31 March 2016

Ms Melinda Cilento

Commissioner
Marine Fisheries and Aquaculture
Productivity Commission
GPO Box 1428
Canberra City ACT 2601
fisheries.inquiry@pc.gov.au

Dear Ms Cilento,

Please find attached the Tasmanian Salmonid Growers Association's (TSGA) submission to the Marine Fisheries and Aquaculture Productivity Commission. The submission is tabled specifically on behalf of the TSGA's members.

On behalf of the TSGA and its members, I look forward to speaking to the submission and responding to any queries or concerns of the Committee in due course.

Yours sincerely,

Dr Adam Main
Chief Executive Officer
Tasmanian Salmonid Growers Association

Tasmanian Salmonid Growers Association
Submission to the
Marine Fisheries and Aquaculture
Productivity Commission, 2016

TSGA Foreword

Sustainable aquaculture growth is good for Tasmania

National Aquaculture

The aquaculture industry is diverse and each sector has different potential environmental impacts of varying degrees of significance. Aquaculture production is subject to an unnecessarily complex array of legislation and managing agencies — covering marine and coastal management, environmental management, land use planning, land tenure, food health and safety, quarantine and translocation.

State aquaculture and/or fisheries legislation have multiple objectives and these are not always clearly defined. The objectives may overlap or conflict, and there is often a lack of guidance as to the relative weights to be placed on each objective.

State government departments primarily responsible for aquaculture regulatory arrangements often have potentially conflicting functions of policy development, implementation of regulation, industry promotion and development, and research.

In most jurisdictions, there are complex approval processes. Obtaining required approvals can take significant time. There would appear to be scope to rationalise the number of approvals, coordinate approval processes, and incorporate statutory time frames for assessing approvals.

Increased efficiency and effectiveness of regulatory arrangements for aquaculture could be obtained from greater use of environmental risk assessment based on species, production system, management practices, site location and the condition of the environment. There is potential for greater use of innovative policy instruments to complement (or in some cases replace) existing regulatory and administrative controls.

Salmonid Aquaculture

Tasmania's primary industries are the engine room of our economy. Of all the primary industries, salmonid (Atlantic salmon and Ocean trout) aquaculture has the potential to significantly power our state's economic growth. We need to enable primary industry growth underpinned by strong environmental performance and strong capacity for delivering research priorities.

Within an international market characterised by strong demand for safe and sustainable seafood products, the salmonid aquaculture sector has significant growth opportunities. This growth has to be industry-led and the industry's opportunities and aspirations are reflected in increasing annual sales to $1 billion in value by 2030. The aquaculture industry has established a strategy to deliver that growth.

The foundations for growth are already in place. Our aquaculture production is free of many of the issues facing international producers and our environmental and food safety credentials are second to none. Australia has good trading conditions and trade agreements with key and emerging markets. Within these markets, we can leverage off our clean green reputation; world-leading environmental, food safety, animal health and welfare standards; and biosecurity management to secure premiums and market share.

While the foundations for growth are strong, the sector faces particular challenges and has unique characteristics that distinguish it from other primary producers and necessitate a specific

Government strategy and action plan. The bulk of aquaculture production comes from the use of public water space, which can only occur in a planning and allocation framework that balances and respects other uses/users of that space. For this reason, the steps necessary to establish aquaculture operations differ from many other primary producers.

Our strategy is to establish a pathway to enable the aquaculture sector to grow, through the development of new farming space, better use of existing space or getting better value from existing production.

We require a Government that will:

- work with industry and the public to plan for sensible and sustainable future aquaculture growth;
- ensure the laws and frameworks governing the establishment and operation of marine and land-based aquaculture are effective and responsive, and enable industry investment;
- build our knowledge of environmental effects and ensure a healthy aquatic environment;
- maintain and build our world-leading animal health and welfare, food safety, and biosecurity standards;
- encourage investment and adoption of innovation; and
- facilitate continued discussion between industry, government, indigenous Australians and the public as to how salmonid aquaculture should grow and be managed in Tasmania.

As the CEO of the Tasmanian Salmonid Growers Association, I am excited about the pathway forward and the scope for working with those with an interest in aquaculture to sustainably grow the sector towards its $1 billion goal and beyond.

Yours sincerely,

Dr Adam Main
Chief Executive Officer
Tasmanian Salmonid Growers Association

Background

The Tasmanian Salmonid Growers Association (TSGA) is the peak body representing the Australian salmonid aquaculture industry. The TSGA is aware of several previous inquiries and reports relating to the framework and practice of regulations applied to Australian aquaculture.

- Productivity Commission, 2004: *Assessing Environmental Regulatory Arrangements for Aquaculture.*
- Aquaculture Committee Report to PIMC, 2005: *Best practice frameworks of regulatory arrangements for aquaculture in Australia.*
- Productivity Commission, 2007: *Annual review of regulatory burdens on business: primary sector*, *draft research report*.
- Seafood Services Australia, 2009: *The costs of regulatory compliance in the Australian seafood industry*.
- Peters, E. ANI Program, 2015: *Barriers to aquaculture expansion in northern Australia - A case study into prawn farming in Queensland.*
- Joint Select Committee on Northern Australia, 2015: *Opportunities for expanding the aquaculture industry in Northern Australia.*

Various aquaculture industry associations, including the TSGA, have provided input into most of these studies.

Of these studies, the Productivity Commission's 2004 Research Paper on regulatory arrangements for aquaculture is the most comprehensive, worthy of study in the context of this inquiry in 2016. The key points from this report are reproduced below and the TSGA believe that each of the eight points remain largely valid today.

Key points

1. The aquaculture industry is diverse and each sector has different potential environmental impacts of varying degrees of significance.
2. Aquaculture production is subject to an unnecessarily complex array of legislation and agencies - covering marine and coastal management, environmental management, land use planning, land tenure, and quarantine and translocation.
3. State aquaculture and/or fisheries legislation have multiple objectives and these are not always clearly defined. The objectives may overlap or conflict, and there is often a lack of guidance as to the relative weights to be placed on each objective.
4. State government departments primarily responsible for aquaculture regulatory arrangements often have potentially conflicting functions of policy development, implementation of regulation, industry promotion and development, and research.

5. New South Wales, Queensland and Western Australia have made limited progress with marine aquaculture planning. This may constrain marine aquaculture, or result in ad hoc approvals for individual sites, and conflicts over resource use.
6. In most jurisdictions, there are complex approval processes. Obtaining required approvals can take significant time. There would appear to be scope to rationalise the number of approvals, coordinate approval processes, and incorporate statutory time frames for assessing approvals. This complexity is compounded when there are other statutory authorities that can override other regulatory agencies (e.g. Great Barrier Reef Marine Park Authority)
7. Increased efficiency and effectiveness of regulatory arrangements for aquaculture could be obtained from greater use of environmental risk assessment based on species, production system, management practices, site location and the condition of the environment.
8. There is potential for greater use of innovative policy instruments to complement (or in some cases replace) existing regulatory and administrative controls. For example, auctions could be used to allocate leases of public land or water, and tradeable permits could be used to manage pollution discharges.

The TSGA shares the National Aquaculture Council's view that the regulatory constraints to aquaculture development flagged in 2004, and frequently since, have not been adequately addressed. Further, the numerous regulations controlling aquaculture are applied under a combination of Commonwealth, State/Territory, and Local Government legislation. As an example, the following is a list of the legislated Acts & Regulations which the Tasmanian salmonid farming industry must demonstrate compliance with (reproduced by permission of the Tasmanian Salmonid Growers Association). This burden is typical of most aquaculture industries in Australia and can also be overlaid with controls implemented by various authorities.

