



Salmon stakes

Risks for the Tasmanian salmon industry

Discussion paper

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Summary

Salmon farming is a hot topic in Tasmania. The industry is responsible for over 2% of Gross State Product and over 1% of employment, including considerable full-time employment. This economic contribution is due to substantial growth. The industry tripled in size over the past decade, and plans to double again in the 20 years to 2030.

The industry has environmental and community downsides that have been exacerbated by the expansion. In 2016 and 2017, these attracted national media attention, including a Four Corners report on pollution in Macquarie Harbour.

These issues have led to concern that the industry's social licence to operate is in jeopardy. Polling reveals a gap between the expectations of Tasmanians and the government and industry's behaviour. There is majority support for an independent investigation into the industry and for stricter labelling laws, and concern that the industry is risking jobs by not changing its practices.

The loss of social licence to operate is a major risk for the industry. It is highly exposed to the domestic market, with 90% of Tasmanian salmon consumed by Australians. The industry is vulnerable to any change in Australian consumer sentiment.

This vulnerability is compounded by international competition - about one-quarter of salmon consumed by Australians is imported. Export markets have proven difficult.

Australian consumer sentiment may have already begun to change. Among Australians who like to choose salmon as a meal option, 39% have heard of negative environmental impacts from salmon and 15% say that they have stopped buying Tasmanian salmon due to environmental concerns.

Problems with the salmon industry internationally and examples of dramatic changes in Australian consumer sentiment in other industries provide some examples of the potential negative effects of a loss of social licence.

The industry is moving some operations on-land and potentially expanding far offshore. This strategy, if implemented fully, would be consistent with community expectations and ensure that Tasmanian salmon is environmentally sustainable and well-regarded, compatible with "Brand Tasmania".

However, aquaculture companies are also expanding their inshore operations, or failing to outline exit plans for existing inshore leases. This expansion may increase profits in the short term, but risks undermining the marine environment, consumer support and social licence on which the industry depends.

Introduction

Salmon farming has attracted considerable attention in Australia.¹ Salmon is responsible for three-quarters of the value of Tasmanian aquaculture and fisheries, and 96% of the value of aquaculture if fisheries are excluded. In 2014-15, aquaculture was responsible for \$650 million of value to wild catch's \$175 million, and salmon was responsible for \$620 million of aquaculture value.²

Aquaculture contributes 2.3% of Tasmania's Gross State Product and 1.2% of state employment,³ including major contributions to some local economies. Significantly, about 80% of aquaculture jobs are full-time. Two of the major salmon companies, Tassal and Huon, are responsible for about 0.8% of full-time employment in Tasmania.⁴

This contribution to GSP and employment is the result of considerable industry growth. Over the decade between 2004-05 and 2014-15, the value of Tasmanian aquaculture more than tripled in real terms, with salmon driving most of the increase, including a 17% increase in volume in the most recent year on record (2014-15).⁵

The industry plans to expand further, including a doubling of production over the 20 years to 2030.⁶ This proposal received support from the state government in 2011, when the primary industries minister Bryan Green doubled the lease area in Macquarie Harbour. A subsequent Senate inquiry into the industry in 2015 was reported as "effectively [giving] the all-clear" to the expansion plan.⁷

This fast growth has not been without costs. Community concern is rising around pollution, health and governance issues.

¹ The industry classification is "salmonids", which includes trout and char. Atlantic salmon represents the vast majority of Tasmanian salmonid production. In this report, "salmon" refers to "salmon and other salmonids".

² ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 43, 46

³ DPIPWE (n.d.) *Salmon industry changes FAQ*, <http://dipiwe.tas.gov.au/sea-fishing-aquaculture/marine-farming-aquaculture/changes-to-salmon-industry-regulation/salmon-industry-changes-faqs>

⁴ Tassal (2016) *Sustainability report 2016*, p 53; Huon Aquaculture (2016) *Sustainability report 2016*, p 15; ABS (May 2017) *Labour force, Australia, detailed, quarterly*, table 26a.

