SafeFish – Past, Present and Future

SOUTH AUSTRALIAN RESEARCH & DEVELOPMENT INSTITUTE
PIRSA

Seafood Exporters Forum
Alison Turnbull

26th -27th November 2014

Canberra

PREMIUM FOOD AND WINE FROM OUR CLEAN ENVIRONMENT

Abalone Council Australia Ltd

MISA marineinnova

SOUTH AUSTRALIA

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

FRDC FISHERIES RESEARCH & DEVELOPMENT CORPORATION

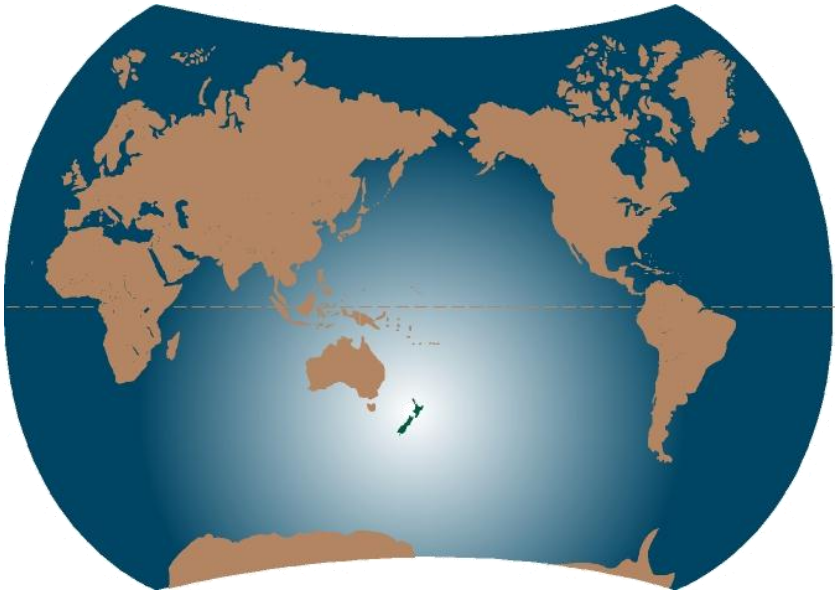
Government of South Australia
Primary Industries and Regions SA

SARDI SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

Outline

- Past – History of SafeFish
  - Why?
  - How?
  - What have we done?
- Present - Example: Trade and Market access for abalone
  - Incident response
  - Short and long term response: addressing information gaps, improving trade and market access, influencing Codex standards
  - SafeFish: the benefits of a partnership approach to managing food safety and trade and market access issues
- Future
  - Challenges

Market Access: The Global Challenge

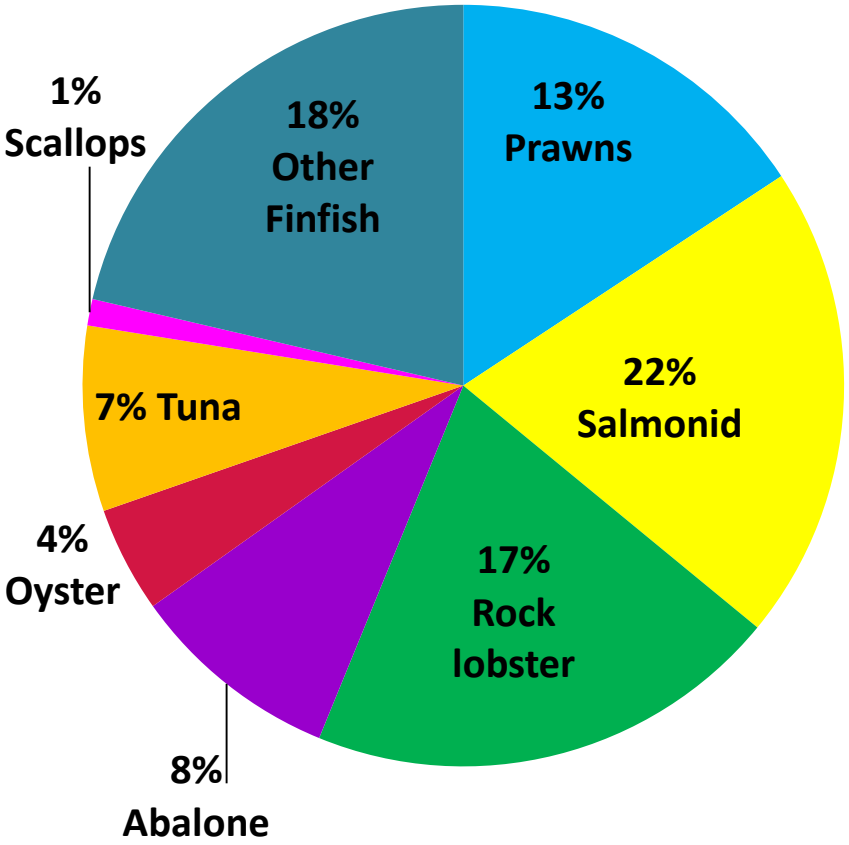


Fair trade platform essential
Food safety is fundamental

- 158 million tonnes produced globally per annum (2012)
- Aquaculture: 66.6 million tonnes - growing at average rate of 6.1% per annum
- Fisheries: 91.3 million tonnes
- 37% of seafood is exported (mostly in processed form) and was valued at $129 billion USD
- *Data Source: FAO Fisheries Statistics 2012*