Statutory Compliance List

Commonwealth Legislation

Aboriginal and Torres Strait Islander Heritage Protection Act, 1984
Aboriginal Lands Act, 1995
Australian Heritage Council Act, 2003
Coastal Waters (State Powers) Act, 1980
Competition and Consumer Act, 2010
Environmental Protection and Biodiversity Conservation Act, 1999
Environmental Protection (Sea Dumping) Act 1981
Export Control Act, 1982
Export Control (Fish and Fish Products) Orders, 2005
Greenhouse Gas Emissions Act, 2005
Heritage Commission Act, 1975
Maritime Safety Authority Act, 1990
National Environment Protection Council Act, 1994
Navigation Act, 2012
Quarantine Act, 1908
Resource Assessment Commission Act, 1989
Sea Installations Act, 1987
Seas and Submerged Lands Act, 1973

Tasmanian Legislation

Aboriginal Relics Act, 1975
Agricultural and Veterinary Chemicals (Tasmania), 1994
Agricultural and Veterinary Chemicals (Control of Use), 1995
Animal Health Act, 1995
Animal Welfare Act, 1993
Crown Lands Act, 1976
Dangerous Goods Act, 1998
Energy Coordination and Planning Act, 1995
Environmental Management and Pollution Control Act, 1994
Farm Water Development Act, 1985
Fire Service Act, 1979
Food Act, 1998
Forest Practices Act, 1985
Gene Technology (Tasmania) Act, 2012
Genetically Modified Organisms Control Act, 2004
Groundwater Act, 1985
Historical Cultural Heritage Act, 1995
Hobart Regional Water (Arrangements) Act, 1996
Hydro-Electric Corporation Act, 1995
Inland Fisheries Act, 1995
Land Titles Act, 1980
Land Use Planning and Approvals Act, 1993

Litter Act, 2007
Living Marine Resources Management Act, 1995
Local Government Act, 1993
Marine Farming Planning Act, 1995
Marine and Safety Authority Act, 1997
Mineral Resources Development Act, 1995
National Parks and Reserves Management Act, 2002
Natural Resource Management Act, 2002
Nature Conservation Act, 2002
Poisons Act, 1971
Pollution of Waters by Oil and Noxious Substances Act, 1987
Primary Produce Safety Act, 2011
Public Health Act, 1997
Rivers and Water Supply Commission Act, 1999
Roads and Jetties Act, 1935
Sewer and Drains Act, 1954
State Coastal Policy Validation Act, 2003
State Policies and Projects Act, 1993
Tasmanian Building Act, 2002
Tasmanian Planning Commission Act, 1997
Threatened Species Protection Act, 1995
Water Management Act, 1999
Water Quality Act, 1999
Weed Management Act, 1999
Whales Protection Act, 1988
Wildlife Regulations, 1999
Work Health and Safety Act, 2012
Workers Rehabilitation & Compensation Act, 1988 (Tas)

Other Guidelines – policies, codes of practice, strategies, management plans
Australian Maritime Safety Authority, National Standard for Commercial Vessels, 2016
Aquatic Animal Welfare Guidelines, National Aquaculture Council, 2004
Broadscale Environmental Monitoring Program (BEMP)
Convention Concerning the Protection of World Cultural and Heritage Areas
Global Reporting Initiative (GRI) Sustainability Reporting
Marine Farming Development Plans and Licences
Marine and Safety (Mooring) By-laws, 1998
Seal and Fishery Interaction Management Strategy, 2002
State Coastal Policy, 1996
State Policy on Water Quality Management, 1997
State-wide Baseline Water Quality Monitoring Program
Tasmanian Marine Protected Areas Strategy, 2001
Tasmanian Salmonid Farming Industry Code of Practice, 2004
The Environment Protection Policy (Noise) 2009

INFORMATION REQUEST

1. Have any jurisdictions been able to successfully balance environmental and economic considerations and potential conflict with other resources uses? How did they achieve this success?

The TSGA would contend that the successful development of the Tasmanian salmon industry over the past 30 years has in part been due to Tasmania's approach to balancing environment, economic development and the needs of other users of the water ways. The processes, strategies, and responses to ensure this has occurred are detailed in the discussion that follows.

The salmon farming industry is one of many waterway users and we all share the benefits and risks associated with operating within the waterways of coastal Tasmania. The industry requires similar values from the waterways that many other users expect, and as a major user we have a role as custodians to ensure those values are maintained. We are on the water every day across a broad geographic region and are well placed to observe and respond to changes.

The impact of salmonid aquaculture on waterway health is dependent on the nature and intensity of farming and the capacity of the receiving environment to assimilate the impacts. There is a continuum of interconnectedness between the farm and the surrounding environment which varies with season, weather and the time in the production cycle.

Research has established that industry impacts on waterway health are wholly reversible[1][2]. In practice this means if a farm is moved or removed the bottom beneath the leases would recover to background levels.

What is our impact on waterway health?

Impacts can be divided into two broad categories - seafloor or benthic impacts (solids) and water quality (dissolved) impacts both near field and broadscale.

1. Benthic impacts

Near field

Salmonid aquaculture in Tasmania is permitted by farm licence conditions to have a permitted zone of impact, monitored over a number of compliance points 35m from the lease boundary. Impacts to the benthos are largely predictable and reversible.

The deposition to the seafloor of excess feed and solid fish excreta is very well understood[3] and marine farming licence conditions to this end are therefore based on solid peer reviewed science. Fauna living on and within the sediments of the seafloor of an active finfish lease comprise different species to those of the surrounding area. Lease benthic

[1] Cromey CJ, Nickell TD, Black KD. 2002. DEPOMOD – modelling the deposition and biological effects of waste solids from marine cage farms. Aquaculture 214:211-239.

[2] Macleod, C.K., Eriksen, R.S., Davey, A., Kelly, B., and Ross, D.J. (2013). *Long-term Recovery - Review of sediment condition at Marine Farm lease No. 76 (Gun Powder Jetty, North West Bay.* Institute for Marine and Antarctic Studies

[3] Op cit Cromey et al., 2002.

communities are comprised of small animals and bacteria adapted to living in high nutrient areas. These specialist communities consume excess nutrients greatly aiding the Assimilative capacity of the environment. If nutrient levels become too high, then one species will tend to dominate over the others and this will be visually obvious. The use of visual indicators is a scientifically robust method of sustainably managing the seafloor within a marine farming lease.[4]

Marine farming licence conditions state that there must be no significant visual, physicochemical or biological impacts at or extending beyond 35 metres from the boundary of the lease area. This is monitored using company operated ROV surveys at specific times in the production cycle when the impact is likely to be greatest and at specific points within and beyond the lease as directed by the regulator.

Survey footage, date stamped GPS data files and a comprehensive report is supplied to the regulator who may require operational changes and follow up surveys if nutrient enrichment is visible. Companies also voluntarily use ROV technology to pro-actively optimise fallowing strategies.

Mitigation strategies include:

- continued improvement in feed management, feeding regimes and formulation;
- designated Marine Farm Plan Areas, optimal positioning of leases, comprehensive environmental impact statements and baseline surveys;
- pro-active fallowing (resting) of leases; and
- ongoing research into near field and far field impacts.