⁵ ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 45-46

⁶ Atkin (2014) *Controversial plans to expand Tasmanian salmon industry, environmentalists accuse farms of polluting ocean*; Gregor Salmon (2017) *How salmon farming pushed Macquarie Harbour to the limit*

⁷ Gregor Salmon (2017) *How salmon farming pushed Macquarie Harbour to the limit*, <http://www.abc.net.au/news/2017-06-08/how-salmon-farming-got-to-push-macquarie-harbour-to-the-limit/8349342>

Community concerns

The industry's recent expansion – and its 2030 target for a doubling of production – has emphasised the risks the industry poses for Tasmania, including its polluting of waterways.

In early 2017, ABC TV's Four Corners revealed that the Environment Protection Authority has found "historic lows" for dissolved oxygen in the waters around fish farming sites in Macquarie Harbour, threatening endangered wildlife. There were also concerns about the adequacy of compliance monitoring. The ABC also covered the EPA's decision to award Tassal a stocking density three times as high as its competitor Petuna and twice as high as Huon, despite Tassal having what the ABC described as "the worst environmental record" of the three.⁸

There are broader concerns about industry research. One scientist reported experiencing pressure to "come up with a positive report" about the threat posed to the industry by climate change, "because the last thing they needed was to have the share market take notice that they were actually vulnerable". In a similar vein, data collection around water quality and benthic sediment has been substantial and robust, but most of that information has not been made public on "commercial in confidence" grounds. "[S]ecrecy itself becomes justification for activism".⁹

ALTERNATIVES TO INSHORE AQUACULTURE

Rising environmental concern has drawn attention to alternatives to the inshore aquaculture currently practiced in Tasmania, which would be more environmentally sustainable.

Inshore aquaculture takes place in coastal waters, in bays and in rivers. It is in contrast to offshore aquaculture, which takes place in the open ocean (exposed waters) and on-land aquaculture, which takes place in carefully regulated, closed-system tanks. All three forms of aquaculture have their costs and benefits, but inshore aquaculture in

⁸ Meldrum-Hanna and Balendra (2017) *Huon Aquaculture takes Tasmanian Government to court over salmon farming in Macquarie Harbour*, <http://www.abc.net.au/news/2017-02-06/huon-aquaculture-lawsuit-tasmania-government-macquarie-harbour/8244330>, Meldrum-Hanna, Balendra and McDonald (2016) *Salmon farmer says Tasmanian Government ignored warning on overstocking danger in Macquarie Harbour*, <http://www.abc.net.au/news/2016-10-31/salmon-farmer-says-tas-government-ignored-overstocking-warning/7978770>

⁹ Leith et al (2014) *Science and social licence*

particular carries heavy environmental and social costs that are not present – or are less prevalent – in on-land and offshore aquaculture.

These alternatives would allow the industry to continue its planned expansion without the environmental costs that are causing public opinion of the industry to sour.

SOCIAL LICENCE TO OPERATE

Social licence to operate is informal community and stakeholder acceptance of an industry, company or project. Projects without social licence may be legally and financially sound, but still exposed to reputational risk, community activism, regulatory and legislative changes, and so on. It is not always clear when a company has a social licence, but it is obvious when the company does not have it.

The salmon industry has long had a conflicted relationship with regulation and community sentiment. Academics have described how the eagerness of government to develop the industry in the 1980s led to some overreaches and a lack of independent regulation, which in turn caused a pushback against development. They concluded that “targeted science, instilled by appropriate science policy” could underpin social licence and environmental governance at the same time.¹⁰

The Australia Institute polled Tasmanians on issues of pollution, additives, industry regulation and government relations.¹¹ A majority of Tasmanians support a suite of measures that would improve confidence in the industry and its governance.

The table below compares the stated wishes of Tasmanians to the outcomes delivered by industry and government. Few of these steps have been implemented. Companies may make efforts to become more accepted by the community, but if they are not addressing the stated concerns of the community these efforts become viewed as superficial.

¹⁰ Leith et al (2014) *Science and social licence: Defining environmental sustainability of Atlantic salmon aquaculture in south-eastern Tasmania, Australia*

¹¹ Polling conducted by ReachTEL on behalf of The Australia Institute in August 2016. It polled a representative sample of 1,310 Tasmanians.

