Area Management Agreement

for salmonid aquaculture in Macquarie Harbour

between

Huon Aquaculture Group Pty Ltd
Petuna Aquaculture Pty Ltd
Tassal Operations Pty Ltd

Schedule 3: Macquarie Harbour Environmental Management Plan

Version 1.0
December 2012
## Version History

<table>
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<th>Version #</th>
<th>Date adopted</th>
<th>Substantive amendments to previous version</th>
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<td>December 2012</td>
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1 Background

1.1 Purpose and scope

The purpose of this plan is to support the Area Management Agreement (AMA) for salmonid aquaculture in Macquarie Harbour. All companies in the harbour depend on sustainable development and use of the harbour’s marine environment.

The basis for the sustainable management of the industry in the harbour is to be provided through rigorous monitoring, firstly for harbour-wide effects and secondly for between and within fish farm effects. This acknowledges that there will be a gradual increase in overall production in the harbour and that the presently modelled maximum or final production scenario will not be reached within the first five years of operation of the new lease areas. The results obtained from the monitoring have been and will continue to be the basis for modelling the effects of farming operations on both the harbour-wide and fish farm scales, and will enable comparison to future “trigger levels” which in turn will be based on the best possible science available at the time.

The companies (Tassal, Huon, Petuna) are participating in a harbour wide Fish Farm Environmental Management Program (FFEMP) and a harbour wide Fish Health Management Program (FHMP). These programs will underpin the responsible and sustainable use of the harbour for salmon and rainbow trout production. Transparency and cooperation are key principles of the agreement and underpin the success of the plans.

All development will be managed strictly according to adaptive management principles through the FHMP and the FFEMP.

Stakeholder input to the development and ongoing feedback on our operations and potential impacts will provide important direction for this plan. An Industry coordinated Community Engagement Group consisting of representatives of the west coast community, the individual fish farm companies and the Tasmanian Salmonid Growers Association (TSGA) will be formed. The purpose of the forum will be to share information on the interactions of salmon farming with the community on a regular basis. A core group of members representing the broader interest of community will be invited to meet twice per year to inform the industry of community concerns/feedback regarding salmon farming operations.

The terms of reference for the group’s activities will be drafted at the initial meeting.

This Plan will be modified on an ongoing basis as specifics for monitoring plans are developed and information comes to hand from modelling and monitoring.

1.2 Structure

The FFEMP will be the responsibility of the AMA Environmental Working Group (EWG) composed of one representative from each company with a named alternate. It is intended that the day-to-day management of the plan will be undertaken by an appointed officer through the TSGA. He/she will collate and disseminate information on a monthly basis to the EWG and to the Fish Health Working Group (FHWG).

The EWG will meet every six months and within a month submit to the AMA Management
Group (AMAMG) a brief environmental report making clear any environmental health issues of note. The EWG will, at least on an annual basis review all environmental data in consultation with any relevant third party provider and the FHWG and prepare a more detailed annual environmental report for distribution to each Party, taking care to present information in a way that does not allow identification of any company. In addition, the EWG and AMAMG will prepare an annual environmental management report that satisfies compliance conditions, for submission to government.

The EWG will present any relevant information to the AMAMG based on ad hoc and/or the half-yearly environmental reports. The AMAMG may then make recommendations to the AMA CEO committee.

The AMAMG will review and revise all environmental monitoring protocols at least annually.

1.3 Ecologically-based Management

Comprehensive regulatory and management controls will be imposed by Government to ensure sustainable development. The parties to the AMA propose further industry agreed best practice protocols and agreements to ensure sustainable operations with minimal and acceptable environmental and stakeholder effects. This FFEMP is designed to support an ecologically based management approach that will be supported by an adaptive management agreement outlined in the MH AMA.

1.4 The Adaptive Management process

Adaptive management is a structured, iterative process of optimal decision making using the best science available with an aim to further improve our knowledge of the system over time using comprehensive monitoring (see Figure 1). In this way, decision making simultaneously maximises one or more resource objectives and, either passively or actively, accrues information (e.g., by monitoring and modelling through fluctuating system conditions) needed to improve future management. Through adaptive management rigorous control can be applied that assures sustainable operation and development.

Adaptive management is a tool which should be used not only to change a system, but also to learn about the system (Holling 1978). Because adaptive management is based on a learning process, it improves long-run management outcomes. The challenge in using an adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current knowledge (Stankey and Allen 2009).

The achievement of Adaptive Management objectives requires an open management process which seeks to include past, present and future stakeholders. Adaptive management needs to at least maintain political openness, but usually aims to create it. Adaptive management must therefore be a scientific and social process.

At the core of the Adaptive Management process proposed for the harbour is a detailed and targeted environmental monitoring program and a whole of harbour environmental predictive model. An industry driven environmental monitoring strategy aimed at
incorporating both company-specific and statutory monitoring requirements is being developed in order to optimise future production management and sustainability assessment within the harbour.

Figure 1   Example of an Adaptive Management Cycle as provided by CSIRO (reference http://www.cmar.csiro.au/research/mse/)

These processes will focus on addressing the main risks of the proposed expansion to the wider aquatic environment and farmed fish (fish health) as production increases over the next five years. The ultimate aim of the adaptive management program is to monitor the gradual production increase over time and increase knowledge in relation to the sustainability and feasibility of the proposed amendment. Monitoring any potential adverse environmental effects will be associated with the application of relevant mitigation measures based on the severity of the observed impacts.

Adaptive Management by its nature provides for flexibility, for example:

- sampling frequency can be targeted to high risk periods
- some parameters may be replaced by others, and/or new ones added
- some parameters may be removed if they no longer reflect an element of risk
- the relevance of survey sites may also change with time and some may need to be created, replaced or moved.

As a general rule, monitoring is carried out not simply to accumulate a wealth of data but rather to identify and tackle specific risks and uncertainties.

Through consultation with the regulators, relevant experts, modellers and community stakeholders and taking into account the information provided through the modelling accompanying this EIS the broad environmental risks associated with fish farming in the
harbour have been listed in order to inform the design of the environmental monitoring program. The risks are seen as being managed by the adaptive management process with continued long-term stakeholder involvement. The following risks have been identified.

Harbour wide:

- that the farms have a "significant effect" outside the lease area. Examples include but are not restricted to eutrophication and the particular requirements of areas such as the Tasmanian Wilderness World Heritage Area and endangered/threatened species
- that the social licence to operate is jeopardised by not maintaining the water quality and general ecology of the harbour and surrounding area, and negatively impacting the local community and other industries in the region.