Further detail on the scientific evidence that impacts to the seafloor beneath finfish leases are **permitted** and **reversible,** is provided below.

Broadscale

Evidence from a significant long term monitoring program in the Huon Estuary and D'Entrecasteaux Channel (BEMP – Broadscale Environmental Monitoring Program) show no evidence for broadscale effects on the condition of the seafloor and faunal communities as a result of salmon farming.

A similar program (MHEMP – Macquarie Harbour Environmental Monitoring Program) is now in its second year and work is ongoing to determine the most suitable parameters for assessment of impacts given the unique nature of the Macquarie Harbour waterway. The benthic indicators are under review pending analysis and outcomes from current research projects.

Rocky Reefs

Marine farming regulations prohibit the siting of a finfish zone over a rocky reef, however the potential broadscale impact of salmonid farming on rocky reefs has been recently identified as a gap in our knowledge. To fill this gap, the industry has spearheaded the development of an IMAS led Fisheries Research and Development Corporation (FRDC)

[4] Sim-Smith, C.& Forsythe, A, (2013). Comparison of the international regulations and best management practices for marine finfish farming. MPI Technical Paper No: 2013/47. National Institute of Water & Atmospheric Research Ltd

project (2015-024) 'Managing ecosystem interactions across differing environments: building flexibility and risk assurance into environmental management strategies'. The aim of this project is to understand potential broadscale interactions with reef systems and validation of local scale sediment condition indicators in new salmonid farming regions.

In 2016, industry welcomed the findings of FRDC project (2014-042 A1 Atlantic Salmon Aquaculture IPA) 'Understanding broadscale impacts of salmonid farming on rocky reef communities'. The focus of the research was to investigate patterns of change in macroalgal community structure that may be attributable to elevated nutrients associated with salmonid farming activities. Analysis of data from MPA monitoring sites for the period 1992-2015 showed no consistent patterns of broad-scale change in macroalgal community structure over time. While key functional groups and dominant taxa showed some variability, these tended to be fluctuations rather than directional change.

2. Water quality impacts

Soluble wastes associated with finfish culture include ammonia, phosphates and dissolved organic carbon emissions. Impacts associated with these nutrient emissions are minimised where flushing rates are sufficient enough to dilute nutrient loads, hence the importance of well sited farms.[5]

Water quality impacts from salmonid aquaculture nutrients must be considered within the context of other nutrient inputs into the system:

- land based anthropogenic (terrestrial farming, forestry, refuse disposal sites, and septic and sewage inputs);
- natural catchment inputs; and
- oceanic inputs.

While attribution of the source of nutrient input is complex, especially in a changing natural system, it is achievable. The industry remains committed to ongoing research that provides a more complete analysis.

Near field

The effect of feed input and fish excreta at any salmonid farm is expected to result in localised environmental impacts to water quality within and around the lease boundary. The most relevant indicators are water quality and sediment parameters such as dissolved oxygen levels and de-gassing from the substrate for example. These parameters have been identified as early warning signs on which companies base management actions.

Broadscale

A local peer reviewed study[6] has shown that, in general, salmonid farm derived nutrient inputs **were not** anticipated to result in significant or broadscale effects to the water quality

[5] Sim-Smith, C.& Forsythe, A, (2013). Comparison of the international regulations and best management practices for marine finfish farming. MPI Technical Paper No: 2013/47. National Institute of Water & Atmospheric Research Ltd

[6] Crawford, C., Thompson, P., Jordan, A., Foster, S., Mitchell, I., Bonham, P. and Willcox, S. (2006). *Development of broadscale environmental monitoring and baseline surveys in relation to sustainable salmon aquaculture in the D'Entrecasteaux Channel region. Aquafin CRC Project 4.4., Aquafin Cooperative Research*

characteristics or ecosystem. This research is currently being reviewed and replicated to identify if there have been any significant changes in the past 10 years.

The Broadscale Environmental Monitoring Program (BEMP, focussed on the southern salmon farming region) and Macquarie Harbour Environmental Monitoring Program (MHEMP) provide comprehensive assessments of ecological condition in the state's south east (D'Entrecasteaux Channel & Huon Estuary) and Macquarie Harbour respectively.

Multiple sites within each Marine Farm Development Plan (MFDP) area are monitored throughout the year to assess spatial and temporal patterns of water and sediment quality. This includes a broad suite of parameters capturing the physical, chemical and biological characteristics of the system. This dataset provides a significant body of information that can be used by regulators, industry and other stakeholders to assess ecological condition and to support adaptive management strategies.

In situ net cleaning

The development of in situ net cleaning enabled the salmonid industry to exit from the use of antifoulant paint on sea cage nets which was identified as potentially posing a long term environmental threat to local ecology. Net cleaning involves using high pressure blasting or vacuuming to remove biofouling from the net surface of the sea pen before it reaches mature stages or heavy growth. Particulate organic matter is released to the environment through this process.

Following a three year study, in 2013 the industry established and published a Best Management Practice (BMP) guideline for this operation which details net washing practices to reduce the impact.

Ongoing research and monitoring is being conducted to further refine best practice in relation to:

- general mass balance calculations around net cleaning emission volumes and overall assimilation capacity;
- updating the marine biosecurity and biofouling management plan for the industry;
- continual improvement of onsite surveillance and monitoring programs and strengthening this in relation to natural seasonality; and
- linkages to international work being undertaken around emission capture and beneficial reuse.

Marine debris

Each company has implemented a waste mitigation strategy in order to reduce the incidence of farming infrastructure leaving leases and entering the marine environment. Rope and feed pipe are a particular focus of the current mitigation strategies. Industry has a 'rapid response' philosophy when it is notified of debris irrespective of its origin.

Broadly, strategic objectives are to:

Centre, Fisheries Research and Development Corporation, CommonwealthScientific and Industrial Research Organisation. Tasmanian Aquaculture and Fisheries Institute, University of Tasmania.

- develop clear, rapid response plans when marine debris is reported in the vicinity of fish farms;
- achieve zero material waste entering the environment;
- establish procedures and operating mechanisms that focus on managing the loss of farm materials into the marine environment;
- establish chains of responsibility at the farm level;
- establish monitoring procedures;
- conduct regular marine debris cleanup efforts in the vicinity of fish farms; and
- identify equipment to drive accountability.

The industry does not discriminate when collecting marine debris from shorelines: in FY2013 and FY2014 the industry collected approximately 15m^3 of debris each year that could not be attributed to fish farming operations (Table 1).

Table 1 – Consolidated salmonid industry marine debris cleanup figures.

	Volume of Rubbish Collected (m^3)	**% attributable to Salmonid Farms**	**Labour Hours**
FY2013	50.4	67	479
FY2014	60.5	72	626

What do we do to understand our impact on waterway health?

Monitoring

The industry's responsiveness to environmental change is supported by robust monitoring programs. These include, but are not limited to, the following:

- Baseline monitoring at new sites or for site amendments of:
  - water quality;
  - sediments;
  - general environmental characteristics; and
  - threatened species.
- daily routine farm level monitoring of salinity, oxygen and water temperature;
- ROV monitoring to achieve and exceed compliance requirements;
- broadscale monitoring of water quality and sediment health in all farming areas;
- emerging issues; and
- implementation of novel real time environmental monitoring such as the Sense-T initiative.