Table 1: Policy preferences of Tasmanians contrasted with policy outcomes

Question	Response	Outcome
The fish farm industry is risking jobs by not investing in future-proofing the industry¹²	54% agree	Some investment has occurred
There should be an independent investigation into the impacts of the industry on other aquaculture, tourism and shoreline communities prior to any expansion	61% agree	Not implemented
Salmon packaging should show all chemicals fed to the fish	88% agree	Not implemented
There should be an independent watchdog for intensive fish farms	70% agree	The EPA has regulated the environmental aspects of salmon aquaculture since July 2016. ¹³ Legislation in September also assigned day to day environmental regulation from DPIPWE to the EPA.
Salmon companies should pay rates to local governments	70% agree	Not implemented; legislation introduced to exempt them altogether ¹⁴

Source: The Australia Institute (2016) *Briefing note: Tasmanian intensive salmon farming*; Minshull (2017) *Concern fish farms not modernising a risk to long-term jobs: Lyons poll*

The substantial gap between what polling suggests the Tasmanian community expects from the industry and government and what is being implemented and achieved should be of concern to the salmon industry. This is particularly the case as the industry is heavily exposed to the Australian domestic market, where consumer sentiment could be readily affected by awareness of these challenges.

¹² From separate polling done for the electorate of Lyons only. Minshull (2017) *Concern fish farms not modernising a risk to long-term jobs: Lyons poll*, <http://www.tai.org.au/content/concern-fish-farms-not-modernising-risk-long-term-jobs-lyons-poll>

¹³ Tasmanian Government (n.d.) *Salmon industry changes FAQs*, <http://dpipwe.tas.gov.au/sea-fishing-aquaculture/marine-farming-aquaculture/changes-to-salmon-industry-regulation/salmon-industry-changes-faqs>

¹⁴ Whiting (2017) *Move to free salmon companies from paying council rates*, <http://www.abc.net.au/news/2017-04-05/legal-move-to-free-salmon-companies-from-paying-council-rates/8416860>

Consumer behaviour

Changes in consumer behaviour represent the most immediate and obvious threat to the salmon industry.

Stakeholders report that the industry “can see the huge economic impact that a [market] campaign against them would have”,¹⁵ an assessment that seems fair given existing consumer concern, the reputational damage experienced by the industry internationally and the consumer backlash experienced by other industries in Australia.

Among those who liked choosing salmon as a meal option, slightly more (39%) had heard of negative environmental impacts than had not heard of negative environmental impacts (38%).

MAINLAND DEMAND FOR TASMANIAN SALMON

Salmon is popular among Australians, and the majority of Tasmanian salmon is sold in Australia.

Salmon is responsible for about a third of Tasmania’s \$147 million annual international seafood exports. This represents 7% of Tasmania’s salmon production, with key destinations including China, Japan, Indonesia and Vietnam.¹⁶

In 2015, Australia produced 48,614 tonnes – \$631 million worth – of salmon, 47,184 tonnes of which came from Tasmania (97%).¹⁷ Australia exported 4,955 tonnes of salmon,¹⁸ indicating that 90% of salmon production is consumed domestically.

At the same time, Australia imported 16,127 tonnes of salmon, with a total value of \$191 million.¹⁹ This spending splits roughly equally between smoked salmon (the most expensive), frozen, fresh and chilled salmon, and prepared and preserved salmon (the least expensive). It is not the case that imports are limited to lower-quality fish.

Of Australia’s annual consumption of 59,786 tonnes of salmon, over a quarter (27%) is imported. This shows willingness from consumers to buy imported salmon.

¹⁵ Leith et al (2014) *Science and social licence*

¹⁶ ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 63, 106-111, 115, 123, 126

¹⁷ ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 46

¹⁸ ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 58

¹⁹ ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 65-66

AUSTRALIAN ATTITUDES TO SALMON

Australians like eating salmon. Polling in September 2017 commissioned by The Australia Institute found that 69% of Australians agreed or strongly agreed that they liked choosing salmon as a meal option, compared to 26% who disagreed or strongly disagreed.²⁰

However, the polling also revealed that many Australians had heard of negative environmental impacts from salmon farming in Tasmania, and those who like choosing salmon as a meal option are more likely to have heard of negative impacts than those who do not:

- Among those who liked choosing salmon as a meal option, slightly more (39%) had heard of negative environmental impacts than had not heard of negative environmental impacts (38%).
- Among those who did not like choosing salmon, 27% had heard of negative environmental impacts while 45% had not heard.