Fish farms:

- that neighbouring leases will affect the quality of the water flowing through adjacent marine farming lease areas
- that environmental conditions may have a synergistic effect on, or have precipitated a fish health event
- that eutrophication of the overall water body will affect water quality on the farms
- that flood conditions in the King River may cause a plume that might influence water quality in the fish farming area.

These risks drive both the strategies (modelling/limits) and implementation plans (environmental monitoring program) of the Adaptive Management process.

1.5 Existing regulatory environmental management and monitoring

The marine farming industry in Tasmania is regulated by the Department of Primary Industries, Parks, Water and Environment (DPIPWE) under the Marine Farming Planning Act 1995 (MFPA) and the Living Marine Resources Management Act 1995 (LMRMA).

There are various steps to the regulatory environmental assessment and management process and these are outlined in Figure 2. Research outputs from service providers such as the Institute for Marine and Antarctic Studies (IMAS) are critical to this process as these assist in the ongoing refinement of management strategies.

Prior to commencing marine farming operations on lease areas, leaseholders are required to collect baseline environmental data on sediment biology, chemistry, current flow and habitat characteristics within and outside lease areas at various compliance and control sites. A comprehensive overview of baseline environmental data collected from the Macquarie Harbour Marine Farming Development Plan (MFDP) for the period 1997-2002 is provided in DPIPWE (2004) and is available at http://www.dpiw.tas.gov.au.

Management controls within the Macquarie Harbour Marine Farming Development Plan October 2005 require all marine farming leaseholders to comply with an environmental monitoring program as prescribed in marine farming licence conditions.
Marine farming licences are issued to lease holders on an annual basis. Licence conditions specify environmental standards, recording and reporting requirements that are dependent on the species being licensed. For finfish licence holders, production data must either be reported or made available for audit on request. Production data can include information on feed, smolt inputs, production planning and food conversion ratios and this can be used in conjunction with other environmental monitoring data to assist in site specific or regional management of sustainability issues across the MFDP area.

In addition to production related reporting, licence holders must also undertake underwater video surveys to assess sediment health either 12 monthly or in accordance with their stocking and fallowing regimes (in consultation with DPIPWE).

Farms have been required to participate in this benthic monitoring program since 1997 in order to monitor compliance against licence conditions and management controls specific to benthic impacts.

The program has led to the compilation of a comprehensive, area-specific dataset, providing information on environmental conditions within marine farming lease areas, at compliance sites 35 m from the lease boundary and control sites. This information has been used to assist in the adaptive management of regulatory monitoring.

The results of monitoring in finfish lease areas around the State have confirmed that pen positioning, stocking duration and intensity are the major factors affecting detectable impacts on the benthos. Current flow is typically low and survey assessments have revealed that visible benthic impacts are localised, with solid particulate waste settlement forming distinct footprint zones directly under pens.

Unacceptable impacts when detected through monitoring can be broken down into two main categories; any visible farm derived impact at a compliance site 35 m outside the lease boundary, or any significant visual impact within the lease area. These impacts are largely due to either or both of the following occurring on a lease:

- detectable impact at a 35 m compliance point - poor pen positioning leading to the presence of a pen footprint at a compliance point; and/or
- significant impact within the lease area - the cumulative impact of overfeeding stock and or stocking a single pen bay for an extended period of time. This leads to excessive feed and faecal deposition, deterioration of sediment health and eventual spontaneous gas bubbling from sediments.

In cases where a breach of licence conditions is detected as a result of these surveys, immediate action can be taken to ascertain the level and extent of the breach and the cause of the specific problem. DPIPWE can then require changes to the management of the lease and where relevant, stipulate an increased frequency and intensity of monitoring to assess the rate of recovery of an impacted site. This program employs adaptive management principles, enabling performance based monitoring for individual lease areas, with the frequency and intensity of monitoring surveys being adjusted according to the level of compliance and monitoring history of individual farm sites.
Figure 2  Steps involved in the environmental assessment and management of a finfish marine farming in Tasmania

1.6 Existing industry-based environmental management and monitoring

Environmental Monitoring

Fish farms also undertake environmental monitoring around all leases. In the main the information is used to assess feeding rates, and as background information aiding in the assessment of fish behaviour, fish health and mortality rates. This information provides a very significant part of the background data for the future revisions to the fish
farm/harbour modelling. This information is also a critical part of the dataset required by the Fish Health Management Plan (FHMP).

The list of variables includes:

- Dissolved Oxygen - measured either at specific times each day or with continuous recording probes at some sites.
- Temperature - as for Dissolved Oxygen
- Salinity - as for Dissolved Oxygen
- Phytoplankton - both events driven – i.e. fish mortalities, water discoloration, etc. – and through a regular sampling program (frequency determined by season)
- Water chemistry - events driven – i.e. fish mortalities, water discoloration, etc.
- Meteorological data – daily, accessed through websites to determine operations for the day.
- Net Fouling - divers provide a score every dive during spring and summer on which net cleaning is based.
- Excess feeding - video monitoring under pens to assess build up of organic matter.
- Seal interactions - ongoing recording of seal interactions around the leases, counts of seals, general counts of seals entering cages, etc.

Petuna has conducted a comprehensive environmental assessment of their marine farming lease areas on a four monthly basis, engaging the scientific expertise of DHI Malaysia. These assessments cover parameters relating to water quality and impacts to the benthic environment and feed back into a specifically developed hydrodynamic model that allows adaptive management processes to be applied to Petuna aquaculture sites in Macquarie Harbour. Since May 2011 this research has now been amalgamated between the three companies in the overall monitoring program to support the on-going modelling of the harbour.

**Environmental Management Systems**

All fish farms operating under the AMA are currently implementing and developing company specific Environmental Management Systems although each is employing a different management and/or accreditation framework.

The Farms have current documented procedures for the installation and maintenance of their marine farming systems as well as documented procedures for the day to day running of all marine farming lease areas. All employees and contractors working on aquaculture leases are fully trained and inducted.

Tassal is demonstrating its commitment to environmental and social sustainability through the development of its Environmental and Sustainability department and the creation of a Head of Sustainability (HOS) position which sits within the Executive Team. The
Sustainability Team led by the HOS consists of an Environmental and Sustainability Manager, Senior Environmental Officer, Seal Management Officer and a Community Relations Coordinator, Tassal also works closely with a number of environmental specialists and local researchers.