The industry also provides a detailed Environmental Impact Statement (EIS) whenever a new farm site is considered. The current annual industry commitment to environmental monitoring for both compliance and an improved understanding of the environment of the waterways is more than $1.9 million. In addition, annual certification costs for independent

assessments of the practices and environmental credibility of the industry are in excess of $0.5 million.

Modelling

In recent years the industry has put significantly greater effort and resources into understanding impacts across the wider ecosystem, rather than just at the farm site scale. This has required a modelling approach backed up by long time-series measurements for validation and calibration, and this approach is ongoing in both the south east and Macquarie Harbour. This modelling is supported by well developed hydrodynamic models overlayed with geochemical and depositional modelling.

How do we manage and respond to our impact on waterway health?

Much of the impact of salmonid farming on waterway health is managed by an extensive set of management controls attached to annual farm licence conditions, and the monitoring and reporting requirements attached to these. For example, there are more than 70 prescribed management controls attached to licence conditions for farming in Macquarie Harbour. Such management controls are often linked to the adaptive management framework that underpins the whole of industry approach to best management practice.

In addition to this, all companies have extensive data collection programs covering all facets of the business and housed in commercially developed databases. Analysis of relevant data helps understand some of the industry's impacts. Data sets can be extracted, supplied to specialist consultancy firms and fed in to more complex modelling software to give further insights.

There has been considerable research effort undertaken in Tasmania aimed at establishing best practice farm management across the whole salmonid farming industry. The adaptive management framework adopted for the ongoing management of the industry underpins the drive for continuous improvement of the industry in Tasmania.

How do we minimise/mitigate our impacts on the waterways?

The industry employs a number of strategies to minimise the impact on waterways. These strategies include, but are not limited to, the following:

- Initiate, participate in and support applied research and collaboration with scientific research institutions such as IMAS, CSIRO and UTAS to better understand the industry's interaction with the environment.
- Maintain contact with leading international research scientists and organisations so that emerging current knowledge can be implemented in our farm management practices.
- Adopt the latest farming infrastructure and monitoring technology if it leads to environmental improvements.
- Continuously review practices and procedures, and change where appropriate, to further reduce impacts on the environment.
- Seek third party independent endorsement/certification that represents international best practice. Third party audit and scrutiny is voluntarily undertaken by industry

participants to aid continuous improvement and provide evidence to a range of stakeholders that the industry is acting responsibly and sustainably.
- Maintain a compliance focus to ensure industry meets regulatory requirements, and where possible operates at and provides information above and beyond the minimum standards required.
- Adopt management practices that will ensure the long term viability of farm sites, such as the development of effective fallowing regimes. Fallowing is the practice of relocating or not re-stocking marine fish cages to allow the sediment below to undergo natural recovery, both geochemically and ecologically, from the impacts of nutrient loading.

Does the environment recover?

An independent IMAS study was conducted in 2002 and replicated in 2012 to assess the long-term recovery of vacated marine farm lease No. 76 in North-West Bay. This was undertaken to determine whether the benthic, visual and physical-chemical conditions were consistent with control site conditions and to what extent the system had recovered. Comparisons were made between data collected one week, 24 months and 13 years after removal of cages from the site. This was one of the earliest farms in the industry and at the time complied with the guidelines for a well sited salmonid farm. The site had been intensively farmed for a period of 10 years during the 1990s and it is now acknowledged within industry that the depth and water movement at this site was not conducive to long term sustainable fish farming. Application of the adaptive management process and research findings saw the cessation of farming in this location in 2000.

The key findings of the study suggested that sediments were subjected to organic enrichment from active farming at the time of removal and that the extent of impact diminished both with time and distance from the sea cage positions. All parameters, except for the benthic community structure, had returned to conditions equivalent to those at the reference site after two years.[7] In 2012, the sediments had recovered and there was no evidence to indicate that farming activity had any permanent impact on the benthic environment.[8] This study supports the view that the impact of salmonid farming on waterway health is **spatial, temporal** and **reversible**.

Involvement in collaborative community projects looking at waterway health

The industry has long been committed to supporting and participating in co-operative studies and projects that provide more information and a better understanding of the marine environment that we operate in. This first commenced with the Huon Healthy Rivers program, initiated in 1996, and is today represented by projects such as INFORMD, Your Marine Values, and D'Entrecasteaux and the Huon collaboration. These projects have produced reports such as '*State of the D'Entrecasteaux Channel and the lower Huon Estuary*

[7] MacLeod, C. K., Mitchell, I. M., Crawford, C. M. and Connell, R. (2002). *Evaluation of sediment recovery after removal of finfish cages from marine farm lease no. 76 (Gunpowder Jetty), North West Bay*. TAFI. Hobart.

[8] MacLeod, C.K., Eriksen, R.S., Davey, A., Kelly, B., and Ross, D.J. (2013). *Long-term Recovery - Review of sediment condition at Marine Farm lease No. 76 (Gun Powder Jetty, North West Bay.* Institute for Marine and Antarctic Studies

2012", "*D'Entrecasteaux Channel and the Lower Huon Estuary inventory of scientific information 2012*' and "*D'Entrecasteaux Channel and Huon collaboration report card 2015".* Note that the inventory draws on 86 scientific data sets accumulated for the region since 1999. Collaborations and data sets like this provide the basis for the implementation of adaptive management and are of value to all users of the waterway.

Ecosystem shift

Perceived changes in the environment are often identified by comparing current observations to unique past events that serve as a baseline for future reference. Often referred to as sliding or shifting baselines, they can change between individuals and generations depending on differing experiences. What is believed to be 'natural' is subconsciously viewed as the state of the environment from one's earliest memory. Therefore, the expectation of what the environment should look like depends on the remembered observations within one's lifetime, changing with each generation.[9] When reconstructing historical circumstances, often the most significant or outstanding events triumph the non-memorable occasions.[10] Therefore, sliding baselines can provide an inadequate measurement for long term, system wide change. This is particularly evident in the marine environment which the vast majority of people only view from above or through a limited exposure. This places unduly increased weighting on marine cues visible from the surface, such as the decline in giant kelp forests.

Giant kelp (*Macrocystis pyrifera*) was once a commonly visible aspect of Tasmanian coastal ecology, in quantities sufficient to support a commercial harvest. Reliant on cold nutrient rich waters, the giant kelp has been in a long term decline on the east and south coasts of Tasmania aligning with the increased influence of the East Australian Current over the past 30 years. This change has been increasingly evident on the east coast and has moved further south as the East Australian Current has influenced further south and persisted in southern regions. While the decline in giant kelp has therefore been observed in parallel with increased fish farming activity over the past 30 years, there has been no scientific evidence that salmonid farming is the cause of the decline in giant kelp and considerable evidence that it is the result of changes in the East Australian Current.

Conclusion

There is a framework in place to manage environmental performance through management controls, robust monitoring, and mitigation strategies. In addition, by continuously improving our modelling and investing in research and development, we are confident that we can continue to improve environmental performance, while contributing to improved understanding of the ocean environment.

[9] Hobday, A.J 2011, *Sliding baselines and shuffling species: implications of climate change for marine conservation*, Marine Ecology, vol. 32, No. 3, pp. 392-403

[10] Bulleri, F, Underwood, A.J, Benedetti-Cecchi, L 2007, *The assessment and interpretation of ecological impacts in human-dominated environments,* Environmental Conservation, Vol. 34, No. 3, pp. 181-182

INFORMATION REQUEST

2. Are existing regulatory arrangements well-targeted and efficient means for managing aquaculture operations and addressing potential environmental impacts? Have regulatory arrangements inhibited the productivity and competitiveness of aquaculture in Australia?

