# Chapter 8

# Possible impact of fin-fish aquaculture on human health

8.1 Some submitters expressed concerns about the possible impact of the fin-fish industry on human health. These concerns can be grouped into two general issues: first, the direct impact of farming operations on residents of nearby communities; and secondly, the possible impact on human health through the consumption of farmed fish.

## Impact on nearby communities

8.2 The committee received a number of submissions from local residents in the Huon Estuary and the D'Entrecasteaux Channel areas. Residents pointed to aquaculture activities which, they stated, affected their physical and psychological health and wellbeing. Of particular concern to submitters were night-time disturbances from bright lights used on leases, noise and vibration associated with boat movements and disturbances from trucks on shore.[1]

8.3 Submitters stated that noise arises from a variety of activities on fish farming leases including:

- the operation of special purpose vessels and equipment associated with fish farms;
- barges, service boats, feed supply and support vessels and tugs moving between leases trucks entering and leaving shore based facilities;
- venturation, a process of raising dissolved oxygen (DO) levels in the water for fish health management purposes during the warmer summer months, potentially 24 hours per day;
- air lift, the process of recovering fish from the pens using compressed air lift systems, which is commonly used during emergencies where large numbers of mortalities occur that need to be removed from pens quickly;
- fish feeding where pellets from the feed barge are blown by a compressor along high density polyethylene (HDPE) pipes that run to individual pens;
- pen lighting powered by generators on the farm barge located within the lease, which may be required to operate 24 hours per day depending on environmental conditions; and
- shore facilities and marine traffic associated with leases.[2]

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1 See Ms Henrietta Manning, *Submission 71*, p. 2; Ms Susan Westcott, *Submission 88*, p. 3; Dr Elizabeth Smith, *Submission 91, p. 7*; Ms Miranda Howie, *Submission 97*, pp 5, 10–16.

2 Doctors for the Environment Australia, *Submission 12*, p. 5; Ms Danielle Cairns, *Submission 36*, p. 2; Tasmanian Aquaculture Reform Alliance, *Submission 95*, p. 12.

8.4 Light pollution arises from lighting of farming structures, including fish pens, and boats.

8.5 The *Marine Farming Planning Act 1995* requires a person preparing a marine farming development plan (MFDP) to identify management controls that contain any measure necessary to satisfactorily manage and mitigate the negative effects of the proposal. Management controls may include provisions relating to the restrictions on noise, light or presence in a marine farming zone.[3] Submitters also pointed to the Huon River and Port Esperance MFDP, which states that:

> 3.9.2 Lessees are to ensure that light generated from marine farming operations does not create a nuisance to the general community…
>
> 3.12.2 Lessees must comply with guidelines on noise emissions made pursuant to the *Environmental Management and Pollution Control Act 1994* for marine farming operations.[4]

8.6 However, it was argued by some local residents that these conditions have been ignored; indeed, light and noise from farming operations continue to increase. One submitter from the Huon Estuary stated that the light 'has never been as offensive or obtrusive as it is currently'.[5] Other residents commented on the light and noise from aquaculture operations:

> Ten years ago we bought a magnificent block of land with outstanding views and built a home. We looked across Port Esperance with guaranteed peace and privacy day and night. We were attracted by the 'clean, green image' of this area and impressed with the health benefits and serenity of our land.
>
> We now have lights right though our home at all hours of the night and have had to cover windows to avoid being woken by an ever increasing battery of colour and brilliance. One of our outlooks is across to Bruny Island and up the Channel and this is currently under attack. There will be the cost of more window coverings and a more commercial and ugly landscape developed.
>
> We suffer sleep deprivation. We understand the loss of amenity will affect the sale of our property yet, we were here first. No-one wants to listen, least of all Tassal or Huon Aquaculture.
>
> There is a continual expansion of water traffic with larger, noisier vessels spoiling the tranquillity and creating sailing hazards across this beautiful waterway.[6]

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3 Tasmanian Government, *Submission 35*, pp 17–18.

