what more can be done and how do we improve an enforceable regulatory framework which deals with the abovementioned limitations?

6. WHAT MORE CAN BE DONE

6.1 To address the limitations imposed by the Food Acts regarding sample procurement, particularly at Foodservice premises (such as restaurants, cafeterias, take-away, entertainment, hospitals and prisons), it is likely that legislative amendment is required to prescribe new or more detailed provisions in the Food Acts or prescribing regulations under the legislation.

6.2 Another option to improve the framework would be a mandatory Code of Practice. This would provide greater integrity to food traceability testing technology so that it may be relied upon in prosecutions and other enforcement actions (such as by the ACCC). This would also ensure more uniform industry compliance. (Refer to paragraph 6.6 below)

6.3 Aside from the creation of a mandatory Code of Practice, another way by which the integrity of food traceability testing technology may be strengthened, at least in

[24] In the *Evidence Act 1995* (Cth), *Evidence Act 1995* (NSW), *Evidence Act 2008* (Vic), *Evidence Act 2001* (Tas), *Evidence Act* (ACT) and *Evidence (National Uniform Legislation) Act* (NT) the relevant sections are 76-77, 101A and 108C. In Western Australia, South Australia and Queensland similar principles are found in common law however these are not as broad as those in the other Australian jurisdictions and, according to the Australian Law Reform Commission, have been applied with varying degrees of rigour. For more information see https://www.alrc.gov.au/publications/12.%20The%20Credibility%20Rule%20and%20its%20Exceptions/expert-evidence-going-credibility and https://www.alrc.gov.au/publications/9.%20The%20Opinion%20Rule%20and%20its%20Exceptions/opinions-based-specialised-knowledge#_ftn33
Note: evidence regarding the credibility of witnesses is generally inadmissible, however it is permitted where expert witnesses are concerned.

relation to food sold by retailers, is to register a certification trade mark. In addition, smart phone applications could also be used to give both retailers and consumers greater peace of mind regarding where their food came from.

6.4 Each of the above options will be discussed in more detail below.

6.5 Legislative amendment

(a) The best way to deal with the limitations under the current Food Acts is to amend the legislation to clearly articulate the following (as referred to in paragraph 4.4 of this Advice):

- How the samples are collected and stored, especially because food deteriorates and any technology would need to be verified and validated for the veracity and accuracy of any tests for original cooked samples from a restaurant in order to be presented as evidence when the matter is listed for hearing in court.
- When the samples are collected. It ought to be at a point in time that is concurrent with the making of representations as to country of origin.
- How the samples can be tested to ensure accuracy and integrity.
- How the evidence is presented in court, having consideration to the principles of natural justice which require that there be no bias and that each party have the right to a fair hearing.
- Chain of custody to ensure that there can be no dispute as to the integrity of the particular food substance sample that has been tested.

(b) It is essential that the legislation includes clear criteria and processes which authorised officers must follow in relation to sample and other evidence procurement. Provided the authorised officers are able to show that they have satisfied the criteria and followed the necessary processes, there should theoretically be no allegations of evidence tampering.

(c) It is important to note that authorised officers may only take samples where they have reasonable grounds to suspect a contravention of the Food Act. Therefore, it is implied that random inspection[25] of businesses at the Retail and Foodservice sectors is not an available legal avenue to tackle and minimise food substitution and misrepresentation.

(d) In addition, the authorised officer may only take samples where they have first paid for the food. However, an authorised officer also has the power to seize any food, package or labelling or advertising material, or any other thing, which the authorised officer believes on reasonable grounds is evidence. Therefore, in theory, an authorised officer may seize the food menu from a Foodservice premises without offering payment. However, the menu on its own is not enough evidence to prove a contravention of the Food Act. Therefore, for the purposes of prosecuting food substitution or misrepresentations (at least under the Food Act), any other evidence

[25] For example, WorkSafe inspectors may randomly inspect workplaces and take samples without paying for them. See *Occupational Health and Safety Act 1984* (WA) s 43; *Occupational Health and Safety Act 2004* (Vic) s 101; *Work Health and Safety Act 2011* (NSW) s 175; *Work Health and Safety Act 2012* (SA) s 165; *Work Health and Safety Act 2012* (Tas) s 165; *Work Health and Safety Act 2011* (ACT) s 165; *Work Health and Safety Act 2011* (Qld) s 165; *Work Health and Safety (National Uniform Legislation) Act 2011* (NT) s 165.

(such as a food menu) which is seized must be accompanied by a food sample to be tested.