An efficient, predictable and accountable regulatory process is required to operate successfully and to provide the investor confidence necessary to grow a sustainable aquaculture sector in Tasmania. It is also the basis for public confidence that the aquaculture industry in Tasmania is responsible and accountable. The industry considers the current regulatory framework is sufficient to ensure these goals are met.

The industry recognises that government agencies need to adopt rigorous compliance guidelines and develop a culture of consistent, incremental enforcement activity in response to breaches of licence conditions. The section below is an extract from the Tasmanian government submission to the recent senate inquiry (Regulation of the fin-fish aquaculture industry in Tasmania).

Regulation of the Salmonid Aquaculture Industry in Tasmania

Legislation - Marine Farming Operations

Marine salmonid farming operations in Tasmania are primarily managed under the provisions of the Marine Farming Planning Act 1995 and the Living Marine Resources Management Act 1995. The Marine Farming Planning Act 1995 and the Living Marine Resources Management Act 1995 are both components of Tasmania's Resource Management and Planning System which was established in 1994 to achieve sustainable outcomes for the use and development of the State's natural and physical resources. The Resource Management and Planning System comprises a suite of legislation with common objectives for sustainable development.

The purpose and objectives of the Marine Farming Planning Act 1995, which commenced in May 1996, is to achieve well-planned sustainable development of marine farming activities having regard for the need to:

- integrate marine farming activities with other marine uses;
- minimise any adverse impact of marine farming activities;
- set aside areas for activities other than for marine farming activities;
- take account of land uses; and
- take account of the community's right to have an interest in those activities.

The Living Marine Resources Management Act 1995 commenced in 1996 to achieve sustainable management of the State's living marine resources. In relation to salmonid marine farming, the Living Marine Resources Management Act 1995 requires marine farming leaseholders to hold a marine farming licence to farm a species of fish. Marine farming licenses provide the authorisation to a leaseholder to engage in the activity of culturing fish.

In summary, the Marine Farming Planning Act 1995 provides processes to plan for, regulate and determine the occupation of State waters by way of marine farming leases and the Living

Marine Resources Management Act 1995 authorises the activity of marine farming, determining what species may be farmed within a lease area and under what conditions by way of a marine farming licence.

Legislation - Freshwater Salmonid Farming Operations

Currently in Tasmania, all marine salmonid farming operations are reliant on the supply of salmon smolt or rainbow trout from freshwater hatcheries for on-growing at sea. Freshwater salmonid farming operations are regulated through the provisions of the Inland Fisheries Act 1995 for which the Inland Fisheries Service (IFS) has responsibility. The Inland Fisheries Act 1995 requires a person farming fish in inland waters to hold a fish farming licence under Division 3 of that Act.

Legislation - Threatened and Protected Species Interactions

Marine species are listed and protected under various pieces of State legislation. The primary act is the Threatened Species Protection Act 1995. This Act lists a number of marine species including numerous coastal or oceanic bird species, four whale species, three seastar species, the Spotted handfish (*Brachionichthys hirsutus*), the Gunn's screwshell (*Gazameda gunnii*) and the Maugean Skate (*Zearaja maugeana*). The Threatened Species Protection Act 1995 sets out a range of measures to protect listed threatened species and makes it an offence to take a listed species without a permit.

In addition the Wildlife (General) Regulations 2010 (regulations made under the Nature Conservation Act 2002), list Specially Protected or Protected Wildlife. A large number of marine mammals and coastal or oceanic bird species are listed as either Specially Protected or Protected Wildlife. The Fisheries (General and Fees) Regulations 2006 also provides for the protection of a number of fish species. Species protected under these regulations include five shark species (of particular note being the Great White Shark (*Carcharodon carcharias*)), and all handfish of the family Brachionichthyidae (in effect all handfish species that occur in Tasmania). The Nature Conservation Act 2002 and the Threatened Species Protection Act 1995 are also components of the Resource Management and Planning System. Freshwater species are listed and protected under the Threatened Species Protection Act 1995 and the Inland Fisheries Act 1995. There are two species that are potentially impacted by freshwater hatcheries, the Australian grayling (*Prototroctes maraena*) and the giant freshwater crayfish (*Astacopsis gouldi*). The possession or take of these species is prohibited.

Marine farming of finfish – environmental management and regulatory process

Marine farming operations in Tasmania are managed under the provisions of the Marine Farming Planning Act 1995 and the Living Marine Resources Management Act 1995. Figure 1 outlines the environmental management and regulatory process in relation to the development and ongoing operation of a marine farming lease area within a marine farming development plan area.