4 Ms Danielle Cairns, *Submission 36*, p. 2; see also Tasmanian Aquaculture Reform Alliance, *Submission 95*, p. 11.

5 Ms Danielle Cairns, *Submission 36*, p. 2.

6 Mr Lance and Mrs Jennifer Hadaway, *Submission 73*, p. 4.

8.7 Considerable evidence was received by the committee concerning the operation of Huon Aquaculture's well boat, *Ronja Huon*. This boat operates on the Huon River and Cnr Rosalie Woodruff commented that it has a 'very deep, loud and penetrating rumble from its motors, and has extremely bright lights…that are clearly visible from the shore'.[7] It was stated that the *Ronja Huon* operates over extended times and a resident commented:

> While there is undoubted reduced 'towing' noise after the introduction of the well boat, this is not the full story. This boat operates almost 24/7, much more frequently than the previous towing operations. It operates overnight and it has extensive and powerful light generating capacity to allow it to do this. It is often accompanied by two smaller boats equipped with powerful spot lights. Significant light pollution results. Light illuminates the sky, the horizon and bedrooms along the coast. Moonrise, moonlight on the sea, the dawn sky and auroras are obliterated. Flashes of light bright enough to wake residents are frequent occurrences. All this accompanied by the hum of engines.[8]

8.8 The committee also received evidence that ongoing and persistent sleep deprivation suffered by those living close to aquaculture activities has caused mental and physical ill health.[9] The Tasmanian Aquaculture Reform Alliance, for example, submitted:

> Sleep fatigue has consequences also for learning, daytime functioning resulting in impaired judgement, reduced hand to eye coordination, concentration and accidents. This is of particular concerns for residents in the remoter areas of the Huon Valley and Tasman Peninsula who frequently commute long distances to work.[10]

8.9 The Tasmanian Aquaculture Reform Alliance went on to comment that stress and anxiety has been reported by residents in areas close to aquaculture operations.[11] Ms De-arne Webb, a Huon resident, outlined her concerns:

> …I have been suffering for the last 10 months, I would think, with severe depression and anxiety that got so bad due to sleep deprivation, noise, reverberation and light impacting on home and my quality of life and my sanctuary, which is my house.[12]

8.10 Doctors for the Environment Australia (DEA), while noting the concerns of residents, commented that 'overall, the extent of psychological impacts of aquaculture

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7 Cr Rosalie Woodruff, *Submission 37*, p. 2.

8 Ms Danielle Cairns, *Submission 36*, pp 2–3.

9 Doctors for the Environment Australia, *Submission 12*, p. 5.

10 Tasmanian Aquaculture Reform Alliance, *Submission 95*, p. 11.

11 Tasmanian Aquaculture Reform Alliance, *Submission 95*, pp 14–15.

12 Ms De-arne Webb, *Committee Hansard*, 15 July 2015, p. 62.

activities on residents is poorly understood and requires addressing as part of a broad investigation of the impacts of the aquaculture on the health of Tasmanians'.[13]

8.11 Evidence was received that concerns about light and noise have been raised with the relevant companies, local council and the Environment Protection Authority. However, the Tasmanian Conservation Trust commented:

> Attempts to find a solution to this problem by contact with Government agencies and the aquaculture company have apparently been unsuccessful. There is no effective complaints procedure in place that can equitably address this type of issue.[14]

8.12 Ms Christine Materia, Tasmanian Aquaculture Reform Alliance, added:

> I think in the past the industry demonstrated that they were not dealing with the mental health issues around noise in particular. Rather than changing regulations, I think that it would be more for the industry to actually develop internal policies and processes for dealing with those types of issues and responding to the community. There is also a failure of regulatory bodies such as local councils and the EPA to deal with the issues of noise.[15]

***Response from industry***

8.13 The Tasmanian Salmonid Growers Association (TSGA) responded to evidence concerning the impact of light and noise on behalf of the industry and stated that:

> The industry does not believe it has caused significant modification to the natural environment to the extent suggested in the submission and all companies act within visual and noise guidelines and regulations.
>
> The industry is committed to working with the community through consultation to identify concerns and has a strong track record of being responsive to those concerns.
>
> All companies within the industry have a responsibility to respond to comments of mental and physical harm or illness regardless of the cause. The industry does not accept that assisting residents through these issues is an admission of responsibility or cause but an integral part of being a responsible community member and corporate citizen.[16]

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13 Doctors for the Environment Australia, *Submission 12*, p. 5.

14 Tasmanian Conservation Trust, *Submission 92*, p. 3; see also Tasmanian Aquaculture Reform Alliance, *Submission 95*, p. 12; Ms De-arne Webb, *Committee Hansard*, 15 July 2015, p. 63.