As a family run ‘local’ company, Huon bases its environmental responsibilities both on sustainable expansion of its operations and working closely with the local community to promote understanding and awareness of environmental issues associated with the fish farming industry. Environmental Management is undertaken primarily on a site by site basis and is directed through the specific site manager and or General Operations Manager for that field of operations (e.g. Processing, Fish Farm Operations, etc.). Huon contracts much of the design of the land operations waste facilities to independent consultants, but takes on the management of those systems through its own trained personnel. General Environmental management of marine farms and the leases is overseen by a technically trained Management group which includes Veterinarians, Biologists but most importantly collectively has more than 100 years experience in water quality monitoring and research, and fish biology.

Tassal has recently implemented and Huon are in the process of implementing their own respective Environmental Management Systems (EMS) which are based on the ISO14001 environmental management framework. These EMS’s are being integrated with the existing OH&S and Quality Management Systems. They will be audited, continuous improvement systems that will rely on compliance and best practice for certification.

The respective EMS’s contain components to educate current and future staff on environmental issues and procedures relating to aquaculture operations in Tasmania. Both companies also have a site EMS Committee (part of the company’s regional management process) representative allocated to the Region who is responsible for the site specific implementation of their company’s EMS.

Tassal has undertaken the development and implementation of an ISO-14001 environmental management system for several reasons; firstly to support a work culture that values and prioritises good environmental practice as part of its day to day operations, to support a disciplined internal approach to environmental reporting and continuous improvement and to track and support environmental compliance.

Petuna is currently undertaking due diligence for Global Aquaculture Alliance (GAA) certification. GAA is a leading international organisation dedicated to advancing environmentally and socially responsible aquaculture and a safe supply of seafood to meet growing world food needs. GAA encourages the use of responsible aquaculture practices.
2 Modelling

The model combines all previous credible historical environmental data for the harbour with seasonal data for 2010 and 2011 for its calibration. Further iterations of the model are planned when data becomes available from the monthly water quality trigger levels assessment, the DHI model calibration surveys (early 2013) described in more detail below, and the lease baseline surveys.

The further refinement of the model will provide information to support the setting of water quality trigger levels and further improve understanding of the hydrodynamic and ecological processes including a better understanding of the deeper water layers in the harbour.

The Farms have provided stocking and production estimates for the calibration period and have also provided a number of hypothetical and realistic stocking/production scenarios for testing the model and understanding those production/stocking levels that might have a significant effect either on a harbour wide scale or between lease areas. From these model runs the maximum production scenario (termed final model scenario) was chosen on the basis of the principle objectives of the Adaptive Management process, making the following assumptions:

- that change in nutrient and dissolved oxygen levels attributable to the proposed marine farming activities will not have an irreversible negative effect on threatened species or the ecology of the harbour or Tasmanian Wilderness World Heritage Area
- that there is minimal risk that the water quality in any one lease area could affect that of its neighbour, and
- that there is minimal risk that the modelled stocking densities and biomass levels within a lease area will result in negative effects on fish health within that lease area.

The final model scenario indicates a maximum sustainable production level that meets the principle adaptive management objectives described above.

As such it represents an increase of between 3-4 times current production levels which, it is anticipated, will take five years or more to reach. Thirty five T ha\(^{-1}\) is a peak for any individual company suggested for the harbour management: this suggestion again is taking a conservative and precautionary approach. It is important to note that it is the average biomass for the harbour that is the key figure – not the short term peaks on individual farms that underpin that overall average. Average densities in the final model scenario are 8-15 kg m\(^{-3}\) across all the companies. The Parties also agree that, whilst complying with the individual peak pen stocking maximum of 15 kg m\(^{-3}\), the maximum permissible stocking density can be extended for up to 40% of the pens of the current harvest year class biomass of salmonid fish (inclusive of those pens already harvested) to a maximum of 17 kg m\(^{-3}\) at any one time, as long as the average for the total number of nets being held on the applicable sites does not exceed 15 kg m\(^{-3}\).
These limits are implemented through Management Controls contained in the Marine Faming Development Plan for average maximum standing biomass for any single company across all of its leased and subleased areas (refer to Appendix for resulting controls and licence conditions).

Initially the modelling has been employed to predict sustainable stocking rates based on the increase in lease area. As part of the ongoing adaptive management process and continuing development of the FFEMP, the AMA Management Group (Fish health and environment) will use the model as a tool to:

- enable a review of the ongoing monitoring results (calibration and then later validation) and place them in context with modelled expectations (see Table 1 below)
- enable proposed future management strategies to be tested on both a fish farm lease and harbour wide basis so as to ensure that the companies party to the AMA can base their decision making on predictable sustainable outcomes
- continue to assist in identifying harbour wide parameters for monitoring into the future and for which “trigger” values may be defined to provide further assurance of the sustainable nature of the development to industry, regulators and the community.
Table 1  Timeline and milestones for harbour-based monitoring and modelling: regulatory and FFEMP

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tbody>
<tr>
<td>- Monthly sampling to determine background levels and to assist in trigger level determination</td>
<td></td>
<td></td>
<td>FINISHED OCT</td>
<td>Review as part of FFEMP</td>
</tr>
<tr>
<td>- Harbour wide (incl. in vicinity to fish farms) regulatory water quality/benthic monitoring and farm based monitoring</td>
<td></td>
<td></td>
<td>START OCT</td>
<td>Ongoing with regular review</td>
</tr>
<tr>
<td>- Calibration specific farm and harbour wide sampling - followed by Model Calibration (particularly to better understand bottom waters)</td>
<td></td>
<td>FINISHED MAR</td>
<td>CALIBRATE MODEL</td>
<td>Review as part of FFEMP</td>
</tr>
<tr>
<td>- Validation of calibrated model</td>
<td></td>
<td>START DATA SET AT SMOLT INPUT</td>
<td>Ongoing observational monitoring through cycle</td>
<td>FINISHED HARVEST - VALIDATE</td>
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Version 1.0: November 2012
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<thead>
<tr>
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<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tr>
<td></td>
<td>summer</td>
<td>autumn</td>
<td>winter</td>
<td>spring</td>
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<tr>
<td>Research into harbour processes (i.e. Remineralisation of sediments)</td>
<td>Draft project and target funding</td>
<td>Commence Project?</td>
<td>Finish project?</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>START</td>
<td></td>
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</tr>
<tr>
<td>Organise and direct a baseline survey for Macro-algae. Participate on</td>
<td>Draft project and target funding</td>
<td></td>
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<td>any resulting on-going monitoring.</td>
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<tr>
<td></td>
<td>START?</td>
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<td></td>
</tr>
<tr>
<td>Co-operation in baseline survey and possible on-going monitoring of</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Maugean Skate</td>
<td></td>
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<td></td>
<td>FINISHED MAY</td>
<td>ADOPT IF AGREED</td>
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<tr>
<td>Review Decision Support Systems (DSS)</td>
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<tr>
<td></td>
<td>JUN</td>
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<tr>
<td>Establish community based liaison group</td>
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</table>

Ongoing observational monitoring

Ongoing use of DSS for farm management, adaptive management forecasting and modelling

Ongoing
3 Monitoring program

The program initially seeks to address the requirements listed in Table 1 above. In the long term the program is designed around the management objectives (industry, regulatory and social) for the harbour as described in Table 2 below and in order to address the risks identified on both the harbour wide and fish farm scales as described above.