We are already seeing changes in purchasing behaviour, with 14% of respondents saying that concerns over environmental impacts have stopped them from purchasing Tasmanian salmon in the past six months. Among those who like choosing salmon as a meal option, the trend is even more pronounced: 15%, or one in seven, say that environmental concerns have stopped them from purchasing Tasmanian salmon.

As well as concern among household customers, Australian chefs are increasingly expressing concern about Tasmanian salmon. A recent campaign by Environment Tasmania has called on chefs to ensure the provenance of the salmon they purchase, a request that companies struggle to answer. Suppliers could not demonstrate that the salmon was sustainably sourced to the satisfaction of the chefs.²¹

We are already seeing changes in purchasing behaviour, with 14% of respondents saying that concerns over environmental impacts have stopped them from purchasing Tasmanian salmon in the past six months. Among those who like choosing salmon as a meal option, the trend is even more pronounced.

²⁰ Between 17 and 26 September 2017, The Australia Institute conducted a national survey of 1,421 Australians via Research Now, with nationally representative samples by gender, age and state or territory.

²¹ Humphries (2017) *Salmon off the menu as chefs sign on to Sustainable Salmon Chefs' Charter*, <http://www.themercury.com.au/business/salmon-off-the-menu-as-chefs-sign-on-to-sustainable->

That one in seven consumers have been reluctant to buy Tasmanian salmon indicates existing community concern over the environmental impacts of Tasmanian salmon – despite the lack of a concerted environmental campaign. If one were to emerge, the consequences could be dire for the industry.

salmon-chefs-charter/news-story/89fa1b4603a9bde217ab0308a491cd15; Inglis (2017) *No salmon 'boycott': Environment Tasmania*, <http://www.theadvocate.com.au/story/4757980/environment-tasmania-disputes-salmon-boycott-claim/?cs=12>

Consequences of a loss of social licence

Community concern has been identified as a major risk to the future of the salmon industry in Tasmania.

In August 2016, *The Mercury* described a social licence as “critical” to Tassal because otherwise a dramatic expansion of fish farming could trigger the same “economy-crippling, community-destroying conflict” that had been seen in forestry. The editorial concluded:

[T]o push ahead with the expansion [of salmon farming on the East Coast] now, in the face of such steadfast opposition and concern from the community, would work against it — both on the company’s immediate bottom line and ultimately its long-term future.

A community licence, as ethereal and elusive as it may at first appear, is critical to Tassal’s plans.²²

The Tasmanian salmon industry’s critical need for a social licence is a result of its heavy dependence on the domestic market with limited export opportunities.

LIMITED EXPORT OPPORTUNITIES

The growing export market for salmon may breed complacency in the industry. At least one company, Tassal, has indicated that it will redirect salmon into the Chinese market if “the domestic market does not take up enough of our volume”.²³

The small volume of salmon that is currently exported, and the unique circumstances that have driven higher export prices, indicate that the industry may find it hard to pivot to exports if it does come under consumer pressure domestically.

²² The Mercury (2016) *Editorial: Social licence necessary to farm success*, <http://www.themercury.com.au/news/opinion/editorial-social-liscence-necessary-to-farm-success/news-story/055709c8ee00caf42649fdc20de2c925?nk=7cc5c013eaeb9c7aadb11fa96514ecb6-1501817520>

²³ Bhole (2017) *Salmon giant Tassal profits up with an eye on China, as pens bound for Okehampton Bay anger opponents*, <http://www.abc.net.au/news/2017-08-23/tassal-profits-up-china-move-flagged-as-okehampton-pens-arrive/8834570>