Australian production 2012/2013

$2,398 million



Exports: total $1,175 million

Rock Lobster	$447 mill
Abalone	$187 mill
Tuna	$163 mill
Prawns	$51 mill
Salmonids	$25 mill

ABARES Outlook 2014

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Data Source: ABARE, Australian Fisheries Statistics 2010/11

What is SafeFish?

- Technical platform
- Australian Seafood CRC funding

The purpose of SafeFish is to:

- provide technical/scientific expertise to enable rapid response to sustain free and fair access to key markets, and
- underpin the safety and hygiene of seafood sold commercially in Australia

Who is SafeFish?

- Partnership of Seafood Safety & Market Access Experts
  - Food Standards Australia New Zealand
  - Department of Agriculture
  - Industry – domestic, exporters, importers
  - Funding bodies
- Industry and Researcher panels to provide advice

What Does SafeFish Do?

- SafeFish provides scientific support to solve issues and challenges relating to the export, import and domestic trade of seafood products.
- Develops technical/scientific advice for trade negotiations
- Develops technical briefs on high priority Codex issues
- Facilitates technical attendance at high priority Codex meetings and specific working groups
- Identifies emerging market access issues
- Facilitates research into priority issues

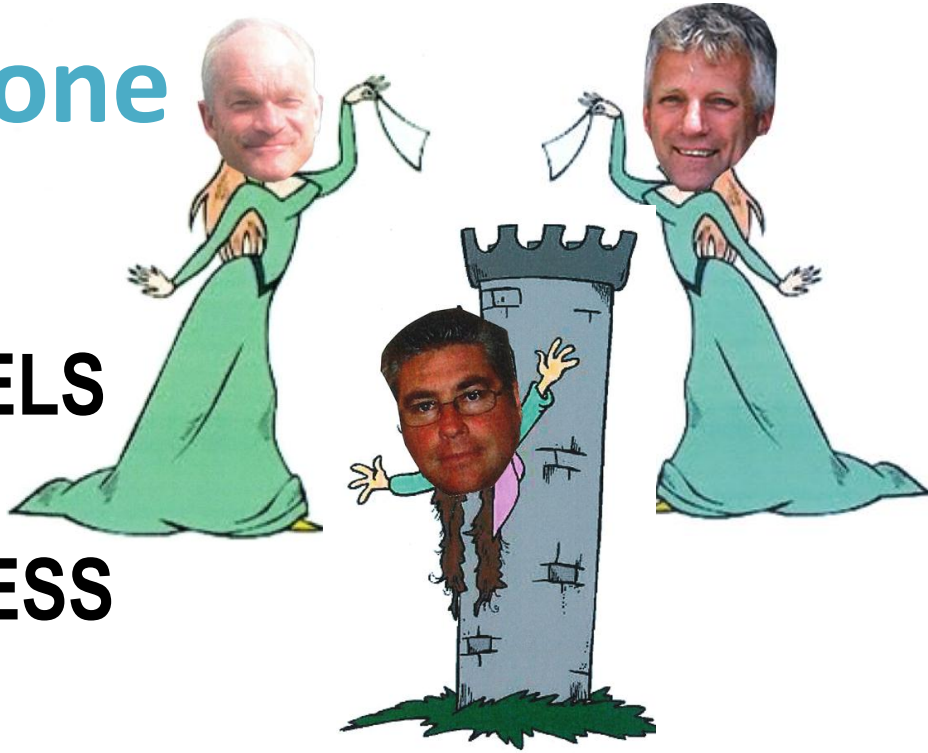
Examples of SafeFish work

- Sulphites in canned abalone
- Vibrios in shellfish
- Viruses in shellfish
- Food safety risks in prawns
- Parasites in finfish
- Ciguatoxins in finfish
- Mercury in seafood
- Marine biotoxins in rock lobster
- http://safefish.com.au

The Tale of Marine Biotoxins in Abalone

THE VILLAIN

FEARLESS HERO IN QUEST OF THE TRUTH



DAMSELS IN DISTRESS

CRUSADING KNIGHTS OF THE TOXIN TABLE

What are marine biotoxins?

- Produced by marine micro-algae, can contaminate seafood and cause illness when consumed.