In addition to the limits to stocking of fish in the harbour as defined through modelling, there is a need for directly measurable or monitored limits (termed “trigger” values) for environmental parameters of concern against which the monitoring program for the harbour can be assessed. Ultimately “trigger” limits, requiring specific action will be built into the adaptive management process. Relevant physical, chemical and biological properties of the harbour need to be monitored and evaluated so that meaningful trigger levels for parameters or indicators can be established. This will enable the Planning authority to determine whether increases above triggers are attributable to the proposed activities and implement appropriate management responses. When sufficient data is not available to provide the “trigger” limits based on a thorough knowledge of the harbour then national/regional guidelines (ANZECC) may possibly be used to define “triggers”, and international guidelines may also have relevance, e.g., US EPA guidelines and limits. However, Macquarie Harbour does certainly not conform to a typical SE Australian estuary or to the SE Australian coastal waters and therefore reliable indicators will be more appropriately defined as a result of 12 months of ongoing monitoring of the harbour as described below.

The detailed basis (refer also to Table 2) for monitoring is presently defined as follows.

Year 1 (Sept 2011-Sept 2012)

- Provide the background/present baseline environmental data for the harbour so as to develop appropriate harbour specific guideline levels in respect to a range of water quality parameters, e.g., nitrate, DO and others. For this sampling needs to be undertaken once a month over a one year period. From this information trigger levels for significant parameters will be chosen against which stocking management responses can be enacted.

- Recalibration of the model from both the DHI model calibration surveys and the water quality trigger level assessment.

- Carry out all the regulatory baseline and on-going requirements (as specified under management controls and licence conditions).

- Provide baseline background information on the distribution of macro-algae.

- Collaborate in providing baseline background information on the distribution of the Maugean skate in the harbour.
<table>
<thead>
<tr>
<th>Issue/management objective</th>
<th>Water Quality</th>
<th>Benthos</th>
<th>General Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor and evaluate the effects of farmed stock on water quality/benthos within the lease area</td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
</tr>
<tr>
<td>Monitor and evaluate the effects of ambient environmental conditions on the health of farmed stock within the lease area</td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
</tr>
<tr>
<td>Monitor and evaluate the effects of farmed stock on the wider harbour environment, World Heritage Area and adjoining lease areas.***</td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
<td><strong>x</strong> <strong>x</strong></td>
</tr>
<tr>
<td>Monitor oxygen, phytoplankton, escapees</td>
<td><strong>x</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submit standardised data to the AMA database and provide timely reporting to the AMA Management Group</td>
<td><strong>x</strong></td>
<td><strong>x</strong></td>
<td><strong>x</strong> <strong>x</strong> <strong>x</strong> <strong>x</strong></td>
</tr>
</tbody>
</table>

* Statutory requirement forming part of the regulatory monitoring program
** This monitoring will also be consistent with the Fish Health Management Plan
*** Includes components identified as contributing to the industry social licence to operate in the harbour, e.g. macro-algae survey and monitoring program.
Subsequent Years (expected to be modified through the Adaptive Management Process)

- Carry out all the regulatory on-going environmental monitoring requirements, e.g. video assessment of the substrate (as specified under management controls and licence conditions).

- Continue to collect water quality data in the vicinity of the fish farms and harbour wide to assess any measured change(s) against “trigger” levels (as specified in marine farming licence conditions) and as background data for any subsequent modelling exercises.

- Provide further background information to harbour processes, e.g. re-mineralisation of the sediments, through funded research.

- The Proponent will conduct a full validation of the model when the stocking rate (peak T/ha) of fish in the harbour has increased at least 100% above the 2010 levels, most likely in the Autumn/Winter of 2014, utilising production input information and observational monitoring data. Outputs will be considered in relation to background levels and will be used by the Proponent to inform future site management planning and regulators to assist assessment of harbour assimilative capacity. These exercises would be conducted at this time of year given that it would follow the peak biomass and production output period, expected to occur in the summer.

- Monitor macro-algae in the harbour as appropriate and as determined from the results of the baseline study.

- Co-operate in monitoring the status of the Maugean skate as appropriate and as determined from the results of the baseline study.

- Co-operate in furthering our understanding of sedimentary processes in the harbour.

### 3.1 Harbour-wide monitoring

For ongoing model calibration, water column and sediment sampling at a minimum of 15 sites covering both the farm (local) and Harbour (regional) scale (Figure 3) has been conducted in December 2010, May 2011, September 2011 and December 2011 and will be conducted in February 2012. Additional sites chosen from the white dashed regions indicated in Figure 3 are also being monitored for the next 12 months (Oct 11 to Oct 12) to aid in establishing background data for harbour specific trigger level determination.

The sampling data from the specific calibration sites and others included in the harbour wide monthly sampling program will be used to re-calibrate/rationalise the existing ecological model used in the EIS with additional contemporary data partially replacing some of the EPA dataset collected in the mid to late 1990s. The dataset aims at covering potential seasonal trends by surveying at least once during each season, with a specific focus on summer (three samplings within 2 years). It will also provide a preliminary answer to the inter-annual changes in nutrient loading with the month of December being sampled for two consecutive years.

Survey Details (the list of parameters may change over time).
• Sonde assisted vertical profiles, throughout the water column from sea surface to seabed sampling with approximately 1 m intervals for:
  • dissolved oxygen
  • temperature
  • salinity
  • electrical conductivity.
• Discrete water column samples are also taken with a water sampler at 2 m, 10 m and 2 m above the seabed (where appropriate). The methodology includes two replicates for each station and parameter:
  • nitrate,
  • ammonium/ammonia,
  • chlorophyll a (only at 2 m from the surface due to light limitation).

Seabed samples for the following are also undertaken at each station (methodology also includes two replicates per parameter and station):
  • total organic carbon
  • total organic nitrogen
  • total organic phosphorus.