Currently, only 10% of Australian salmon is exported; 2,486 tonnes (50% of exports) – worth \$24.6 million – went to China.²⁴ There has been no public information on how Tassal plans to grow this market, or in what time it would expect to do so. As a risk mitigation strategy against a declining domestic market, it looks tenuous. China, a highly government regulated market, has been prepared to ban salmon exports from other countries in the past (albeit not for environmental reasons).²⁵

Last year, Tassal's domestic salmon sales fell by 3,800 tonnes, or 15%.²⁶ A rise in the price of salmon and an increase in salmon exports together managed to offset this fall in domestic sale volumes. The increase in export demand for salmon has been significantly driven by a reduction in the supply of Chilean and Norwegian salmon due to environmental issues,²⁷ circumstances that may change. Further reductions of sales in the domestic market could be hard to absorb.

PROFITS AND THE NEED FOR CAPITAL REINVESTMENT

Tasmania's publicly-listed aquaculture companies, Tassal and Huon, have both made record profits in the last year. In 2016-17, Huon made a \$42 million profit, up from \$3 million the previous year, which allowed it to pay its first dividend to shareholders. Tassal also received record profits in 2016-17, of \$58 million, although it has been profitable and paying dividends for some years.²⁸

These unprecedented profits should be reinvested in the long-term sustainability of the industry. Some such investment is already occurring.

²⁴ ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 132

²⁵ Lewis (2011) *Norway's salmon rot as China takes revenge for dissident's Nobel Prize*, <http://www.independent.co.uk/news/world/europe/norways-salmon-rot-as-china-takes-revenge-for-dissidents-nobel-prize-2366167.html>; the ban lasted at least until 2015: Norwegian University of Life Sciences (2015) *Chinese boycott of Norwegian salmon industry unsuccessful*, <http://scienzenordic.com/chinese-boycott-norwegian-salmon-industry-unsuccessful>

²⁶ Tassal (2017) *Tassal Group Limited: FY 2017 Roadshow*, p 5, <http://www.aspecthuntley.com.au/asxdata/20170906/pdf/01893273.pdf>

²⁷ Tassal (2017) *Tassal Group Limited: FY 2017 Roadshow*, p 16, <http://www.aspecthuntley.com.au/asxdata/20170906/pdf/01893273.pdf>

²⁸ Humphries (2017) *Salmon surging as fish farm firms Huon Aquaculture and Tassal cash in with record profits*, <http://www.themercury.com.au/business/salmon-surging-as-fish-farm-firms-huon-aquaculture-and-tassal-cash-in-with-record-profits/news-story/9a0da646c701b9845d0bd7902653af54>; Tassal (2016) *Full year results*, <http://www.tassal.com.au/full-year-result/>

For example, Huon invested \$200 million in “fortress” fish pens that would allow it to expand into more open waters. The nets are also more resistant to seal-incursions, avoiding the seal relocations that have caused complaints from other fishers.²⁹ Tassal has now committed to accelerating the roll out of new pens.

Similarly, Huon’s on-land salmon nursery is expected to cost \$30 million. Salmon would grow to 500-600 grams before being placed into marine pens, reducing the time the fish spend in the sea to less than a year.³⁰

Many investors have a stake in both Tassal and Huon. Almost half of Tassal’s 20 largest shareholders are also among Huon’s 20 largest shareholders. 66% of Tassal and 24% of Huon are owned by these overlapping shareholders.³¹ In many cases these will be institutional investors holding shares on behalf of many others, but regardless these figures emphasise that many shareholders have a stake in the Tasmanian salmon industry as a whole, rather than the fortunes of either one of its companies.

INTERNATIONAL COMPARISON

Among varieties of aquaculture, salmon farming is especially vulnerable to reputational damage: global media reporting on aquaculture is typically positive, with the exception of salmon farming where 52% of headlines are negative.³²

Recent problems in Scotland’s salmon farming industry demonstrates the environmental and social vulnerability of the industry. Continued failure to contain sea lice – which infest about half of Scottish salmon farms – has decreased production and provoked alarm in the community. *The Guardian* wrote in April of this year of concern

²⁹ Denholm (2016) *Dangerous dinners: Is salmon farming ruining Tasmania?*, <http://www.theaustralian.com.au/news/inquirer/dangerous-dinners-is-salmon-farming-ruining-tasmania/news-story/b585cb51aecd31d162e81d9088117116>