Syndrome	Causative toxins	Symptoms
Paralytic Shellfish poisoning (PSP)	Saxitoxin group (STX)	**neurological symptoms;** tingling sensations in extremities, headaches, dizziness, nausea, muscle/limb paralysis respiratory distress and in extreme cases death
Diarhhetic Shellfish Poisoning (DSP)	OA group toxins: okadaic Acid (OA), dinophysistoxins (DTX) and derivatives	**diarrhoea, nausea, vomiting and abdominal pain**
Amnesic Shellfish Poisoning (ASP)	Domoic acid and isomers (DA)	Symptoms involving **multiple organ systems**; gastrointestinal tract, central nervous system and the cardiovascular system. In severe cases death may ensue, or **neuronal damage** can persist for years after exposure to the toxin.
Neurotoxic Shellfish Poisoning (NSP)	Brevetoxin group (BTX)	**Acute neurological and gastrointestinal effects** (e.g. nausea, diarrhoea, numbness, temperature reversal, slurred speech, respiratory distress, seizures

THE VILLAIN

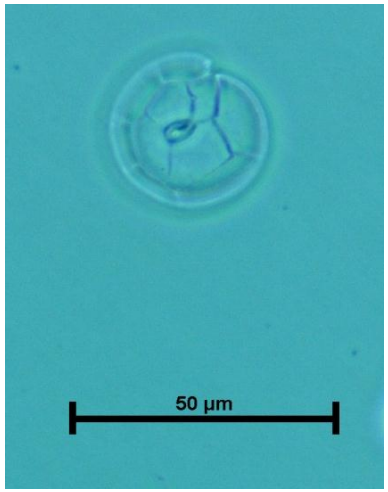


Image - A.Vaquer

Alexandrium species

Gymnodinium catenatum

Image D. Thomas

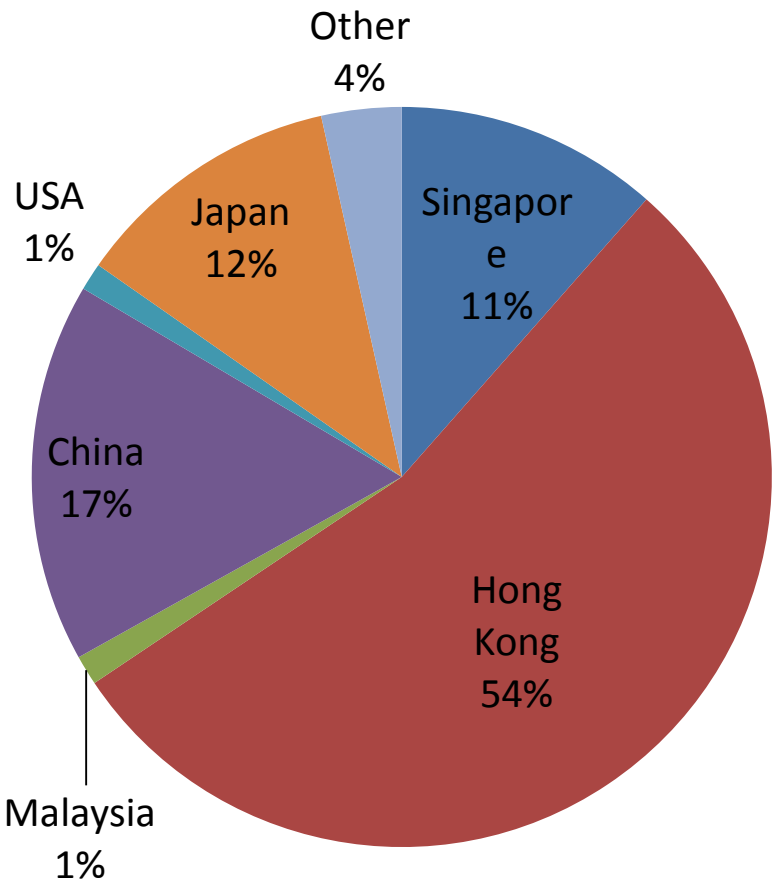
Dinophysis species

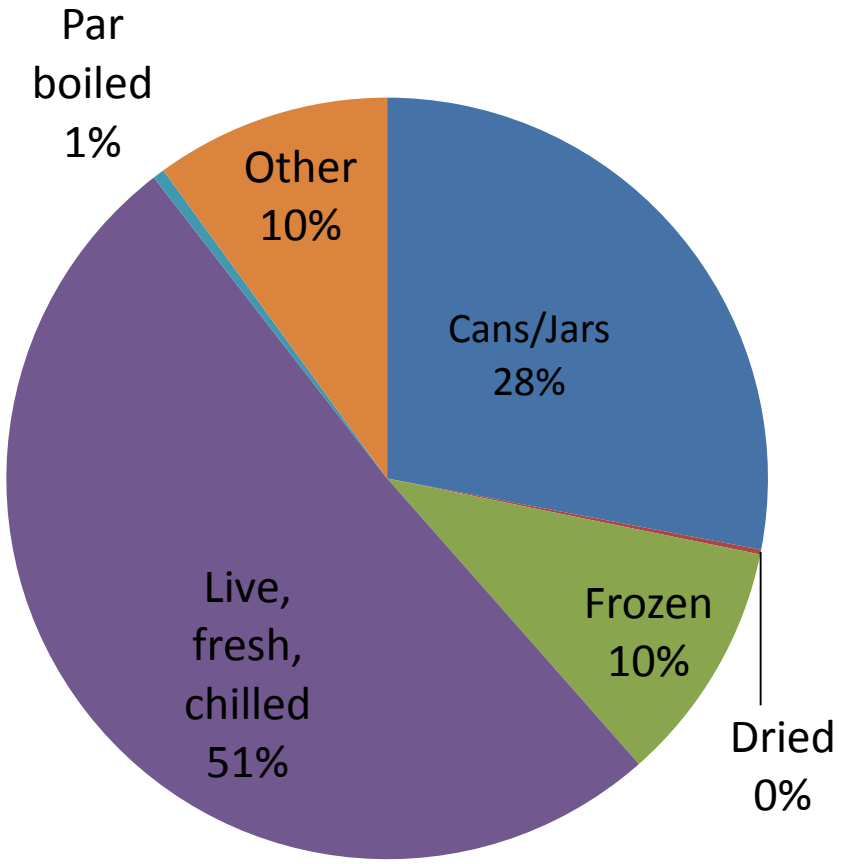
Pseudo-nitzschia species

Karenia species

Abalone Export Markets & Products

Australia $220million/annum, 4600 tonnes per annum





2006 New abalone standard proposed at Codex

- In 2006, the Codex Committee of Fish and Fishery Products (CCFFP) agreed to new work to develop a standard for abalone