15 Ms Christine Materia, President, Tasmanian Aquaculture Reform Alliance, *Committee Hansard*, 16 July 2015, p. 10.

16 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 13.

8.14 In relation to concerns about the *Ronja Huon*, the TSGA stated:

> The *Ronja Huon* specifically provides [Huon Aquaculture] with the capacity to move offshore and farming at these locations would not be possible without its use and the vessel allows the safe bathing and transport of fish in higher-energy locations.
>
> The 75 metre state of the art vessel is powered by a diesel electric motor that readily complies with the *Environmental Management and Pollution Control (Miscellaneous Noise Regulation) 2014*.
>
> The vessel operates in a designated commercial shipping lane (up the Huon River) and services marine farming sites in the Huon and D'Entrecasteaux Channels.
>
> The Company is of the view that it is using best available technology and employs best practice environmental management to reduce noise emissions to the greatest reasonable extent. In addition, the Company has continued to modify the operation of the vessel as far as possible to limit the impact on residences.[17]

8.15 The TSGA went on to note that 'all companies within the industry have thorough complaint procedures in relation to noise from operations'. The companies also conduct noise monitoring by independent agencies and the regulator in order to ensure all vessels are compliant.[18]

8.16 Huon Aquaculture and Tassal specifically addressed comments in relation to noise from their operations on the Huon River. Huon Aquaculture stated that all of its vessels are tested for noise emissions and those currently used are compliant with the relevant noise regulations. In addition, it noted that it has voluntarily limited towing operations on the Huon River so that all tow vessels are south of Brabazon Point by 9.00 pm each day, except in extenuating circumstances. The number of towing movements have also decreased in this stretch of the river. The reduction in tows has been facilitated by the use of the *Ronja Huon*. This boat is also compliant with the relevant noise regulations.[19]

8.17 Tassal indicated to the committee that it was responsive to community complaints and has a culture of 'beyond compliance'. Noise mitigation strategies include changes to, and replacement of, equipment, limiting towing operations to late afternoon, and adjusting the stocking strategy for the lease, where possible, to minimise the noise impact.[20]

8.18 The committee also received evidence from Dr Steve Carter, an environmental engineer who has worked with Tassal on noise mitigation. Dr Carter

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17 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 13.

18 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 31.

19 Huon Aquaculture, *Response to Ms Miranda Howie's submission*, pp 4–5.

20 Tassal Group Limited, *Response to Ms Miranda Howie's submission*, p. 2.

commented that Tassal has worked at reducing noise and has 'succeeded in quieting down their marine and noise marine and land facilities'. Dr Carter concluded 'Tassal now has more hands-on noise management experience than just about any other industry in Tasmania'.[21]

## Other possible impacts on human health

8.19 A number of submitters commented on the potential for the activities of the aquaculture industry to affect human health through contamination of target and non-target species. In this regard, DEA pointed to the bioaccumulation and contamination of the marine environment with polychlorinated biphenyls (PCBs) and the use of antibiotics.[22]

### *Polychlorinated biphenyls*

8.20 DEA noted that PCBs are 'persistent, cancer-causing chemicals that continue to contaminate the environment and the food supply'.[23] Research from the United States and Canada was cited as demonstrating that PCB contamination of farmed salmon is significant, being much higher than that found in wild salmon. The research suggested that the cause of this contamination is likely a consequence of elevated levels of contamination found in commercial salmon feed.[24]

8.21 Submitters noted that, while studies have been conducted on overseas aquaculture operations, there are no comparable studies of PCB contamination of Tasmanian farmed salmon or trout.[25]

### *Antibiotics*

8.22 Antibiotics are used in aquaculture to treat outbreaks of disease in farmed fish. For example, in 2014, Huon Aquaculture and Tassal treated an outbreak of Yersinia at pens in Macquarie Harbour with antibiotics.

8.23 The Tasmanian Aquaculture Reform Alliance pointed to the large amounts of, and different by types of, antibiotics used in fish farming. It stated that studies indicated that antibiotic residue is present in sediment as well as other fish species near fish farms.[26] Submitters stated that there was a danger to human health from the

21 Dr Steve Carter, *Submission 72*, p. 2.

22 Doctors for the Environment Australia, *Submission 12*, p. 3.

23 Doctors for the Environment Australia, *Submission 12*, p. 3.

24 Doctors for the Environment Australia, *Submission 12*, p. 3; Tasmanian Aquaculture Reform Alliance, *Submission 95*, p. 10.