(e) Amendment of the legislation is done by the Governor in Council who acts on the recommendation of the Ministers of each State and Territory. However, regulations may also be created by the various State and Territory food regulators (mentioned at paragraph 4.5).

6.6 Mandatory Code of Practice

(a) A mandatory Code of Practice sets out the standards of conduct and other processes to be undertaken in a certain manner for everyone in that particular industry.

(b) The mandatory Code of Practice could prescribe the traceability testing technologies and methodologies to be used to substantiate any representations or descriptions of quality, composition, value or origin of prawns.

(c) If a mandatory Code of Practice is implemented, the powers of authorised inspectors must be broadened accordingly to allow for inspection where they suspect such a Code has not been complied with.

(d) Such a Code could be enforced by the ACCC or the State or Territory food authorities and regulators established under the Food Acts. For example, in Victoria, such a Code of Practice could also be made enforceable by PrimeSafe in the case of enforcement against businesses with licences under its legislation. It should be noted that the Seafood Safety Act already allows PrimeSafe to introduce any Code of Practice.[26]

(e) An example of an existing mandatory Code of Practice in the food industry is the Horticulture Code of Conduct (**Horticulture Code**). Another example is the Franchising Code of Conduct (**Franchising Code**), which is obviously not confined to companies in the food industry.

(f) The Horticulture Code, which came into effect in its current form on 1 April 2017, is a mandatory industry code prescribed under the *Competition and Consumer Act 2010* (Cth). The purpose of the Horticulture Code is to improve the clarity and transparency of trading arrangements between growers and traders in the horticulture sector. Among other things, the Horticulture Code prohibits certain trading, deals with record keeping requirements, introduces financial penalties and infringement notices for breaches of the code and allows for ACCC investigations and compliance checks. The Horticulture Code is enforced by the ACCC.

(g) Like the Horticulture Code, the Franchising Code is also a mandatory code prescribed under the *Competition and Consumer Act 2010*. The Franchising Code imposes one set of obligations to all franchise agreements entered into, renewed, extended or transferred on or after 1 October 1998. The Franchising Code introduces financial penalties and infringement notices for serious breaches and imposes various other requirements on franchisors. The ACCC investigates breaches of the Franchising Code and takes enforcement action where appropriate.

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[26] *Seafood Safety Act 2003* (Vic) Part 4.

6.7 Certification trade marks

(a) Certification trade marks are particularly useful for food that is packaged to be sold by retailers. Where the food is unpackaged (for example, prawns on ice at the market or prawns sold at Foodservice premises), signs and labels with certification trade marks could still be used and would be placed on price tags or nearby on display.

(b) A certification trade mark shows that a trader's goods and services meet an official set of standards, usually relating to quality and geographic origin.

(c) Your certification trade mark could be a symbol of the particular traceability testing technology to show that the origin, quality or composition of food product (such as the prawns) has been substantiated using a prescribed traceability testing technology which carries the certification trade mark logo. You could also register different certification trade marks for different fisheries and different brands. For example, it might be possible to utilise GPS to delineate the geographic coordinates of a particular fishery and create a separate brand or logo for that fishery.

(d) Popular certification trade marks that have been used elsewhere to indicate provenance include the "Australian Made, Australian Grown" trade mark which is used by more than 1700 companies on over 10,000 products sold globally (this trade mark is also now adopted for prescribed usage in accordance with the CoOL Information Standard in the Australian food market). Other examples include Parma which is used to authenticate Prosciutto di Parma (ham originating from Parma made according to designated procedures) and Darjeeling which is used to indicate that the tea product has been grown and produced in the specified tea gardens of Darjeeling, India to a designated quality standard.

Figure 4: Certification trade mark from left to right – Australia Made, Australia Grown; Parma; and Darjeeling

(e) An application for a certification trade mark must include a set of rules which specify (as a minimum):

- the standards that goods or services must meet;
- the method for determining if the standards have been met;
- the requirements an approved certifier must meet;
- the requirements the owner of the certification trade mark, or an approved user, must meet;
- any other requirements for the use of the certification trade mark;
- the procedure for resolving a dispute about whether goods or services meet the certification standards; and

- the procedure for resolving any other issue regarding the certification trade mark.

(f) If you were to register a certification trade mark, the set of rules could (and arguably should) provide that users may only use your certification trade mark if they have tested their food product using your traceability technology and that they have met a certain standard set by you.

(g) In order for your technology to be a worthwhile and profitable investment, we recommend that you own the certification trade mark and that you set the rules, as opposed to leaving it up to the prawn or seafood industry as a whole.