- The first draft was presented to CCFFP in 2007 and included the following requirements:
  - Abalone harvesting areas or farms to be approved by the official agency
  - Limits for Marine Biotoxins, and associated monitoring programmes.
  - Microbiological monitoring programmes for growing/harvesting areas
  - Microbiological limits for both *E.coli* and *Salmonella*

EU Trade restrictions for Australia Abalone

- *Why?*
  - 'Must classify abalone production areas' (European Commission)
  - 88% Australian wild abalone harvest taken from areas where no biotoxin monitoring is in place

- *Implications?*
  - "*a national monitoring program would require infrastructure investment of AUD$4-5 million and an estimated annual cost to the industry of approximately AUD$20m*" David Hudson SGA Solutions
  - Potential impact on export market to other countries substantial

International Marine Biotoxin Standards

Market	Species to which ML applies	PST (Saxitoxin group)	DST (Okadaic Acid Group)	AST (Domoic Acid)	NST (Brevetoxins)
China	Aquatic products	0.8 mg/kg	0.6 mg/kg	N/A	N/A
Japan	Shellfish	4 MU (i.e. 0.8mg/kg)	0.05 MU	N/A	N/A
USA	All fish	0.8 mg/kg	N/A	20 mg/kg	N/A
EU (France UK)	Molluscs, live echinoderms, tunicates and marine gastropods (including abalone)	0.8 mg/kg	0.16 mg/kg	20 mg/kg	N/A

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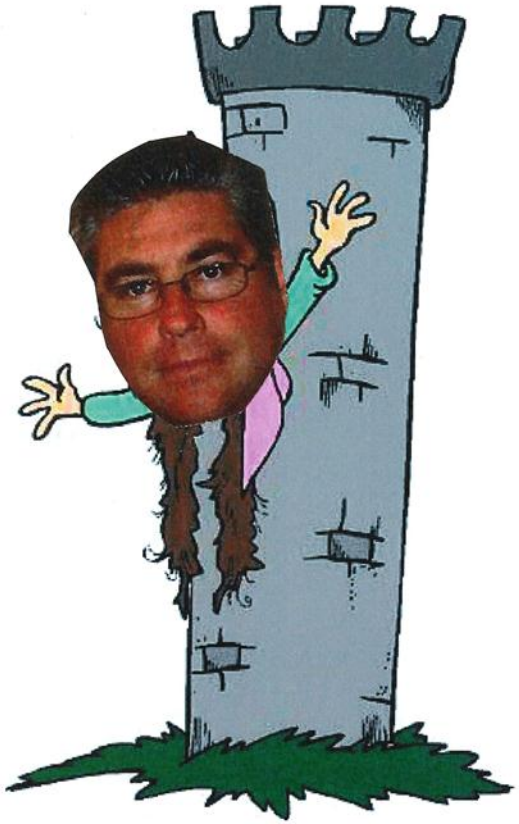
Aussie response