25 Doctors for the Environment Australia, *Submission 12*, p. 4; Tasmanian Aquaculture Reform Alliance, *Submission 95*, p. 10.

26 Tasmanian Aquaculture Reform Alliance, *Submission 95*, pp 10–11.

use of antibiotics both in relation to elevated levels of residue and development of antibiotic resistant bacteria.[27]

8.24 The Tasmanian Conservation Trust argued that the use of antibiotics in food production should be phased out, particularly given the rise of antibiotic resistant bacteria and the implications for human health.[28] The DEA added that overseas studies need to be replicated in Tasmania.[29]

***Response from the industry***

8.25 The fin-fish industry responded to concerns about antibiotic use and possible PCB contamination on human health from farmed fish. The TSGA noted that 'the industry continues and is committed to producing salmon which is safe and healthy for the consumer and believes that adequate monitoring is undertaken to comply with all food safety regulations'.[30]

8.26 In relation to antibiotic use, the TSGA noted that they are never used prophylactically or for growth promotion. Any salmon that are treated with antibiotics undertake a lengthy withdrawal period to ensure that all residues are cleansed from their system. Any group intended for harvest which falls within a period of twice the stated withdrawal period will undergo flesh testing for antibiotic residue. This complies with the Australia New Zealand Food Standards Code for residue levels.[31]

8.27 The TSGA went on to note that the industry's use of antibiotics is strictly monitored, recorded and regulated and has, in fact, fallen dramatically since 2008–09.[32] The TSGA commented that the reduction in antibiotic use has been achieved through a greater focus on improving knowledge and research activities targeting specific fish health issues.[33] Tassal provided the following explanation of its use of antibiotics:

> Fish are not treated with antibiotics unless they are sick and a bacterial disease is confirmed. Salmon which are treated with antibiotics undergo an extended withdrawal period and are tested for antibiotic residues before harvest. All harvest fish are food safe. Our goal is to continue to reduce antibiotic use by improving fish husbandry through the Zero Harm for Fish

27 See Mr Peter Schulze, *Submission 89*, p. 8; Dr Elizabeth Smith, *Submission 91*, p. 11; Tasmanian Aquaculture Reform Alliance, *Submission 95*, pp 10–11.

28 Tasmanian Conservation Trust, *Submission 92*, p. 5.

29 Doctors for the Environment Australia, *Submission 12*, p. 4.

30 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 12.

31 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 16.

32 Tasmanian Salmonid Growers Association, *Response to submissions*, pp 12, 16; see also Tasmanian Government, *Submission 35*, Appendix 1, p. 25.

33 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 16.

> initiative, and move into preventative approaches for disease management with the use of vaccines.
>
> We have expected that our antibiotic use will now fluctuate around this very low level of use.[34]

8.28 The TSGA commented that the industry's preferred option was vaccination and noted that significant investments have been made into the development of vaccines with some success. However, until vaccines are developed for Tasmanian conditions, antibiotics are still required.[35]

8.29 In addition, the TSGA stated that stock inspections are a routine part of farming activities and focus on disease monitoring and early detection. Companies are also actively involved, along with the Tasmanian Government, in the Tasmanian Salmonid Health Surveillance Program. This program provides passive and active disease surveillance through regular submission of fish diagnostic samples and testing for specific disease agents of concern.[36]

8.30 The Department of Primary Industries, Parks, Water and Environment annual report stated that the Tasmanian Salmonid Health Surveillance Program was revised in 2013–14 by the introduction of company and regional quotas to ensure samples were submitted consistently during the year and for all production zones and compartments. It was stated that 'farm companies were provided with monthly submission statistics and quarterly data based on regional data'.[37]

8.31 Reports of antibiotic use are provided by Huon Aquaculture on its Sustainability Dashboard and by Tassal in its annual Sustainability Report. For example, Huon Aquaculture reported on the use of antibiotics from 2007.[38] Tassal's *Sustainability Report 2014* also reported the use of antibiotics to control an outbreak of Yersiniosis in Macquarie Harbour. This resulted in an increase in antibiotic use in 2013–14 following a decline in previous years. Tassal stated that:

> Fish are currently vaccinated for the disease, but new research efforts in 2015 will be placed into the development of a more efficacious vaccination strategy for all of our sites. This will reduce the need for antibiotics and increase performance and fish welfare.[39]

8.32 In relation to the study cited in the DEA's submission concerning antibiotic residue, the TSGA stated that the study did not include an assessment of Tasmanian

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34 Tassal Group Limited, *Sustainability Report 2014*, p. 37.