³⁰ Bender (2017) *Creating value in volatile markets*, p 5, <http://www.aspecthuntley.com.au/asxdatal/20170406/pdf/01845711.pdf>; Clark (2017) *Huon Aquaculture in bid to move fish farming on land*, <http://www.themercury.com.au/business/huon-aquaculture-in-bid-to-move-fish-farming-on-land/news-story/7a0a862bf690121e2ed610a95425ee69>

³¹ Huon Aquaculture (2017) *Annual report 2017*, p 103; Tassal (2017) *Annual report 2017*, p 81

³² Froehlich, Gentry, Rust, Grimm and Halpern (2017) *Public perceptions of aquaculture: Evaluating spatiotemporal patterns of sentiment around the world*, <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0169281>

from salmon fishers that sea lice “could potentially wipe out a global multibillion-dollar industry that feeds millions of people [i.e. the salmon industry]”.³³

Headlines like “Scotland’s farmed salmon industry stinks”, “Thousands of fish poached alive” (after multiple cases where salmon in a lice-killing bath were overheated) and “Salmon farming in crisis: ‘We are seeing a chemical arms race in the seas’” have run in the press. Sea lice treatments are expensive and raise public health and animal welfare concerns and the pesticides, bleach and antibiotics used to treat the lice and associated diseases can pollute bodies of water. The growing controversy, and multiple examples of industry breaches of regulatory restrictions, has led to calls for an investigation into the industry’s links with government.³⁴

The Canadian province British Columbia provides an example of what the industry can experience when environmental concern, the loss of social licence and political will combine. The province has had on-and-off aquaculture moratoriums for two decades, including reports and investigations, government investment in environmental protection in the aquaculture industry, and recommendations to not issue new licences in certain locations until at least 2020.³⁵

AUSTRALIAN CONSUMER BEHAVIOUR

As well as international examples of the salmon industry experiencing severe pressure, Australians have readily changed consumer behaviour

In the modern digital era, boycott campaigns spread quickly and the power and influence of social media cannot be underestimated. Australia has seen the effects of boycotts and consumer backlash in multiple other industries:

³³ Vidal (2017) *Salmon farming in crisis: ‘We are seeing a chemical arms race in the seas’*, <https://www.theguardian.com/environment/2017/apr/01/is-farming-salmon-bad-for-the-environment>

³⁴ Blythman (2017) *Scotland’s farmed salmon industry stinks*, <https://www.thegrocer.co.uk/opinion/columns/second-opinion/scotlands-farmed-salmon-industry-stinks/548955.article>; Sawer (2016) *Thousands of fish poached alive in lice treatment bungle that could hit Christmas salmon prices*, <http://www.telegraph.co.uk/news/2016/11/18/thousands-of-fish-poached-alive-in-lice-treatment-bungle-that-co/>; Vidal (2017) *Salmon farming in crisis: ‘We are seeing a chemical arms race in the seas’*, <https://www.theguardian.com/environment/2017/apr/01/is-farming-salmon-bad-for-the-environment>; Fraser (2017) *Scottish salmon farming’s sea lice ‘crisis’*, <http://www.bbc.com/news/uk-scotland-38966188>

³⁵ Drews (2013) *Feds extend farmed-salmon moratorium in BC*, <http://globalnews.ca/news/936051/feds-extend-farmed-salmon-moratorium-in-b-c/>

- A campaign by consumer advocacy organisation Choice to boycott eggs being sold as “free range” that didn’t meet the CSIRO’s free range standard was reported as a success by SBS, which cited some free range producers whose sales had doubled over five months.³⁶
- Concern about nanoparticles in sunscreen is widespread, with the Department of Industry finding in 2012 that one in three Australians had heard or read stories about the risks of using sunscreens with nanoparticles, and one in five Australians would avoid using sunscreens with nanoparticles.³⁷
- After a product recall in February 2015 following a Hepatitis A outbreak potentially caused by its frozen berries, Patties Food’s net profit for the year fell by \$14.6 million (87%) and the company exited the frozen berry market soon after.³⁸
- A 180-day union dispute with brewer CUB resulted in a long-running boycott of popular Australian beer brands and thousands of people attending a protest, eventually ending when CUB backed down in December 2016.³⁹
- Nine months after a fatal accident at Dreamworld, visitor numbers were down 30%.⁴⁰

POTENTIAL IMPACTS

The heavy dependence of the industry on the Australian market, the proven willingness of Australians to change their consumer behaviour and polling that shows that environmental concerns about Tasmanian salmon have already affected the purchasing behaviour of Australians all give reason for concern.