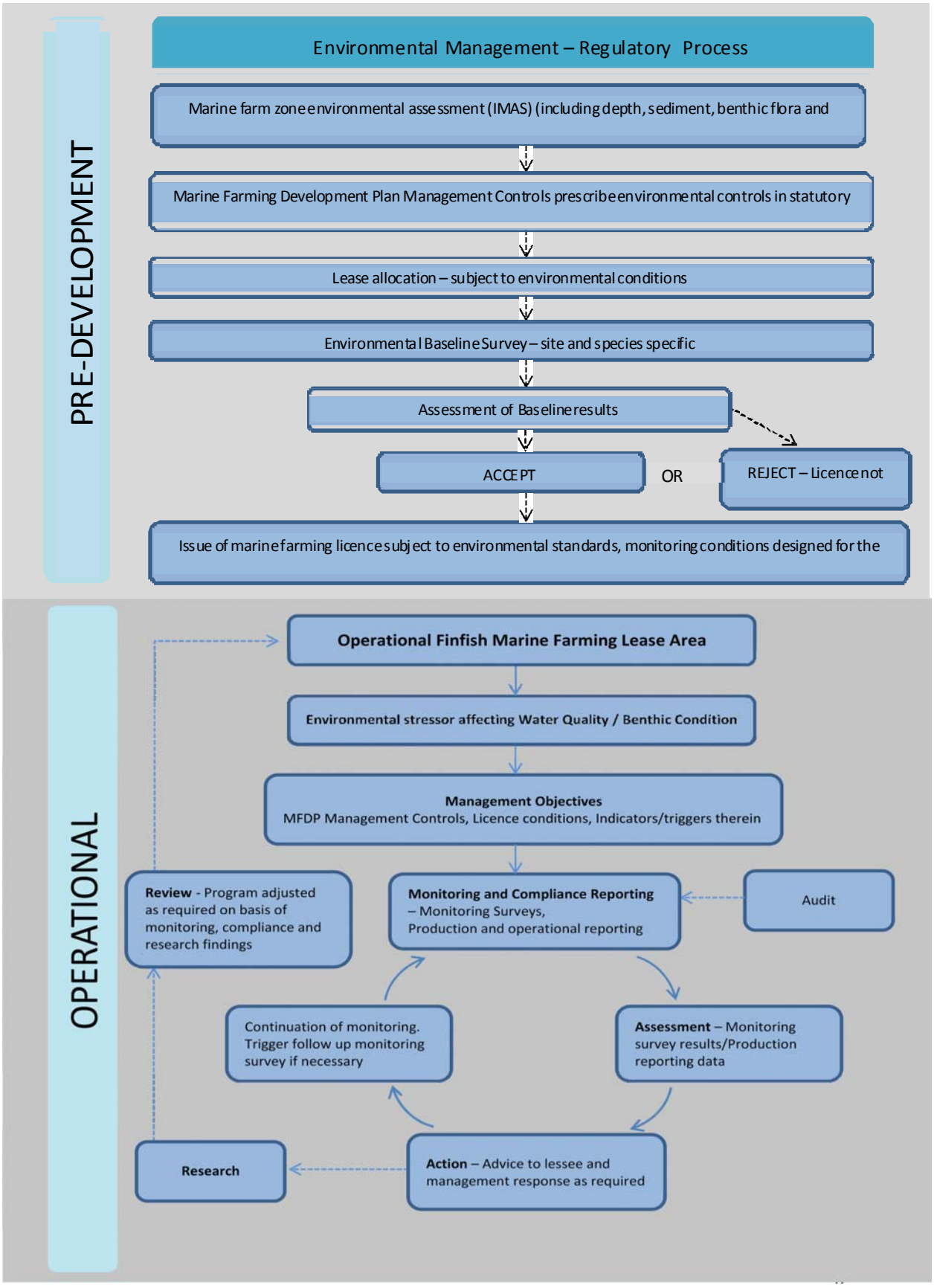


Figure 1: Pre-development and operational components schematic (Adaptive management cycle employed for ongoing environmental management and regulation of operational finfish marine farming lease areas). *Note:* MFDP (Marine Farming Development Plan).

The Marine Farming Planning Act 1995 provides for the preparation of marine farming development plans which contain management controls to manage and mitigate negative effects of marine farming operations. Management controls include provisions relating to environmental monitoring and management of marine farming operations. Management controls contained within marine farming development plan areas cover a range of issues including, but not limited to:

- levels of unacceptable effect;
- nitrogen outputs;
- carrying capacity;
- monitoring requirements;
- chemical usage and reporting;
- waste;
- disease;
- visual effects;
- access and marking;
- odour;
- noise;
- marine farming equipment; and
- predator control.

In establishing a marine farming development plan, or progressing an amendment to a zone or zones within an existing marine farming development plan area, targeted zone assessments are undertaken by the Institute for Marine and Antarctic Studies (IMAS). This environmental survey assesses substrate type, habitat distribution, bathymetry and benthic flora and fauna. Where relevant, specific surveys to target threatened species listed under the Threatened Species Protection Act 1995 or the Environment Protection and Biodiversity Conservation Act 1999 Act are also undertaken.

The Living Marine Resources Management Act 1995 requires marine farming leaseholders to hold a marine farming licence to farm fish (under the Living Marine Resources Management Act 1995 fish include a range of species). A baseline environmental survey must be undertaken prior to the commencement of marine farming operations For example, industry is required to provide a detailed Environmental Impact Statement (EIS) whenever a new farm site is considered or significant modifications are planned for an existing farm site. Much of the information and discussion in these documents centres on potential impacts on waterway health. They therefore provide an extensive data and reference set to the issues raised under these terms of reference. Examples can be seen at the following web site addresses – Trumpeter Bay, Trumpeter Bay EIS ; Lippies Point, Lippies EIS).

Regulatory mechanisms

Tasmania has one of the most comprehensive environmental regulatory and planning frameworks in the world, a global best practice planning process and unmatched levels of

broadscale monitoring[11]. The industry has invested heavily in developing and maintaining comprehensive broadscale water quality monitoring programs which means Tasmania has environmental baselines that can be used to alert regulators and industry to cumulative or far field environmental changes. Some of the important features of the Tasmanian regulatory framework are as follows:

- broadscale water quality monitoring based on hydrodynamic and geochemical modelling that tracks water quality changes over time and provides an early warning of any system wide changes;
- annual benthic compliance surveys based on local conditions and local, current research which ensure that industry do not have irreversible impacts outside their lease areas;
- fish health surveillance programs that detect any emerging or exotic diseases;
- biosecurity frameworks that protect both the health of Tasmanian farmed salmonids and wild marine species;
- extensive siting criteria, a well-developed environmental impact statement (EIS) framework and dedicated aquaculture plan areas that ensure salmonid farms are located in appropriate marine areas with a minimum of environmental and social impact and a maximum economic value to the state; and
- a seal management framework that ensures the humane and ethical treatment of seals interacting with salmonid farms.

In addition, the industry works closely with WorkSafe Tasmania which is the division of the Department of Justice responsible for administering and enforcing laws that regulate work health and safety and worker rehabilitation and compensation. This ensures compliance with the overarching legislation, the *Work Health and Safety Act 2012.*

The salmonid industry also consults with Marine and Safety Tasmania (MAST) to ensure safe operation of vessels and equipment and to ensure that lease siting will not disrupt recreational or commercial boating traffic. MAST is a statutory authority established in 1997 to ensure the safe operation of recreational and commercial vessels, provide and manage marine facilities and manage environmental issues relating to vessels. MAST has four primary functions which are conferred by the *Marine and Safety Authority Act 1997*:

- to ensure the safe operation of vessels;
- to perform the functions delegated to it by the national regulator for commercial vessels, the Australian Maritime Safety Authority;
- to provide and manage marine facilities; and
- to manage environmental issues relating to vessels.

The current system has been proven to be effective: infringement notices have been issued and responded to. For example, marine farming licence conditions state that there must be no significant visual, physicochemical or biological impacts at or extending beyond 35 metre from the boundary of the lease area. If there is a significant impact at the 35 metre compliance

[11] FAO (2009). Environmental impact assessment and monitoring in aquaculture. *FAO Fisheries and Aquaculture Technical Paper 527*. Food and Agriculture Organisation of the United Nations, Rome.

point, the company is advised and asked to implement an appropriate management response. This is called a required management action. The frequency of surveillance is increased to monitor the impact of the response.

Regulatory costs

Tasmanian salmonid farming companies pay some of the highest environmental compliance costs in the world both from a statutory and voluntary perspective. Industry calculations put the cost of compliance at **$0.04/kg of production or $1,720,000 per annum** and increasing.

Industry estimates that costs have increased 100 per cent in the past five years due to increased monitoring, additional staff, independent certification and operational changes to meet certification requirements.

The industry accepts that this is the cost of 'doing business' but industry is also keenly aware that these costs to the industry are a significant impediment to achieving global price competitiveness.

The adequacy of current environmental planning and regulatory mechanisms

An important issue for the industry is the planning and regulatory environment. The legislation and regulations that the industry must comply with are wide and varied, and include Commonwealth, state and local government components. Industry has operated successfully within this framework for 30 years and has driven innovation in and the evolution of a contemporary planning and regulatory environment.

Statutory compliance

The Tasmanian salmonid industry is currently governed by almost 70 Commonwealth and State Acts (listed on pages 6-7 of this submission). These acts and their subordinate regulations serve to regulate and support the responsible development and growth of the industry.

Voluntary commitments

In addition to these statutory obligations the industry participates in or is directed by a number of state and Commonwealth policies and voluntary programs. A prime example of an industry led voluntary program that is internationally recognised and considered progressive by global industry peers is the Tasmanian Salmonid Health Surveillance Program (TSHSP). This is a joint venture between the DPIPWE and the Tasmanian salmonid industry. The program has been in operation for over 20 years and is acknowledged by industry and the Tasmanian and Australian governments as an important means of providing health services to a key sector of primary industry. The program underpins Tasmania's access to markets domestically and internationally.

