

Guidelines for EMP preparation in relation to

Salmonid Aquaculture Waste Capture Systems, Macquarie Harbour

25 May 2017



Instructions

Purpose of the Guidelines

These guidelines are to assist the proponent in preparing an Environmental Management Plan (EMP) to inform decision-making under the *Environmental Management and Pollution Control Act 1994*, in relation to proposed under-pen waste capture systems for salmonid aquaculture in Macquarie Harbour.

Documentation relating to the proposed waste capture systems, including these guidelines, will be made publicly available on the EPA Tasmania website.

Preparing the documentation

The documentation should be prepared using these guidelines.

Part A – Proponent information

Part B – Proposal/ project information

- Objective
- Design
 - o Design overview
 - o Design location
- Project schedule/timeframes

Part C – Risk identification and Management

- Environmental risks & risk management
- Project risk & risk management

Part D – Monitoring & Testing, reporting, and consultation

- Monitoring & Testing
- Reporting
- Consultation

Part E – Other

- Biosecurity
- Fish Health
- Social aspects and alternatives

Note -

- Any other relevant information may be attached to the EMP to support the application.
- Detailed technical information should be provided as an appendix.
- Information should be presented in appropriately scaled and labelled maps, charts, and plans as much as possible to enhance understanding.
- All images in the EMP must be of high quality, with text readily readable.
- Where commercially or otherwise sensitive information needs to be provided, provide this information in a separate, and clearly marked confidential appendix. Comment should be provided as to why the information is considered confidential.

Submission

The EMP may be emailed or file shared to:

Director
Environment Protection Authority
GPO Box 1550
Hobart TAS 7001
Email: SalmonRegulation@environment.tas.gov.au

Content of documentation

Part A – Proponent information

Provide the following information regarding the proponent:

- Name of proponent (entity name)
- Name of proponent (trading name)
- Registered address of proponent
- Postal address of proponent
- ABN number/ACN (where relevant)
- Contact person's details, including name, phone number, and email address.
- General background on the proponent, such as relevant development and operational experience.

If a different entity will operate the activity after construction, provide similar details for that entity also.

If a consultant has been engaged to prepare the EMP, provide the name and contact details of the consultant.

Provide the following information regarding the key contracting companies for the waste collection, removal and disposal:

- Name of company
- Registered address of company
- Contact person's details, including name, phone number, and email address.
- Company website address
- General background on the company, such as relevant development and operational experience.

Part B – Proposal / Project information

- **Objective of the project**

The proponent must state the objective of the proposal. For example:

Solid waste that is available for capture from a pen bay may be comprised of uneaten food and fish faeces. It is the objective of this project to:

- *capture all of this solid / particulate waste at pen bays;*
- *manage all captured solid / particulate generated waste from pen bays;*
- *manage all other waste - solid and liquid – generated as part of the process.*

The proponent must state the key measures of performance and success to be measured. For example:

No new deposition of food or faeces under pen bays as measured by

- *No observable food or faeces on sediments under pen bays after installation of capture systems;*
- *No observable food or faeces outside pen bays;*
- *Waste capture from a tonnage of fish greater than or equal to that required by the supplementary biomass determination;*
- *Waste Managed in line with State Policy, Acts and Regulations.*

Describe the need and the rationale for the proposal

- **Design**

Design overview

The proponent must:

- Provide a general description of the proposed activity, including method of operation and the main technologies, infrastructure and equipment for both land and water based components of the activity;
- Detail workflows from waste capture, extraction and transport on the water, unloading waste, vehicle movements, waste storage, waste characterisation, treatment, road transport. Provide diagrams or flowcharts to describe these workflows;
- Detail the leases and pen bays for which the waste capture system will be implemented. Put this in the context of the Director's proposed supplementary biomass allocation to illustrate how the proposal will meet or exceed the proposed requirements;
- Provide details of the pen bay waste capture technology. Specific, detailed designs should be included and address mechanisms of waste capture and extraction, the methodology of construction / installation. The designs should demonstrate the capacity to withstand the environmental conditions expected at each lease in Macquarie Harbour;
- Detail timing of all operational aspects of the project. At what frequency will waste be extracted from the waste capture systems? How long is the extraction process likely to take? How often will waste be transported back to land? What is the capacity of the waste transport containers? How is waste landed? What happens to the waste once on land?