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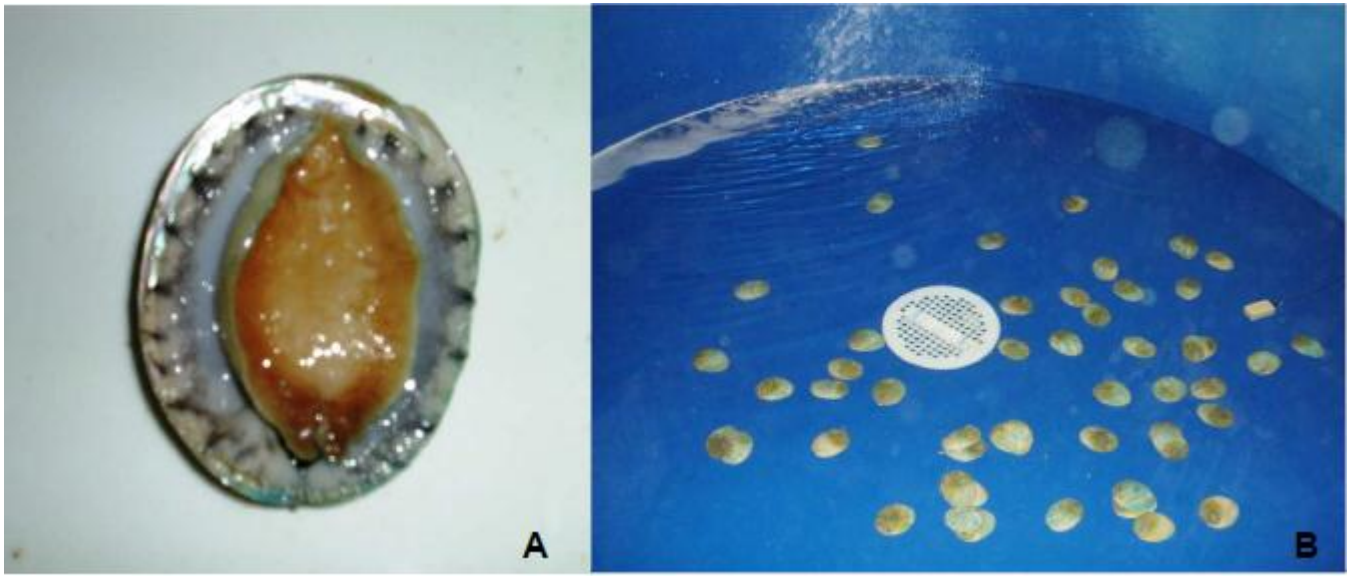
- independent, robust, defensible scientific advice

Initial risk assessment – PST in canned product



- Tank studies using pellets containing high levels PST from *Alexandrium minutum*
- Potential risk mitigation strategies: scrubbing & depuration
- Risk assessment

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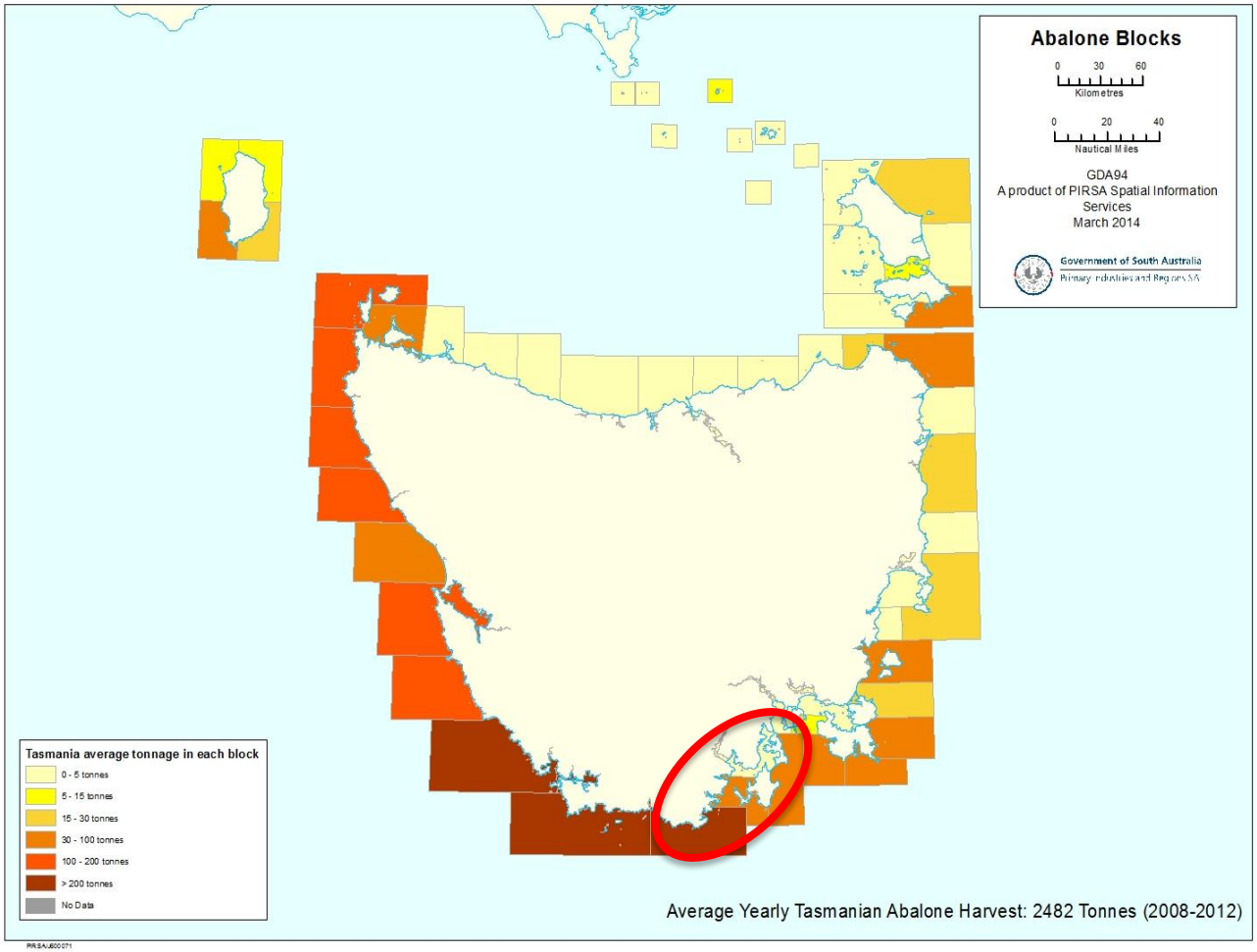
Initial risk assessment – PST in canned product