(h) A useful way to encourage compliance and deter food substitution and misrepresentations is to get major retailers such as Coles and Woolworths on board. Given the state of the current market, such major retailing groups may also include Aldi, IGA-Metcash, Costco, Harris Farms, IKEA, Amazon and Kaufland in the near future.

(i) The idea is for these major retailers to publicise the value of the certification trade mark so that consumers are supportive and confident that there has been no food substitution or misrepresentation.

(j) One certification trade mark which already exists in the seafood industry is the stylised fish in an oval tick which is owned by the Marine Stewardship Council (**MSC**). The MSC manages certification regimes concerning sustainable fishing and seafood traceability. It signifies that the seafood products have been obtained from an ecologically sustainable source. Currently, Australia, Coles and IKEA have full MSC-certification. The MSC does allow restaurants buying or serving MSC certified sustainable seafood to use the certification trade mark on their menu and also allows consumers to quickly search for restaurants that offer MSC labelled sustainable seafood on their menus online.[27] Below are also some examples of how the MSC-certification is being used in relation to packaged and unpackaged foods at both the Retail and Foodservice sector.

Figure 4: Marine Stewardship Council certification trade mark

[27] https://www.msc.org/where-to-buy/dining-out

Figure 5: Images indicating how the MSC certification trade mark is being used at both the Retail and Foodservice sectors.

(k) Another example of certification currently being used by major retailers is "Australian certified organic" illustrated below. This particular certification trade mark imposes an audit system to ensure compliance with organic standards. However, it allows retailers to purchase non-retail ready products and sell them without revealing to competitors who their suppliers are. Major retailers such as Coles and Woolworths stock a wide range of certified organic products.

Australian Certified Organic

Figure 6: Australian certified organic certification trade mark

6.8 Enforcement of a certification trade mark

(a) You could enforce your certification trade mark against retailers and Foodservice businesses who use it with permission by using the existing regulatory framework. For example, the retailer could be held liable for misleading and deceptive conduct by falsely advertising the product (contravening the ACL).

(b) You may also initiate proceedings for infringement in the Federal Court or Supreme Court pursuant to Part 12 of the *Trade Marks Act 1995* (Cth).[28] The court may grant an injunction to prohibit the infringing party from using the trade mark. The court may also grant damages for or an account for profits where applicable. This is arguably a faster way to enforcement pathway compared with the existing enforcement framework.

6.9 Smart phone applications to trace food

(a) Some companies are currently using smart phone applications and QR codes or other barcoding systems to access database information as to the origins and quality of food products. This could be accessed by anyone in the supply chain, including retailers and consumers.

(b) We do not think this will be effective in preventing food substitution or misrepresentations on its own but it could extend the commercial opportunities for traceability technologies.

(c) Another example is the technology systems promoted by a company called Ambrosus Technologies GmbH, based in Switzerland. This company is currently promoting the use of its combined technologies (including high-tech sensors, Blockchain technology and smart contracts) to record the entire history of food products. The company has created a smart phone application to track the supply chain data to allow verification of the source of the food product. The smart contract feature claims that it allows companies to have real-time supply chain audits through automatic tracing and tracking systems to reduce human error.

(d) The Ambrosus Technologies GmbH system has already been used with respect to olive oil. The diagram below shows the application's user interface.

(e) Please note, FoodLegal has **no connection with and is no way affiliated with** Ambrosus Technologies GmbH.

[28] See sections 125 and 190.

Figure 6: user interface of the first implementation of Ambrosus applications

7. MAINTAINING THE COMMERCIAL VALUE OF YOUR TRACEABILITY TESTING TECHNOLOGY

7.1 In order to protect your intellectual property with respect to any technology you create, you could apply for a patent. If granted, the patent will give you exclusive commercial rights to your invention. In order to be entitled to a patent, your invention must be new (i.e. different from existing technology), involve an inventive step (i.e. not obvious for someone with experience in the technological field) and be able to be made or used in an industry. Standard patents last up to 20 years and obtaining one would effectively allow you to have a monopoly over the technology. Patents are granted under the *Patents Act 1990* (Cth). If you seek more information about patents, please let us know.

7.2 We also recommend that you do not share your trace element databases with any competitors or government agencies, unless in accordance with strict intellectual property protection mechanisms in place.

7.3 There are companies around the world which already use their traceability testing technology to assist in food substitution, misrepresentation and contamination investigations and provide expert evidence where required.