- Detail whether there are any particular areas of a lease where it is expected the proposed waste capture system may be either more or less effective in capturing particulate waste (due to currents, depths, etc);
- Provide projected volumes of waste to be captured and managed. Details of expected peak capture, as well as average daily captured rates, and any seasonal or other variations, must be provided;
- Detail key waste management locations – loading/unloading points, storage, treatment, reuse, recycling and or disposal sites;
- Provide, when relevant, details of waste management service providers including information that supports the suitability and capacity of the service provider / facility to manage the waste. Is authorisation needed to managed the waste? Is the service provider or facility authorised to manage the waste? Has the service provider agreed to manage the waste?
- Describe the composition and volumes of waste material to be extracted from the waste capture systems, and any methods of pre-treatment or treatment to be undertaken by the proponent, (operation of a waste management facility, storage treatment or disposal of waste may require separate authorisations).
- Note that solid or liquid waste or supernatant must not be discharged back into Macquarie Harbour;
- Detail any industry standards or guidelines that are applicable to the activity;
- Detail type of testing of the systems prior to commencement of full operation;
- Detail a maintenance schedule for waste capture systems;
- Provide a clear definition of the waste being captured. It would be useful to express this in terms of proportion of total waste generated by the fish plus uneaten feed;
- Detail scenarios where waste is likely to be lost to the environment. This should include wastes lost during capture and transfer of wastes. Provide estimates of waste capture and waste loss with and without the waste capture system;
- Detail total feed – waste mass balance in terms of carbon, nitrogen, and phosphorus for the following scenarios : effective capture system with supplementary biomass; ineffective waste capture system with supplementary biomass; no waste capture system and no supplementary biomass. Oxygen drawdown should be considered as part of these scenarios ;Modelling must be completed to take account for the force of physical factors like current on the waste capture systems. Engineering design must be informed by this modelling;
- Detail predicted effects the waste capture system will have on the water quality. Include discussion on permeability of the capture system and risks and risk mitigation strategies of water “contained” in this system. Consider plume behaviour in a range of scenarios. What happens if waste has been sitting in the capture system for a number of days and then is disturbed (e.g. a storm event);
- Detail quality assurance and quality control and acceptance criteria for all aspects of the project including works delivery and monitoring data.
- Outline operational impacts (if any) of net cleaning on waste capture system and how this will be quantified when calculating the food and faeces capture rate

Design location

Provide a general description of the location(s) of the proposed activity, including:

- relevant aspects of the local physical environment, including both the marine environment and relevant shore areas (including climate, species of conservation significance, *etc.*);
- Describe current and historical use of the proposal location(s);
- Provide a description of current related activities undertaken by the proponent, and others more broadly in the vicinity;
- For the marine component of the proposal, provide detailed maps and lease plans for the location of the proposed activity. These should include current and projected pen bay locations and details of planned stocking at each pen bay location (species, year class, stocking densities, expected harvest timings and timings of movement of fish between leases, *etc.*).
- For shore-based activities related to the proposal, describe surrounding land use, including location of nearest residences and other sensitive uses (such as schools, residences, *etc.*);
- For shore-based activities related to the proposal, provide maps and site plans clearly showing the following:
 - site boundaries (defined by means of land title information, map coordinates or other suitable means);
 - location of staging, manufacturing, assembly or other relevant work areas;
 - position of existing and proposed buildings/structures;
 - positions of plant and machinery;
 - position of any material, product and waste stockpiles;
 - native vegetation;
 - watercourses (rivers, creeks, lakes);
 - location of significant earthworks and/or vegetation to be cleared;
 - location of any nearby residences or other nearby sensitive uses; and
- the proposed route(s) to be used by vehicles travelling to and from the activity
- Provide details of any current regulatory approvals relating to the existing activities (for instance waste storage treatment or disposal sites).
- Provide the following in relation to the existing activity:
 - a summary of environmental monitoring results;
 - a summary of public complaints regarding the activity;
 - details of breaches of conditions of current regulatory approvals (if any); and
 - details of contraventions of environmental law (if any).

• **Project Schedule/ timeframes**

Project time and milestones must be provided. This should include but not be limited to:

- Dates on which capture systems will be installed (including a detailed schedule of roll out to individual pen bays demonstrating how roll out will keep pace with growth of supplementary biomass);
- Dates on which testing and or capture systems will become operational;
- Dates on which waste capture, extraction, transport, storage, treatment and other waste management activities will begin;
- Completion date for the project;
- Key reporting dates.