- Low propensity for abalone to take up PST (Dowsett et al,2011)
- Commercial canning processes significantly reduce levels
- Negligible risk of illness to consumers

→ Information package put together for trade negotiations

- ***In July 2010 the EU revised requirements – abalone no longer subject to growing area classification requirements***
- ***Research allowed Australia to argue against draft Codex standard with mandatory biotoxin testing***

Tasmanian wild abalone production



8% Australian production from affected blocks ($18 million per annum)

Public health risk
Trade risk

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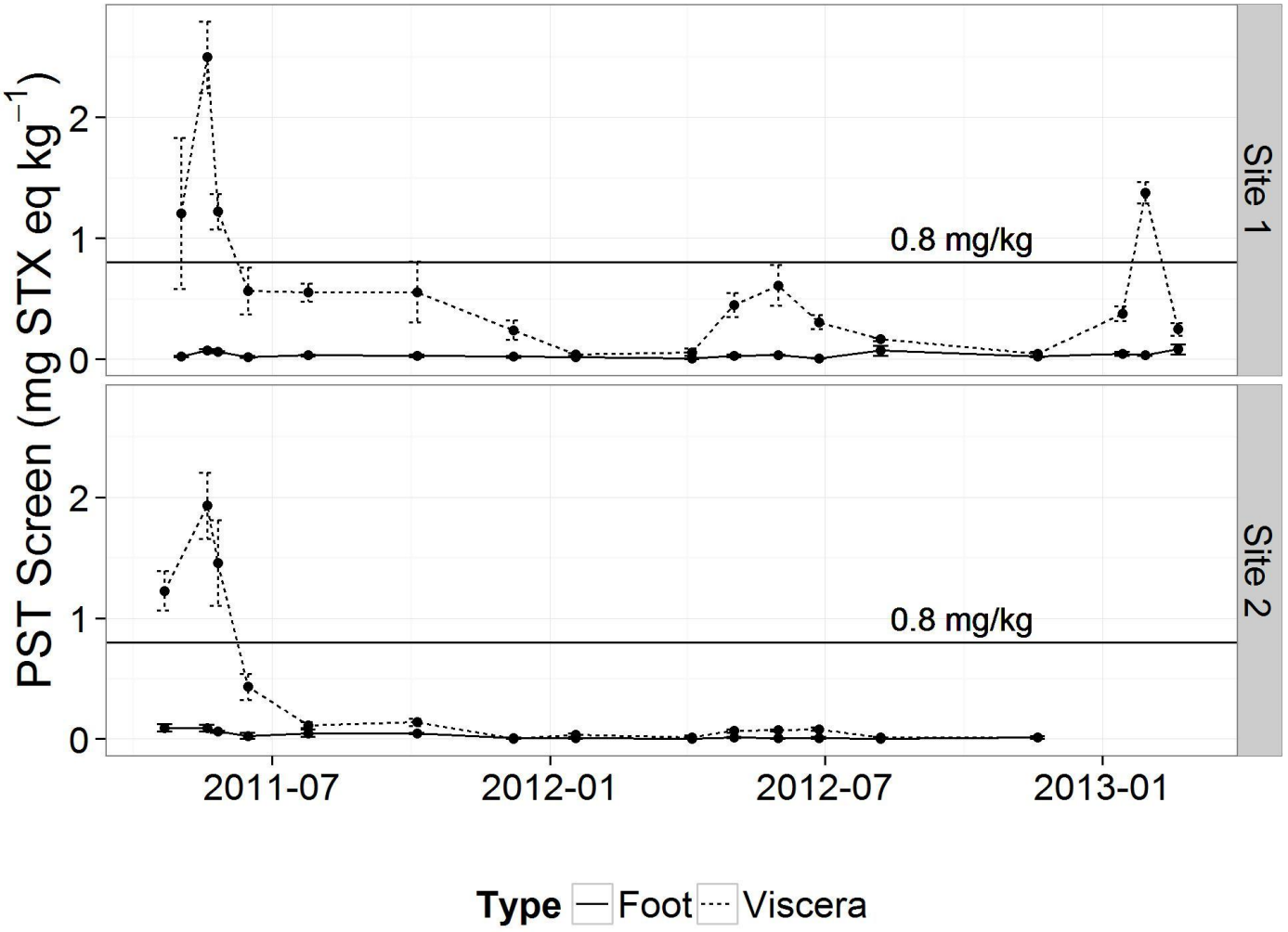
PST in abalone