The information collected from this series of surveys will be used to recalibrate the model. The larger amount of data, along with the previous assessments made from the 1990’s dataset should give the model a higher degree of accuracy, including event based variability of ecological indicators. It should also be noted that farm-specific water quality sampling data will be used in conjunction with the monitoring data collected at the various calibration and harbour wide sites to add further rigour to the calibration and validation process.

Further harbour wide monitoring as described above will be undertaken at a frequency determined by the results of the 2011/12 monitoring and model calibration to help validate the model over time as farm production increases. Any future sampling program will include natural harbour inputs, with probable sampling stations at the mouths of the Gordon River, King River and Hell’s gate as well as additional locations presently determined to be out of any field of effect of the current expansion in farming. These will act as controls and should contribute to the general understanding of the natural variability of the ecology in this semi-enclosed environment. The parameters and sampling methods (both water column and sediment) should remain similar to the previous harbour wide sampling with the exception of Chlorophyll a – the methodology for which will be reviewed at the end of the 12 months of trigger level assessment monitoring. The number of stations sampled may be adjusted subject to assessment and evaluation of the monitoring data and consideration of the production levels.
3.2 Farm or lease monitoring

In-pen monitoring
This is predominantly required to inform the Fish Health Management Plan and will include dissolved oxygen, temperature and salinity. Phytoplankton assessment taken as part of the general lease based monitoring described below would also be required. These variables are also included in the full list of information required under the FHMP. This information is to be provided on a monthly basis but will be sampled daily.

Lease-based monitoring
Designed to inform the individual lease or farms of changes occurring in and around the farm and to include sentinel sites upstream and downstream of the fish farming area within the harbour. Many of these sites will also provide information back to the harbour wide water quality assessments.
Draft Plan (designed with input from DHI)

A draft map (Figure 4) of the sites based on where the DO is likely to be lowest between leases as determined by DHI from their models is provided below, together with some recommended reference sites. However, due to practicalities (MAST, mooring concerns) involved if and when the companies adopt fixed monitoring stations (under a DSS for instance) we may achieve greater consistency by moving the sites to just inside the lease boundaries from the start.

Prior to the installation of fixed monitoring stations dissolved oxygen, salinity, temperature (possibly Chlorophyll a) and secchi depth will be measured using a Sonde and/or individual probe. For Ammonia water samples will be collected in bottles and sent to a NATA accredited (or equivalent) laboratory for processing. Ammonia will be measured weekly during peak production (December to February) and monthly at other times of the year. Phytoplankton samples will be collected at three sites one for each company and at a reference site near Hells gates. These phytoplankton samples will be collected once every two weeks during spring/summer and once every month or less during autumn/winter, preserved in Lugol’s iodine and submitted to Analytical Services Tasmania for identification and counts.

Probe based measurements (Sonde or other) will be taken at metre intervals down to 15m depth. Ammonia samples will be taken at 2-4m and 5-7m depth initially but may be subject to review depending on the results from the harbour-wide monthly (trigger level) monitoring programme. Phytoplankton will be sampled by net tows from 20m depth up through the water column and initially (at least) integrated samples will be taken for the top 2m and for the top 10m until the actual depth stratification is better understood.

All stations/sites will be monitored on the same day each week by a single contractor, most likely the TSGA Macquarie Harbour Officer who will collate and report the information to EWG and the FHWG on a monthly basis.
Figure 4  Approximate location of farm based monitoring sites (green triangles) including potential reference sites (red crosses)
4 Mitigation

The basis for the sustainable management of the industry in the harbour is to be provided through rigorous monitoring, firstly for harbour wide effects and secondly for between and within fish farm effects. This acknowledges that there will be a gradual increase in overall production in the harbour and that the presently modelled maximum or final production scenario will not be reached within the first five years of operation of the new lease areas. The results obtained from the monitoring have been and will continue to be the basis for modelling the effects of farming operations on both the harbour wide and fish farm scales, and will enable comparison to future “trigger levels” which in turn will be based on the best possible science available at the time. The results will be collated and disseminated by the AMA officer.

Risk mitigation will be driven by an adaptive management process as overseen by the Environmental Working Group. The AMA officer will provide collated data on a monthly basis to the EWG and review and report on all relevant data on a 6 monthly basis. The EWG will review this data and provide advice to the AMA Management Group. Evaluation and assessment of results from both farm-based and regulatory monitoring (Table 2), the outputs of modelling and relevant research conducted into ecological processes within the harbour will drive both Management Group and regulatory decision making in relation to sustainable production within the harbour.

The response mechanisms to the monitoring results are defined under the AMA.

Given the commitment that the industry will be making to the region, those signatory companies to the AMA will also undertake research aimed at providing a more detailed ecological understanding of the harbour in general and will provide information on issues that may be deemed low risk scientifically but have been raised as a concern from a community and/or tourism perspective.

Requirements for monitoring and modelling will also be included in the marine farming management controls and licence conditions prescribed by DPIPWE (refer to appendix).

The signatories to the AMA are also committed to forming a regional advisory committee composed of major stakeholders in the region to assist industry in reviewing their environmental management practices in the harbour. This group will allow for feedback from stakeholders, for example cruise boat operators in relation to navigational issues or marine debris.

The Signatories have already commenced or will also:

- Undertake the trigger level water quality monitoring program discussed above, in the next 12 months as background data for the harbour and for more precise calibration of the model.
- Review the model in spring/summer 2012 in the light of the calibration results and background information, and provide any adjustments to the planned peak stocking rates and biomass as required.
- Provide background data for the development of harbour specific guidelines. These
guidelines will then be used to define “trigger” levels for the harbour and/or for the fish farming area, and will be accompanied by an appropriate range of management responses to address any non compliance. The first set of guidelines, triggers and management responses will be provided by the end of 2012.

- Validate the model most likely in autumn/winter 2014 when stocking rates have increased appreciably over current levels.
- Commit to supporting R&D covering process and social licence issues.

References


APPENDIX A: REGULATORY CONTROLS

This section outlines Management Controls from the Macquarie Harbour Marine Farming Development Plan October 2005, including proposed controls to be included in the plan as a result of this amendment.

From the Macquarie Harbour Marine Farming Development Plan October 2005

- **Management Control 3.0.1** Lessees and sub-lessees must comply with any written notice or request given by the Secretary.

- **Management Control 3.1** There must be no significant visual, physio-chemical or biological impacts at or extending 35 metres from the boundary of the lease area, as specified in the relevant marine farming licence.