Part C – Risk Identification and Management

Environmental and project risks must be identified for all land and water based aspects of the project. These risks may be grouped by construction / development phases and operational phases of the project.

A table containing the following must be provided:

- Identification of the risk;
- level of risk;
- description of management strategy. Management strategies must eliminate or reduce risk to acceptable levels;
- performance criteria for each management strategy. For example, if the identified risk is *dust trespass beyond the site boundary*, the performance criteria is *no dust trespassing across the site boundary*.

It is expected that the proponent will self-audit performance and implement appropriate reporting and issues resolution processes. In this context, provide:

- Self-audit schedule;
- Issues resolution process to resolve non-compliance.
- Framework for regular reporting to the Director (weekly).

There is an expectation that industry monitors its own compliance and takes action to rectify non compliance and or improve its management practices.

Note that the EPA will undertake independent compliance assessment against laws, regulations or other requirements that apply to this project.

- **Environmental Risk Management**

Environmental risks to be identified/managed may include but are not limited to consideration of the following:

Air emissions

- Will the activity result in emission of pollutants to air (includes dust, odours and emissions from chimneys)? If yes, provide details about potential impacts and how they will be managed.
- Show the location of all stationary sources of emissions on a site plan.

Aquatic environment

- Describe potential impacts from waste captured in the waste capture system on pelagic water quality (e.g. potential for plumes or other impacts arising from this waste) and how these will be assessed and managed;
- Is the activity likely to impact on sensitive marine areas, conservation areas, or areas used extensively for recreation or commercial fishing activities? If yes, provide details about potential impacts and how they will be managed.
- If any stage of the land-based aspect of the proposal is to occur within 200 metres of a river, creek, wetland, or estuary, provide details of drainage of stormwater and protection of waterways from contamination.

Flora and fauna

- Is the proposed activity expected to impact species of conservation significance in either the marine or shore-based environments? If so, provide details of species, their significance (e.g. Maugean Skate), details of the expected impacts, and provide proposed management measures to minimise or eliminate negative impacts.
- For shore-based activities, provide details of any native vegetation clearing required and how this is intended to be minimised. Detailed flora and fauna surveys may be required.
- Provide copies of any relevant surveys of species of conservation significance (marine or shore-based), or of weed/pathogens.

Hazardous substances

- Will the activity involve the use and/or storage of environmentally hazardous substances (i.e. substances that have the potential to cause environmental harm if released)? If so, provide details of the nature and quantity of the materials, their storage location and methods and proposed measures to prevent their release.
- Describe proposed measures for responding to accidental spillage or escape of environmentally hazardous substances.
- Identify all controlled wastes likely to be present on the site, with reference to standard classification¹.
- Identify all dangerous goods likely to be present on the site².

Noise emissions

- Will the activity include fixed or mobile equipment that emits noise? If yes, provide details of the noise sources including size, power ratings, noise attenuation and hours of operation. Show the expected locations of the noise sources on the site plan and the locations of nearby residences and other noise sensitive premises on the area map (see Part B).
- Potential impacts from noise generated by the activity must be described, and the need or otherwise for detailed technical review and additional mitigation measures are to be considered and discussed.

Significant areas

- Provide details of significant areas such as World Heritage Areas, National Parks, State Reserves, Regional Reserves, Nature Reserve, Forest Reserves or Conservation Areas. Detail management strategies that will be implemented to protect the values of these areas.

Site contamination (historical)

- Has the site on which the activity is to be located been used in the past for activities which may have caused soil or groundwater contamination? If so, provide details. Include details of any assessments of soil or groundwater contamination on the site.

Sites of high public interest

¹ Information on controlled waste identification and classification is available on the internet at: <http://epa.tas.gov.au/regulation/identify-a-material-as-a-controlled-waste>.

² As defined in the *Australian Code for the Transport of Dangerous Goods by Road and Rail*.

- Is the activity located within or adjacent to a site of high public interest (such as a recreation area or natural scenic feature)? If so, provide details.