Management issues

Immediate issues

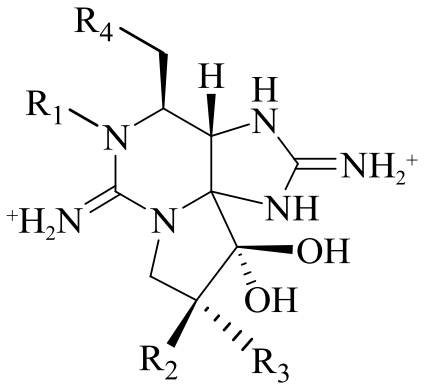
- Sample sites
- Sampling plans
- Sample frequency
- Analysis

Short term issues

- Where is it coming from?
- Accumulation propensity
- Uptake and depuration rates
- Is it really a health risk?
- What the hell are those two bloody big peaks on the chromatogram, and are they a problem?

SafeFish *played a major role at this table!*

PST toxin project - Outcomes



do = deoxydecarbamoyl
dc = decarbamoyl

	MW	R_1	R_2	R_3	R_4
doSTX	240.3	H	H	H	H
STX	299.3	H	H	H	$OCONH_2$
dcSTX	256.3	H	H	H	OH

- Deoxydecarbomyl saxitoxin in high levels in Tas abalone
- Purified and characterised by Cawthron
- Very low potentcy - TEF 0.042 Harwood et al (2014) Toxicon

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- *Standard solution produced for future quantification*
- *Reduced closures in future*

PST toxin project - outcomes

- Confirmation of microalgae as source of PST toxins- world first
  - *can now monitor for the alga rather than the toxin*
  - *Use information available on seasonality, bloom conditions, longevity of blooms etc*
  - *Potential to combine monitoring with other fisheries*
- McLeod et al (in prep)

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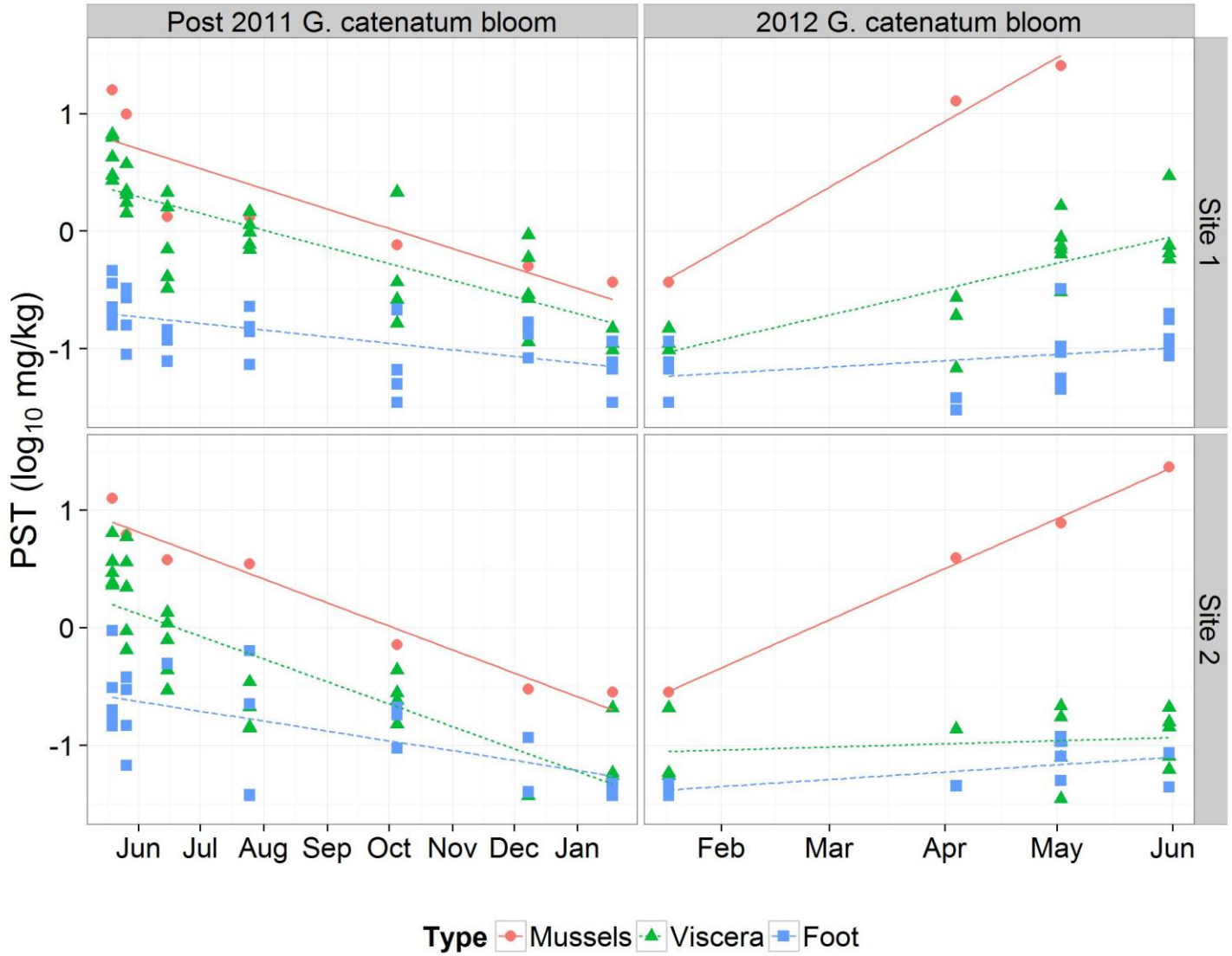