- Environmental parameters must be monitored in the lease area, 35 metres outside the boundary of the marine farming lease area and at any control site(s) in accordance with the requirements specified in the relevant marine farming licence.

- **Management Control 3.2.1** The Secretary may, from time to time, determine the total permissible dissolved nitrogen output, within specified periods, attributable to marine farming operations within a specified area covered by this Plan.

- **Management Control 3.2.2** For the purposes of assessing quantities of dissolved nitrogen output attributable to marine farming operations the Secretary may use:

  - **Management Control 3.2.2.1** the proportion of expected dissolved nitrogen output from a unit of feed as used in Butler et al. (2000) at section 10.2.5; or

  - **Management Control 3.2.2.2** any other method that the Secretary is satisfied delivers a measure of total dissolved nitrogen output from marine farming operations equal to or better than that used by Butler et al. (2000).

- **Management Control 3.2.3** If the Secretary makes a determination under clause 3.2.1, the Secretary is to apportion the total permissible dissolved nitrogen output between those lessees within the specified area.

- **Management Control 3.2.4** The Secretary is to give notice in writing to lessees within the area specified in 3.2.1 of any determination the Secretary makes under 3.2.1 and 3.2.3.

- **Management Control 3.2.5** Lessees must comply with any written notice given by the Secretary under 3.2.4.

- **Management Control 3.3.1** The Secretary may from time to time, determine the maximum permissible stocking density of finfish held within any fish cage, within the area covered by this plan or any other specified area within the plan area.

- **Management Control 3.3.2** Maximum permissible stocking densities for other finfish species may be specified in licence conditions.

- **Management Control 3.3.3** Lessees must ensure that farmed areas are fallowed as soon as practicable if bubbles of hydrogen sulphide and/or methane gases form...
in the sediment and rise to the surface without physical disturbance of the seabed.

- **Management Control 3.3.4** Stocked finfish cage nets must be at least 1 metre clear of the seabed at low tide under normal growing conditions unless otherwise specified in the relevant marine farming licence.

- **Management Control 3.3.5** The Secretary may from time to time, determine the maximum permissible biomass (tonnes per hectare) of finfish that may be stocked within the area covered by this plan or any other specified area within the plan area.

- **Management Control 3.3.6** The Secretary is to give notice in writing to any lessees, or if a lease is subleased, any sub-lessee, subject to a determination made by the Secretary under 3.3.1, 3.3.2 or 3.3.5.

- **Management Control 3.3.7** Compliance with 3.3.5 will be calculated for any point in time, according to the following formula, or any other method deemed equal to it, or better.
  
  \[
  \text{Total Biomass (TB) = Total biomass in tonnes of finfish held by lessees or sublessees within the determined area at a single point in time.}
  \]
  
  \[
  \text{Total Area (TA) = Combined total lease area licenced for the culture of finfish held by lessees or sublessees within the determined area at that same point in time.}
  \]
  
  \[
  [\text{TB/TA should be} \leq (equal to, or less than) \text{maximum permissible biomass, in tonnes per hectare, as determined by the Secretary.}]
  \]

- **Management Control 3.4.1** Lessees must provide a baseline environmental survey as specified by the Secretary. A baseline environmental survey must be undertaken prior to the commencement of marine farming operations on those areas;
  
  - where a new lease area is being established; or
  - when required as a condition of varying or expanding a lease area; or
  - where a marine farming licence is varied to allow the farming of another species not addressed by the existing baseline survey for the lease.

  Data to be collected may include but is not limited to video assessment, sediment particle size analysis, redox potentials, sulphides, current flows and composition of the benthic community.

  Note: The Secretary will use the information from the baseline environmental survey, amongst other information, to assess whether the area to be farmed contains any rare or endangered species or any unusual habitat and to determine marine farming licence conditions.

- **Management Control 3.4.2** Lessees must keep the following records for each lease area held by the lessee and retain these records for a period of 5 years:

- **Management Control 3.4.2.1** Lessees or sub-lessees subject to determinations made by the Secretary under 3.3.1, 3.3.2, or 3.3.5 must maintain
daily records including:
  - maximum stocking density of finfish in each stocked cage
  - maximum biomass of finfish in each stocked cage.

- **Management Control 3.4.2.2** The type, origin and dry weight of food placed into a lease area on a monthly basis.

- **Management Control 3.4.2.3** The names and quantities and date of use of all chemicals which have been used on a lease area. This must include, but is not confined to, therapeutants, anaesthetics, antibiotics, hormones, pigments, antifoulants, disinfectants and cleansers.

- **Management Control 3.4.2.4** Location (to a degree of precision to the satisfaction of the Secretary), size and stocking rates of all cages.

- **Management Control 3.4.2.5** The duration that individual cages are held in a particular location.

- **Management Control 3.4.3** Lessees must provide to the Manager, Marine Farming Branch, Department of Primary Industries, Water and Environment the records detailed at 3.4.2 at the request of the Secretary.

- **Management Control 3.4.4** Lessees must notify the Manager, Marine Farming Branch, Department of Primary Industries, Water and Environment within 48 hours of using any therapeutants including antibiotics but excluding vaccines. Information provided to the Manager, Marine Farming Branch must include:
  - **Management Control 3.4.4.1** The names of therapeutants.
  - **Management Control 3.4.4.2** The date of use.
  - **Management Control 3.4.4.3** The location (to a degree of precision to the satisfaction of the Secretary) and identification of the specific cage / cages in which therapeutants have been placed.
  - **Management Control 3.4.4.4** The quantities of therapeutants placed into specific cages.

- **Management Control 3.4.5** Environmental data is to be collected at each finfish lease area and analysed to specific standards and in accordance with the requirements for collection, reporting and analysis as specified in the relevant marine farming licence.

  Note: The Secretary will use the information from the environmental monitoring surveys when determining marine farming licence conditions.

- **Management Control 3.4.6** Leaseholders must comply with any environmental monitoring requirements specified in marine farming licence conditions.

- **Management Control 3.4.7** The Secretary may require from time to time, a leaseholder, at the leaseholder’s expense, or a person subleasing a lease, at the sub-lessee’s expense, to employ an independent auditor determined by the Secretary, to undertake an audit, as specified by the Secretary, of a lessee or sub-lessee’s business records, and record keeping practices.
- **Management Control 3.4.8** An audit undertaken under 3.4.7 may include an assessment of the accuracy and truthfulness of records with respect to the physical parameters being recorded under 3.4, for the purposes of determining compliance with any management control or licence condition.