Initially, the program was comprised of active surveillance and general ('passive') surveillance. However, in recent years the focus of the program has been on general surveillance due to the development of a system capable of the detection and prompt reporting of disease. For the Tasmanian salmonid industry, this is achieved through industry veterinarians and trained fish health technicians who are supported by a laboratory network that provides competent and authoritative findings.

For many years the TSHSP was a stand-alone activity, largely for the purpose of general surveillance. However, a need to reposition the TSHSP has emerged with the intensification and expansion of salmonid production. A fish health area management agreement for Macquarie Harbour has been developed and a formal state-wide integrated Biosecurity Program for the Tasmanian salmonid industry has been developed and ratified (2014). The Biosecurity Program establishes the guiding principles for biosecurity standards, strategies and requirements for salmonid production across Tasmania. The TSHSP has become a defined component of the Biosecurity Program.

INFORMATION REQUEST

3. What, if any, developments have there been in the aquaculture industry since 2004 that the Commission should specifically consider in this Inquiry?

Standards, certification and accreditation

In addition to compliance requirements, the industry invests significant resources annually in third party sustainability certifications. The aim of these standards

> '*is to credibly offer measurable, performance-based requirements that minimize or eliminate the key negative environmental and social impacts of salmonid farming, while permitting the industry to remain economically viable*'[12].

Producers seeking relevant certification are required to comply with numerous standards that cover environmental impacts, fish health and disease management, sustainability of feed ingredients, wildlife management, employee safety and working conditions, transgenic animals, escapes, energy efficiency and biosecurity, as well as the mandatory regulations required by the government. These voluntary standards typically have higher requirements than legislated regulations, but the extra compliance costs involved may be offset by increased production through the reduction of mortality from disease and stress, and increased growth under better environmental conditions [13]. Certified products also have greater market access and can obtain a higher market price.

The industry has been involved in the evolution of aquaculture accreditation programs since their genesis and continues to support their development provided the certification criteria are rigorous and transparent. Criteria must consider environmental outcomes, not just processes – the industry is of the view that merely having an environmental management plan should not be sufficient to satisfy the requirements. Industry participants must demonstrate that the plan has been successfully implemented, is responsive, and is achieving sustainability outcomes.

Tasmanian salmon industry participation in certification schemes

- **Best Aquaculture Practices (BAP) – Van Diemen Aquaculture, Tassal and Petuna**

  http://bap.gaalliance.org/

Best Aquaculture Practices (BAP) is an international, third-party certification system that verifies the environmentally and socially responsible processes under which finfish are produced.

BAP certification standards contain the key elements of responsible aquaculture, such as environmental responsibility, social responsibility, food safety, animal health and welfare, and traceability.

[12] ASC salmon standard. ver. 1.0. Aquaculture Stewardship Council, The Netherlands. 103 pp. Available from http://www.asc-aqua.org/upload/ASC%20Salmon%20Standard_v1.0.pdf (Accessed May, 2015).

[13] Sim-Smith, C.& Forsythe, A, (2013). Comparison of the international regulations and best management practices for marine finfish farming. MPI Technical Paper No: 2013/47. National Institute of Water & Atmospheric Research Ltd

- **Global G.A.P. – Huon Aquaculture**

  http://www.globalgap.org/

The Global G.A.P. Integrated Farm Assurance Standard – Aquaculture Version 4 – is a pre-farm gate standard that covers the whole production process of the certified product from the hatchery until the point of harvest and packing.

The Global G.A.P. Aquaculture Standard sets criteria for legal compliance, for food safety, worker occupational health and safety, animal welfare, and environmental and ecological care. The Global G.A.P. Aquaculture Standard applies to a diversity of fish, crustaceans and molluscs and extends to all hatchery-based farmed species, as well as the passive collection of seedlings in the planktonic phase. It covers the entire production chain, from broodstock, seedlings and feed suppliers to farming, harvesting and processing. Aquaculture producers covered by the standard are also required to source the compound feed used at the aquatic farming and hatchery levels from Global G.A.P. accredited suppliers.

- **Global Salmonid Initiative (GSI) – Huon Aquaculture**

  http://www.globalsalmoninitiative.org/

The Global Salmonid Initiative (GSI) is a global leadership initiative founded and lead by salmonid producers dedicated to determining the best measures by which our sector can grow sustainably. Salmonid aquaculture is the world's fastest growing food production system.

The GSI has four main objectives:

- Bring together global farmed salmonid producers and other industry stakeholders to strive towards significantly improving the sustainability of salmonid farming.
- Cooperation to continue to outperform other sources of animal protein in terms of contribution to human health, environmental responsibility, and efficient feed conversion rate, and to be widely recognized for this accomplishment.
- Achieve the highest standards of corporate citizenship in the regions where members operate.
- Translate environmental and social sustainability into greater economic sustainability through enhanced social license and market acceptance.

- **Aquaculture Stewardship Council (ASC) – Tassal**

  http://www.asc-aqua.org/

The ASC program promotes industry best practice to minimise the environmental and social footprint of commercial aquaculture. Through its consumer label, the ASC promotes certified responsibly farmed products in the marketplace.

The ASC program is:

- credible – ASC standards are developed and implemented according to ISEAL guidelines (ISEAL Alliance is the global membership association for sustainability

standards) - which are multi-stakeholder, transparent, and incorporating science-based performance metrics;
- meaningful – including science-based performance metrics, the requirements in the standards are realistic, measurable and auditable; and
- effective – a globally recognised, market-oriented program that aims to promote meaningful improvements in aquaculture production in a credible and cost efficient way that adds real value to producers and buyers of certified products.

- **Global Reporting Initiative (GRI) – Tassal**

  https://www.globalreporting.org/

GRI promotes the use of sustainability reporting as a way for organizations to become more sustainable and contribute to sustainable development. GRI's Sustainability Reporting Framework is a reporting system that enables all companies and organizations to measure, understand and communicate this information. GRI's mission is to make sustainability reporting standard practice; one which helps to promote and manage change towards a sustainable global economy.

The industry is also compliant with a myriad of quality and safety certification schemes including, but not limited to, the following:

	Auditing Body	**Main purpose**	**Audit Frequency**
DAFF (formerly AQIS)	DA Biosecurity	Export compliance	Dependent on site rating and previous audit results – between six and nine months All facilities currently have an A rating
ISO 9001:2008	Societe Generale de Surveillance (SGS)	International standard	Annual surveillance/ three year recertification
HACCP	SGS	International Standard	Annual recertification/ six monthly surveillance (processing sites only)
SQF Code (Safe Quality Food) Level 3	SGS	International Standard/ Customer requirement	Annual recertification
WQA	SGS	Customer requirement	Six monthly
HALAL	Halal Australia	Sell product with Halal approval	Annual desk audit
KOSHER	Kosher Australia	Sell product with Kosher approval	Annual audit
AS 4801	TQCS	Australian Standard	Annual audit rotation basis/ three yearly recertification
OHS AS 18001:2007	TQCS	International standard	Annual audit rotation basis/ three yearly recertification
Woolworths Quality Assurance Program (WQA)	Woolworths Quality Assurance Program (WQA)	Compliance with WQA Version 8 – Manufactured Foods.	Annual audit

Additional information on all the industry sustainability and safety certification schemes, and compliance with, can be found at the following locations:

Huon Aquaculture

Website – http://www.huonaqua.com.au/

Dashboard – http://dashboard.huonaqua.com.au/

Petuna

Website – http://www.petuna.com.au/aquaculture/

Reports – http://www.petuna.com.au/wp/wp-content/themes/petuna/img/Petuna-Sustainable-Living-Book-SML.pdf

Tassal

Website – http://www.tassal.com.au/

Dashboard – http://www.tassal.com.au/sustainability/asc-dashboard/

Reports – http://www.tassal.com.au/sustainability/our-sustainability-reports/

INFORMATION REQUEST

4. Are there factors outside the regulatory environment that have significantly limited the productivity and competitiveness of aquaculture production in Australia?