35 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 16.

36 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 16.

37 Department of Primary Industries, Parks, Water and Environment, *Annual Report 2014*, pp 72–73.

38 Huon Aquaculture, *Sustainability Dashboard*, http://dashboard.huonaqua.com.au/

39 Tassal Group Limited, *Sustainability Report 2014*, p. 37.

aquaculture and that 'different growing regions face varying challenges, particularly in regards to antibiotic use'.[40]

8.33 The TSGA concluded:

> As with any animal production, antibiotics may be required in fish farming from time to time, but their role and uses are poorly understood by the general public and easy for critics and observers to interpret in a negative light.[41]

8.34 The committee also notes that a review was undertaken by the Institute for Marine and Antarctic Science (IMAS) in 2009 of ecological impact of the antibiotics and antifoulants used in the Tasmanian salmonid aquaculture industry. The IMAS provided information on the outcomes of the review:

> Current data indicate that water column concentrations of antibiotics are extremely low and consequently impacts on phytoplankton communities are likely to be limited. The testing of wild fish with respect to human health toxicity showed no risk to human health. The review suggested that although major environmental changes are unlikely to have occurred, identification of suitable indicator species would be valuable to ensure ongoing sustainability. It also suggested that where antibiotics are used, a measure of bioavailability rather than simply a measure of total residue level would be preferable, and that the effect of local environmental conditions…on ecotoxicity be assessed.[42]

8.35 The review was followed up by a workshop at which government and industry stakeholders and relevant experts discussed proposed future research.[43]

8.36 In relation to PCBs, the TSGA commented that studies have found that levels of PCBs and dioxins in fish species are low. In addition, the Commonwealth Department of Agriculture conducts an annual national residue survey (NRS) that regularly tests farmed salmon to ensure that they are safe for human consumption. – industry has participated in this for almost a decade. The TSGA added that 'tests in 2014 confirmed that Tasmanian salmon were well within acceptable ranges for a wide range of potential contaminants based on European Union Values and Food Standards Australia New Zealand'.[44]

8.37 The TSGA also responded to comments about contamination of commercial feed, and stated that the Tasmanian salmonid industry does not use feed manufactured in Canada. One company providing feed to the industry, Skretting Australia,

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40 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 12.

41 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 16.

42 Institute for Marine and Antarctic Studies, *Submission 20*, p. 19.

43 Institute for Marine and Antarctic Studies, *Submission 20*, p. 35.

44 Tasmanian Salmonid Growers Association, *Response to submissions*, pp 12, 16.

undertakes testing to ensure quality. In 2014, all results from Skretting Australia were within the Australian and European limits.[45]

## Committee view

8.38 The committee acknowledges the concerns of local residents about the impact of the fin-fish industry on their wellbeing through disturbances from light, noise and vibration and understands the frustrations of individual residents over perceived lack of response to complaints. However, the committee is of the view that there is an adequate regulatory regime in place to address these concerns and considers that residents should seek action through the appropriate regulatory channels.

8.39 While having come to this view, the committee nonetheless considers that the industry must continue to look for ways in which to diminish the impact of light and noise on local residents particularly through changes to farming operations and equipment used.

8.40 In relation to concerns about possible contamination of Tasmania-farmed salmon through antibiotics or PCBs, the committee received no evidence that this is the case. Australia has one of the most strongly regulated agricultural sectors and it would be highly detrimental to the fin-fish industry should there be any doubts about the quality of its product. Further, the committee notes that the industry is funding research to limit the use of antibiotics and is committed to ensuring the health of fish through appropriate farming practices.

**Senator Anne Urquhart**
**Chair**

45 Tasmanian Salmonid Growers Association, *Response to submissions*, p. 16.