- **Management Control 3.4.9** The Secretary may require from time to time, a lessee, at the lessee’s expense, or a sub-lessee, at the sub-lessee’s expense, to employ a consultant, scientific institute, or other entity deemed acceptable to the Secretary, to conduct environmental modelling, for the purpose of reviewing or predicting the environmental effects of marine farming within the area covered by this plan.

- **Management Control 3.4.10** For leases that have an associated marine farming licence authorising the culture of finfish, lessees or sub-lessees must provide to the Secretary on an annual basis, unless exempted in writing by the Secretary, a production planning report for three years in advance, by lease.

- **Management Control 3.5.1** All chemical use must comply with the requirements of the *Agriculture and Veterinary Chemicals (Control of Use) Act 1995*.

- **Management Control 3.6.1** Lessees must dispose of wastes from:
  - harvesting;
  - processing of produce;
  - removal of fouling organisms; and
  - production,

  in accordance with relevant Acts or regulations and tradewaste agreements and in a manner that the Secretary is satisfied will not cause an unacceptable effect on the ecology of the marine environment or nearby shorelines.

- **Management Control 3.6.2** All marine farmed fish mortalities must be disposed of, according to relevant Acts, local council by-laws, or other legally approved manner.

- **Management Control 3.6.3** The licence holder must ensure that blood resulting from the harvesting of fish is fully contained and not allowed to enter the marine environment unless authorised in writing by the Chief Veterinary Officer.

- **Management Control 3.6.4** Lessees must fallow or comply with limits upon the use of a lease area if unacceptable benthic impacts specified in the relevant marine farming licence are identified through routine monitoring.

- **Management Control 3.6.5** Lessees must ensure that Black and Grey Water resulting from the servicing of marine farming operations is not released into the marine environment unless otherwise authorised in a marine farming licence.

- **Management Control 3.12.1** Lessees must comply with the *Marine Farming Planning Act 1995* and with any other Act or regulations that may affect the lease area or the marine farming operations in that lease area.

- **Management Control 3.12.4** Lessees must remove fouling organisms from marine
farming equipment, as directed by the Secretary, in a manner that the Secretary is satisfied will not cause an unacceptable effect upon the ecology of the marine environment or nearby shorelines.

- **Management Control 3.12.7** Lessees must permit the Minister, or persons authorised by the Minister, to enter into and inspect the lease area at all reasonable times.

- **Management Control 3.12.8** Lessees must comply with all lawful written requirements of the Minister.

- **Management Control 3.13.1.1** The use of Zone 3B is restricted to the mooring of vessels and equipment associated with marine farming activities. No fish may be farmed, held or moved within Zone 3B.

Relevant marine farming licence conditions relating to environmental management of a marine farming Lease area including proposed conditions are included below.

From Schedule 1 Marine Farming Licence Conditions Relating To Environmental Management of a Finfish Farm

- **Condition 2.** The licence holder in respect of marine farming operations unless otherwise required by the Secretary of the Department of Primary Industries and Water shall:
  a) keep records of all fish brought onto and taken off the area to which this licence relates. Those records must show:-
     i. the date of each movement;
     ii. a description of each consignment of fish being moved, including species, class and quantity of fish;
     iii. for fish taken off the area, the place to which each consignment of fish was sent;
     iv. for fish brought onto the area, the place from which the fish came.
  b) keep the records at (a) above in a manner and form that enables rapid access to the information in the event of an emergency. (A recommended format is at Attachment A to this Schedule).
  c) keep the records at (a) above for not less than five years from the date of production of the record.

- **Condition 3.** The licence holder in respect of marine farming operations unless otherwise required by the Secretary of the Department of Primary Industries Water shall:
  a) keep records summarising the amounts of fish taken off the lease area to
which this licence relates for consumption, processing and/or for on-growing outside of Tasmania showing:

i. for each Australian State and Territory and for each overseas country to which fish have been consigned, the amount of fish taken off the area in the previous three month period.

b) keep the records at (a) above in the manner and form shown at Attachment B to this Schedule for not less than five years from the date of production of the record.

- **Condition 4.** The licence holder unless otherwise required by the Secretary of the Department of Primary Industries and Water, shall submit to the Secretary of the Department of Primary Industries and Water, within fourteen (14) days of the end of each three month period, a copy of records kept under 3. above, summarising:

  a. the amounts of fish taken off the area to which this licence relates for consumption and for on-growing outside of Tasmania; and

  b. the average number of persons employed on the area to which this licence relates in the previous three month period.
STOCK BROUGHT ONTO THE LICENSED AREA
(Record each transfer as a separate entry)

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Write in the date of transfer
Write in the name of the species
Type of stock (year class, size)
Enter the quantity
Specify units
Write in the name of the person to whom the consignment was sent
Write in the address of the lease area or place to which the consignment was sent
ATTACHMENT “B” (SCHEDULE 1)

Department or Primary Industries, Water and Environment
Quarterly Marine Farming Production Return

Licence No.  

Living Marine Resources Management Act 1995

PRODUCTION RETURN FOR THE THREE MONTH PERIOD ENDING
(Please mark the appropriate box and enter year)

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<th>30 June</th>
<th>30 Sep</th>
<th>31 Dec</th>
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STOCK TAKEN OFF THE LICENSED AREA FOR CONSUMPTION OR PROCESSING DURING THIS QUARTER

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STOCK TAKEN OFF THE LICENSED AREA FOR ONGROWING OUTSIDE TASMANIA DURING THIS QUARTER

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EMPLOYMENT

Average number of persons employed directly on the licensed area during this period

permanent (include licence holder)  
casual employees

CONFIDENTIALITY

The information provided on this form will remain confidential to the Department of Primary Industries, Water and Environment and only summarised statistics, not identifiable by lease or licence number, will be used in publications or in reports to industry organisations.

Please complete and deposit with the Department of Primary Industries, Water and Environment, Marine Farming Branch, GPO Box 192, Hobart 7001 or fax (03) 6233 3065 within 14 days of the end of each three month period.

Name:  
Remarks:  

Signature:  
Date:  


A person, in making an application, giving any document or stating anything to a Fisheries Officer, must not

A) MAKE A STATEMENT KNOWING IT TO BE FALSE OR MISLEADING, OR

B) OMIT ANY MATTER FROM A STATEMENT THAT WITHOUT THAT MATTER THE STATEMENT IS FALSE OR MISLEADING

PENALTY - FINE NOT EXCEEDING 500 PENALTY UNITS
From Schedule 3 Marine Farming Licence Conditions Relating To Environmental Management of a Finfish Farm

- **Condition 1** The licence holder must comply with the following environmental standards in carrying out operations on the marine farming Lease area to which this licence relates (the Lease Area):
  - **Condition 1.1** There must be no significant visual, physico-chemical or biological impacts at or extending beyond 35 metres from the boundary of the Lease Area. The following impacts may be regarded as significant.