Removal of the current loophole in Country of Origin labelling by extending country of origin laws for seafood to the food service sector.

TSGA has a clear policy for the mandatory labelling of seafood to ensure that consumers are able to make informed choices about their seafood. The current absence of effective labelling requirements for seafood at food service level compromises consumer choice and undermines the Australian industry.

Specifically, TSGA seeks a commitment to remove the current loophole in Country of Origin Labelling by extending country of origin laws to seafood in the food service sector.

Economic growth and employment to enhance productivity and competitiveness

An available and appropriately skilled workforce is vital to underpinning a viable and economically sustainable fishing industry. There are recognised significant labour and skills shortages in the fishing industry – especially in regional Australia – that impact industry productivity and output. For the fishing industry, overseas workers are a key component of the workforce. The retention of the Temporary Skilled Work (SC 457), Working Holiday (SC 417), and Work and Holiday (SC 462) visas; and extension of the guest worker schemes to include the professional fishing industry are vital to providing an adequate workforce for our seafood-producing industries.

Employment costs should be subsidised for employment in regional areas. TSGA is supportive of increasing the length of time in which holidaying backpackers can work in remote/regional areas around Australia, and for the seasonal workers program to be expanded to include more countries.

TSGA seeks a commitment to find ways to increase the inclusiveness and opportunities for indigenous Australians to be part of the growth and development opportunities.

INFORMATION REQUEST

5. What are the major challenges and opportunities facing the aquaculture industry over the next 20 years?

Secure resource access, both in terms of access to areas and access to seafood species.

Security of resource access (access both to areas and species) is of fundamental importance to the TSGA.

TSGA believes the only way to prevent situations occurring which negatively impact the industry's resource access in future is to elevate the importance of fisheries and aquaculture legislation – relative to competing demands from environmental and recreational fishing and other interests – to ensure the needs of the seafood industry and seafood consumers in relation to resource access are met.

Factors impinging on access to seafood include displacement of fishing operations by port development, recreational fishing havens, offshore oil and gas exploration and production, and marine reserves.

Restoration of public faith in fisheries management, particularly by supporting initiatives that promote the science underpinning Australia's sustainable seafood production.

Community concerns over the environmental impacts and sustainability of seafood production in Australia are likely to have been heightened by negative campaigns and Government decisions that fuel these negative perceptions (i.e. by Government taking action based on perceptions rather than science results in the popular acceptance that perception is fact.)

The TSGA requires continued support from the Commonwealth Government to answer the criticism of fisheries management, rather than allowing unjustified criticism to stand uncorrected.

Biosecurity

Australia remains relatively free of exotic aquatic pests and diseases, a key advantage for Australian seafood producers, but this status is increasingly challenged by the globalisation of trade.

TSGA recognises that adequate funding is required to ensure that pre-border biosecurity risk and post-border responses are maintained at appropriate levels to protect Australian aquaculture and fisheries.

Continued Government support for the Fisheries Research & Development Corporation (FRDC)

TSGA continues to strongly support the role of FRDC. Ongoing Commonwealth support for the public good aspect of work undertaken by the FRDC; and continued support for the current model used to provide funds to the FRDC, including maintenance of the current arrangements for control and management of funds by FRDC is essential if the aquaculture industry is to develop to its full potential in Australia.

INFORMATION REQUEST

6. Are there technological solutions to the potential environmental problems associated with aquaculture? Where and how has the industry invested to develop solutions? To what extent, and under what funding arrangements, should governments be involved in developing innovative solutions?

There is a growing range of technological solutions seeking to address potential environmental solutions associated with aquaculture. The Tasmanian salmon industry has since it's inception researched and applied the latest technology to problems that it has faced – and often these have been locally initiated responses and locally developed technical solutions. The industry has invested significantly in applied research to solve such problems and has been an active user and supporter of both state and federally funded initiatives to further industry development.

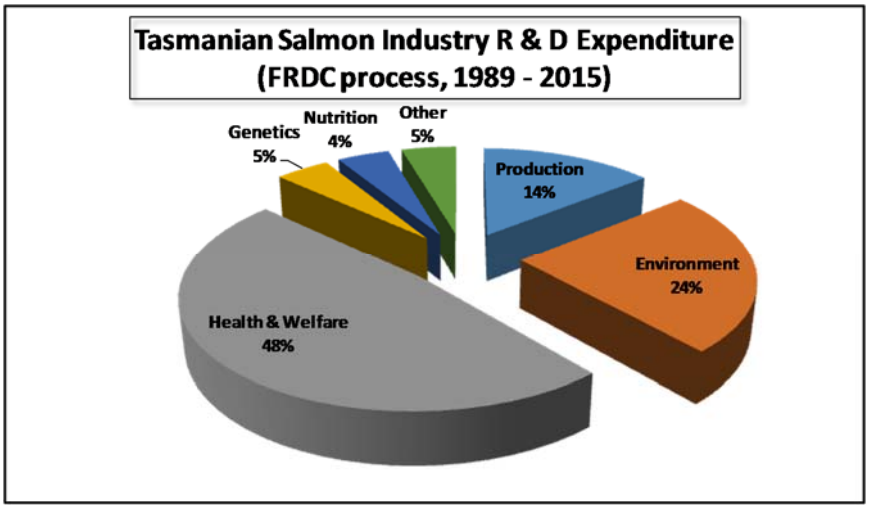
Support and funding for research to understand our impact

The Tasmanian salmonid farming industry has a long standing commitment to research and development. The *Saltwater Salmonid Culture Act 1985* guaranteed that at least 25 per cent of annual smolt cost would be invested in research and development to support the emerging industry, and this was in place until 1995. The industry has contributed in excess of $200 million in Australian Taxation Office (ATO) recognised research expenditure to a broad range of topics over the last 30 years. Further contributions from the Fisheries Research Development Corporation (FRDC), supportive research bodies and organisations and businesses associated with the industry add an additional $75 million.

This equates to a total industry research and development spend in excess of **$275 million.**

The total spend through the FRDC funding mechanism (1989 – 2015) is estimated at $48 million (including in-kind contributions from research organisations and industry). This has been in a number of key program areas including health and welfare, environment, production, nutrition and genetics. The environment portfolio of projects (19 in total) accounts for 24 per cent of expenditure (see Figure 2).

Figure 2. Tasmanian salmonid industry R & D expenditure by tactical program.



INFORMATION REQUEST

7. Is a regulatory framework required for aquaculture in Commonwealth waters?

The Australian Government has a limited regulatory role in aquaculture. Aquaculture operations are undertaken in state and territory waters and traditionally there has been no demand for a regulatory framework in place for aquaculture in Commonwealth waters. However, whilst not in Commonwealth waters, the Tasmanian salmon farming industry has been trialling "offshore farming" to the extent of one company setting up a lease at an exposed site off the East coast of Bruny Island in Tasmania. The site has already experienced (and survived) swells of some 7 metres; one of the tests which will give the industry experience and confidence to venture further off-shore perhaps into Commonwealth waters.