7.4 FoodLegal is aware of one particular traceability technology company in New Zealand that has assisted police in the investigation and analysis of dairy infant formula samples contaminated with sodium fluoroacetate (1080) which were accompanied by blackmail letters. The collective volume of 1080, if ingested, had the potential to kill between 13 and 33 infants. The police investigation lasted for approximately 10 months and involved at times 35 investigators and analysts. The police assessed 2,600 individuals who voiced opposition concerning the use of 1080

as a pest control agent and those who had access to 1080. The investigation involved over 30,000 investigator and analytical man hours amounting to more than NZD $4 million. In addressing the threats, the Ministry of Primary Industries in New Zealand also incurred costs in excess of NZD $32 million. The perpetrator, Jeremy Hamish Kerr, was eventually convicted of two counts of blackmail and sentenced to eight years and six months imprisonment (from DNA evidence on the blackmail letters). The case was heard in the High Court of New Zealand and the complexity of investigation as articulated in this paragraph was specifically mentioned in the sentencing decision.[29]

7.5 Whether you invent new technology or refine existing technology, your technology must carry integrity to withstand challenges at the highest level that is in a court of law. We think that training your analysts in giving evidence in court settings would be highly valuable. If this is something you are interested in, please let us know and we could happily arrange for intensive training sessions.

8. CONCLUSION

8.1 To summarise our detailed Advice we make the following points:

A. The term "food fraud" has been defined as intentional mislabelling, substitution, unapproved enhancement, contamination or grey market production/theft/diversion for economic gain. However, we recommend using more accurate terminology such as food substitution or misrepresentation because the offence of "fraud" requires evidence of intention that is subjective and sets a benchmark that could undermine the benefits of the traceability technology. Strict liability offences exist under the Food Act that do not require proof of fraudulent intention.

B. Existing powers and legal enforcement mechanisms exist in the Food Acts and ACL. However, current legislation was written at a time which predated traceability technologies. The current law is therefore inadequate to address how and when authorised officers may inspect, take and test samples using the new technology.

C. Currently, where evidence from traceability testing is to be used in court, it would be through expert witnesses. In civil proceedings, the standard of proof is "on the balance of probabilities" – which is easier to prove than in criminal proceedings where the standard is "beyond reasonable doubt". Where a strict liability offence has occurred, such as might occur under many offences in the Food Act and the ACL, it is likely the standard of proof will be on the balance of probabilities. However, where the penalty may include imprisonment, it is more likely that the standard of proof to be applied will be "beyond reasonable doubt."

D. However, this procedure could be simplified by legislative amendments or a mandatory Code of Practice that introduced prescribed standards for which a breach would constitute a statutory offence of strict liability. A mandatory Code of Practice setting standards and guidelines for authorised officers and how and when they may exercise the powers given to them under the Food Act, could be introduced to the same effect.

[29] *R v Kerr* [2016] NZHC 512 at [3]-[6].

E. Such a Code could also require businesses at the Foodservice and Retail sectors to substantiate a description of their prawn product by testing using a prescribed traceability testing technology - to substantiate the origin, quality and composition of the product they are selling.

F. Certification trade marks are another way to reduce the likelihood of food substitution and misrepresentation. There are different levels of certification that could be provided for different aspects of the products' source and quality (e.g. based on GPS systems or places of origin).

G. Patents provide further legal protection of the technology and its use. We also recommend that you do not share your trace element databases with any competitors or government agencies, unless in accordance with strict intellectual property protection mechanisms in place.

SIGNED:

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GLOSSARY OVERLEAF

GLOSSARY

ACCC	Australian Competition and Consumer Commission
ACL	*Australian* Consumer *Law*
Advice	this letter of advice dated 16 November 2017
CoOL Information Standard	*Country of Origin Food Labelling CoOL Information Standard 2016*
Food Acts	*Food Act 2008* (WA); *Food Act 2003* (NSW); *Food Act 1984* (Vic); *Food Act* (NT); *Food Act 2001* (ACT); *Food Act 2003* (Tas); *Food Act 2006* (Qld); and *Food Act 2001* (SA).
Foodservice sector	food premises such as restaurants, cafeterias, takeaway, hotel, hospitality, entertainment and prisons, which serve food that is ready to eat
Food Standards Code	Australia New Zealand Food Standards Code
Franchising Code	Franchising Code of Conduct
Horticulture Code	Horticulture Code of Conduct
Meat Industry Act	*Meat Industry Act 1993* (Vic)
MSC	Marine Stewardship Council
Retail sector	retailers, markets and shops which sell packaged and unpackaged food products
Seafood Safety Act	*Seafood Safety Act 2003* (Vic)