Visual impacts:
- Presence of fish feed pellets
- Presence of bacterial mats (e.g. *Beggiatoa* spp.)
- Presence of gas bubbling arising from the sediment, either with or without disturbance of the sediment
- Presence of numerous opportunistic polychaetes (e.g. *Capitella* spp., *Dorvilleid* spp.) on the sediment surface.

In the event that a significant visual impact is detected at any point 35 metres or more from the lease boundary, the licence holder may be required to undertake a triggered environmental survey or other remedial activity determined by the Director.

Physico-chemical:
- Redox: a corrected redox value which differs significantly from the reference site(s) or is \(< 0\) mV at a depth of 3 cm within a core sample.
- Sulphide: a corrected sulphide level which differs significantly from the reference site(s) or is \(> 250\) \(\mu\)M at a depth of 3 cm within a core sample.

Biological:
- A 20 times increase in the total abundance of any individual taxonomic family relative to reference sites
- An increase at any compliance site of greater than 50 times the total Annelid abundance at reference sites
- A reduction in the number of families by 50 per cent or more relative to reference sites / complete absence of fauna.

As natural environmental variation renders some locations more susceptible to
‘unacceptable’ parameter values, the above thresholds will be considered in addition to baseline environmental information for determining the presence/absence of a significant impact.

- **Condition 1.2** There must be no significant visual impacts within the Lease Area. The following impacts may be regarded as significant.

**Visual impacts within Lease Area**

- Excessive feed dumping
- extensive bacterial mats (e.g. *Beggiatoa* spp.) on the sediment surface prior to restocking
- spontaneous gas bubbling from the sediment.

The licence holder must conduct annual underwater video assessment of sediments under stocked and fallowed cage sites to assess the effects of organic loading to the substrate. Underwater video assessment of sediment at monitoring stations located 35m outside the lease area must also be undertaken on an annual basis.

- **Condition 1.3** Where areas are fallowed due to visual impacts, the Lease Area shall not be restocked until the sediments have recovered to the satisfaction of the Director.

- **Condition 1.4** The licence holder must comply with any written request from the Director specifying waste disposal actions for the purpose of mitigating against any effect on the ecology of the marine environment or nearby shoreline associated with marine farming operations including harvesting, processing of salmonids and the removal of fouling organisms.

- **Condition 1.8** Levels of antibiotics, or chemical residues derived from farm therapeutic use, present in sediments within or outside the Lease Area, are not to exceed levels specified to the licence holder by prior notice in writing by either the Director or the Chief Veterinary Officer, Tasmania.

- **Condition 1.13** Black water (defined as all of the components of domestic sewage) from marine farming vessels and structures within the Lease Area, must be either contained and transferred to an approved sewage treatment plant on land, or treated and released into the marine environment using an in-situ sewage treatment system that has been approved and licensed by the Director.

- **Condition 1.14** Grey water (defined as non-industrial wastewater generated from domestic processes such as dish washing, laundry and bathing, excluding water from the toilet) from marine farming vessels and structures within the Lease Area must be managed in such a way as to ensure that the release of the components of domestic sewage are not harmful to the marine environment. Measures may include but not be limited to the use of screens to remove food scraps, the removal of fats and oils prior to washing, and the use of
environmentally friendly soaps.

- **Condition 2** Renewal of annual licences will be subject to compliance with all environmental reporting requirements. Where required the reporting of information to the Director is to be made by phone (03) 6233 3370 or electronically (e-mail: mfarming.environment@dpipwe.tas.gov.au).

- **Condition 2.1** The following records unless otherwise determined by the Director, must be kept by the licence holder for a period of five years and reported to the Department using electronic reporting templates specified by the Director.

<table>
<thead>
<tr>
<th>Records</th>
<th>Parameter</th>
<th>Reporting Frequency</th>
<th>Reporting format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Usage</td>
<td>• Monthly quantity by pen bay</td>
<td>Annual</td>
<td>electronic template</td>
</tr>
<tr>
<td>Chemical Usage (Antifoulants)</td>
<td>• Paint - Type and Quantity</td>
<td>In line with APVMA reporting requirements</td>
<td>electronic template</td>
</tr>
<tr>
<td>Chemical Usage (Antibiotics</td>
<td>• Antibiotics – Type and Quantity</td>
<td>Annual</td>
<td>electronic template</td>
</tr>
<tr>
<td>and Therapeutants)</td>
<td>• Therapeutants – Type and Quantity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present Site Management</td>
<td>• Biofouling Management – Type and Frequency of Cleaning Operations</td>
<td>On request</td>
<td>electronic template</td>
</tr>
<tr>
<td>Production and Site Management (includes present, future and/or historic records)</td>
<td>• Feed Inputs</td>
<td>On request/Audit</td>
<td>electronic template</td>
</tr>
<tr>
<td></td>
<td>• Average and historical biological FCR’s</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Smolt Inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fallowing Regimes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information that is required as part of annual reporting (1 January to 31 December), is to be submitted to the Department within fourteen days of the end of each calendar year. If the information is to be provided on request, then that information is to be provided to the Department within the period specified in the request for the information.

- **Condition 2.3** The licence holder must notify the Director in writing of the presence of any unusual or uncharacteristic marine flora or fauna found within the Lease Area (including any introduced marine pests).

(email: mfarming.environment@dpipwe.tas.gov.au)
• **Condition 2.4** Reports of any incidents of spontaneous outgassing are to be immediately reported to the Director.

4.1.1.1 Overall effect following implementation of mitigation measures

The proposed amendment would result in an increase (both in area and amount) in the input of organic matter and nutrients to the harbour. However, the Adaptive Management process (outlined above) underpinning the fish farm environmental monitoring program (FFEMP), will provide the means for:

- detecting any changes related to the increase in the organic and nutrient loading of the harbour through the environmental monitoring program,
- enabling industry to control their inputs in a timely manner preventing nutrient or organic deposition levels to increase in the water column or substrate to levels where effects are detected outside the lease boundary or recovery processes beneath fish pens are compromised.

The implementation of the mitigation measures described above will minimise the likelihood of unacceptable impacts occurring to the harbour from the fish farm organics and nutrients.