mussels >> abalone viscera >> abalone foot

– *Can use mussels as sentinel species during bloom initiation but not during bloom decline* McLeod et al (in prep)

The Codex Standard

The Standard for Live Abalone and for Raw Fresh Chilled or Frozen Abalone for Direct Consumption or for Further Processing (CODEX STAN – 312-2013), now contains the following:

"*Abalone from some geographical areas have been found to accumulate certain marine biotoxins.* ***It is up to the Competent Authority (using a Risk Assessment) to determine whether a risk exists in any geographical areas under its control and if so, put in necessary mechanisms to ensure that the part of the abalone to be consumed, meets with the marine biotoxin level in the Standard for Live and Raw Bivalve Molluscs (CODEX STAN292-2008).***

The Risk Assessments should be undertaken in accordance with the Working Principles for Risk Analysis for food Safety for Application by Governments (CAC/GL 62-2007)."

The swiss cheese statement

- ✓ high levels of the toxin must be present in the harvest area at or just prior to harvest
- ✓ abalone must be able to accumulate significant amounts of this toxin in the edible tissues
- ✓ Consumers eat enough abalone to exceed the acute reference dose for that toxin by a margin significant enough to cause illness.

The absence of any confirmed or probable cases or outbreaks of shellfish poisoning linked to the consumption of abalone indicates that these conditions are rarely all met.

Summary of all outcomes - Direct benefits

- International acceptance of risk based Codex standard
- Demonstration of the low risk for NZ and AU commercially harvested wild abalone

→ **Protection of market access**

- Avoidance of mandatory large scale biotoxin monitoring (AU $20mill + NZ $2-3 mill p/a)
- Cost approx. $600,000 (0.27% average export sales)
- Improved management
- Identified future areas research

Episode 2

18 months after the G. catenatum bloom affected abalone……

- Different toxic alga
- Different coastline and period
- Different seafood sectors
- **Similar story**

The east coast event

- Late October 2012 PST's were detected in shellfish exported to Japan
- *Alexandrium tamarense* – not seen previously in the bivalve monitoring program in Tasmania, and not normally toxic in Tasmania
- Offshore bloom affecting the whole east coast
- **More potent STX analogs, affected many fisheries**
- **Numerous closures – direct cost to industry $6.3 million, indirect costs $23 million**

Cray seas

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ABC NEWS

Triabunna

Toxic algal bloom returns closing two east coast fish

Posted Wed 14 Aug 2013, 8:55am AEST | Updated Thu 15 Aug 2013, 7:59am AEST

A toxic algal bloom returns to Tasmania's east coast, closing two fisheries

Blooming mussels image

ABC Rural

Management meetings

- Immediate meetings between Dep Ag, FSANZ, DPIPWE, DHHS, SafeFish and rock lobster industry
- Covering new ground
- Precautionary approach taken
  - Public health
  - Market access
- **No trace back**

SafeFish role in managing seafood safety

- Risk characterisation and risk assessment to underpin the risk management & risk communication

- Independent scientific advice to assist
  - Incident response
  - Short-term food safety and trade and market access issues
  - Longer term risk management

SafeFish role –Incident management

- Two examples – we have had more
- All have impacted market
- Individual businesses and whole sectors suffered losses through with-held or recalled product & market loss
- Safefish provided technical expertise and filled research gaps
- SafeFish brought groups together to resolve and respond to the issues to minimise the impacts on market.

The SafeFish partnership approach

- Builds capability in Australia
- Puts research focus on priority issues
- Improves information for decision making = better risk management
- Faster uptake of new practices
- Improves relationships between stakeholders
- Resolves trade and market access issues

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Challenges

- Continuing food safety R&D
- Retaining and developing capabilities
- Prioritising and responding to issues (industry and government)
- Keeping ahead of emerging issues (Codex and domestic)
- Data to back up food safety claims
- Communicating to stakeholders
- $$$?

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Food safety often taken for granted

BUT – is a huge marketing asset

and needs to be maintained

www.safefish.com.au

LOVE AUSTRALIAN PRAWNS

Australian Southern Rocklobster clean. green.