³⁶ Theodosiou (2016) ‘We’ve won’: How the free range egg boycott became a win for the little guys, <http://www.sbs.com.au/news/article/2016/09/14/weve-won-how-free-range-egg-boycott-became-win-little-guys>

³⁷ Department of Industry (2012) *Concerns about sunscreen nanoparticles put Australians at risk of skin cancer*, <https://industry.gov.au/AboutUs/Media/Pages/ConcernsAboutSunscreenNanoparticlesPutAustraliansatRiskofSkincancer.aspx>

³⁸ Kimmorley (2015) *Patties Food exits the frozen berries market after ‘Nanna’s’ Hepatitis A break out*, <https://www.businessinsider.com.au/patties-foods-exits-the-frozen-berries-market-after-nannas-hepatitis-a-break-out-2015-12>

³⁹ Woods (2016) *Unions claim victory as 55 CUB workers return to work*, <http://www.theage.com.au/victoria/unions-claim-victory-as-55-cub-workers-return-to-work-20161207-gt5sw4.html>

⁴⁰ McKechnie and Stevenson (2017) *Dreamworld visitors down 30pc after fatal ride accident*, <http://www.abc.net.au/news/2017-07-10/dreamworld-visitors-down-a-third-after-fatal-accident/8694328>

The effects of a loss of social licence and changes in consumer sentiment are difficult to predict, but media is correct to describe them as “critical” for Tassal and the salmon industry more generally. As highlighted in the last section, one in five Australians has said they would avoid using sunscreen with nanoparticles. A change in consumer behaviour of the same magnitude would be very damaging for the salmon industry.

If 20% of Australians switched from Tasmanian to imported salmon, the result would be a considerable drop in revenue for Tassal and Huon. In 2016, Huon reported sales revenue of \$244 million and Tassal reported revenue of \$431 million.⁴¹ Since about 10% of Australian salmon production is exported,⁴² only 90% of that revenue would be affected by changes in domestic sales. Applying a straightforward reduction in domestic revenues of 20% would lower Huon’s revenue by \$44 million and Tassal’s by \$78 million, for a total loss to industry of \$122 million. Companies may be able to reduce that loss by increasing exports, but the small volume of existing salmon exports and changing circumstances in the international export market would make such a transition precarious.

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⁴¹ Tassal (2016) *Annual report 2016*, p 3; Huon Aquaculture (2016) *Annual report 2016*, p 10

⁴² ABARES (2016) *Australian fisheries and aquaculture statistics 2015*, p 46, 58

Conclusion

The threat of reputational damage to Tasmanian aquaculture is real and substantial. The overwhelming focus of the industry on salmon means that a loss of consumer confidence in that product would have an outsized effect on the industry, and by extension the entire state.

Scotland and other overseas jurisdictions show how the salmon industry can quickly and strongly become associated with ecological damage, mass fish deaths and misrule.

If 20% of Australians switched from Tasmanian to imported salmon, with a commensurate drop in revenue for Tassal and Huon, the salmon farmers could expect to lose \$122 million in a year. This would reduce earnings to almost nothing and leave the industry struggling to fund investment in sustainability, leaving it vulnerable to further consumer backlash.

In the current boom, the industry could fund these and other sustainability investments from revenue. On the other hand, a consumer backlash on environmental grounds could dramatically reduce salmon farming revenue, leaving the industry struggling to pay for the investment required to improve sustainability.

There are alternatives it can pursue to make its expansion sustainable, foremost among them moving production to on-land and offshore facilities instead of the current onshore production.