Solid wastes

- How will solid waste generated in any part of the capture, transfer and management process be managed so that that it will not be released to land or water;
- How will spills from any point in the waste capture, transfer and management process be managed;
- Contingency planning for waste cake and supernatant storage. Management for spills. Protection of waterways near waste pre-treatment, transfer, etc areas around the shore;
- Detail potential sources of marine debris (within the proponent's control) and detail how this debris will be managed.

Transport impacts

- Will the activity result in or require substantial transport of goods or materials to or from the site, which may affect the amenity of the surrounding area? If yes, provide details such as vehicle types, number of vehicle movements, times of movements and route(s).

Liquid waste

- How will liquid waste generated in any part of the capture, transfer and management process be managed so that that it will not be released to to land or water;
- How will spills from any point in the waste capture, transfer and management process be managed;
- Will the activity result in discharge of liquids (including to sewer)? If yes, provide details of the nature of the discharge (estimated volume and characteristics);
- Provide details of any proposed effluent / liquid waste treatment;
- If discharge to sewer is proposed, provide details of the associated trade waste agreement.

Other off-site

- Does the activity have the potential to generate any other off-site impacts that may affect the amenity of residences or other sensitive uses (such as schools and hospitals)? If yes, provide details. The location of all nearby residences or other sensitive uses must be clearly shown on the area map.

• **Project Risk Management**

Project risks to be identified/manage may include but are not limited to the following:

- Where applicable provide management actions / contingency plan to minimise the risk around failure of the agreement / arrangement between a preferred waste manager and the proponent. What contingency arrangements will be put in place to minimise the risk that there will be no alternative waste management strategy if the primary agreement / arrangement fails?
- Describe number of pen bays to be fitted with waste capture systems. How will waste capture keep pace with the rate set out in the Director's proposed supplementary biomass determination? In the event that waste capture is not sufficient to keep pace,

detail management actions that will be taken. For example, provide a cull / harvest schedule to ensure that biomass remains compliant with the Director's biomass determination;

- Dead/ culled fish. Provide a management strategy for dead fish management to account for failure to comply with biomass limits, project slippage or project failure. This plan must detail timing of cull/harvest, transport arrangements and disposal/management to be implemented and approvals being sought or needed;
- Detail contingency management for the scenario waste capture systems are rendered inoperable (mechanical failure, storm damage, installation faults, equipment faults) or are otherwise found not to be effective at capturing and retaining solid waste within the pens for subsequent extraction and disposal;

Part D – Monitoring & testing, Reporting & Consultation

- **Monitoring & testing**

An outline and rationale for Monitoring and Testing receiving environments is provided at **Appendix 1**. As a minimum, this monitoring must be incorporated into your own monitoring program and submitted for consideration.

More generally, please consider the following:

Monitor receiving environments

- Describe the proposed environmental monitoring and reporting for the activity.
- Show all proposed monitoring points on the site plan (see Part B).

Characterise waste

- Describe the waste physically (e.g. texture, odour, water content) and chemically, including any expected variation over time. Provide details as to when and how waste will be further characterised as the project proceeds and what tests / analyses will be performed.
- Are any wastes controlled waste?
- Quantities of all waste materials must be monitored and recorded. Details must be provided on how quantity of waste will be tracked, recorded and reported to the Director.
- Waste management strategies must be based on comprehensive waste characterisation.

Other Monitoring

- Describe any other monitoring program that will be implemented. For example noise, odour, dust, marine debris

- **Reporting**

Provide details of reports that will be submitted to the Director. These reports should include but not be limited to:

- Monitoring & testing report(s)
- Complaints recording, management and complaint resolution reporting. Details of how complaints will be recorded, managed/ resolved and reported must be provided

- Environmental Audit report
- Audit issues resolution reports
- Project Audit reporting
- Project issues resolution reports
- Weekly project progress reporting
- Waste characterisation reporting
- Project analysis and review
- Any other report (e.g. routine fish health reporting as per licence)
- Project closure reporting

Provide details of reports/data that will be made available to the public, including real time monitoring data from Macquarie Harbour.

Detail frequency and timing of reporting.

Where possible, all records should be prepared to a standard that is suitable for public scrutiny. Mechanisms should be put in place to make reports available to stakeholders and the public as expediently as possible, web publication being preferred.

Note that there are existing notification obligations with which you must comply. For example, notification obligations under section 32 of the *Environmental Management and Pollution Control Act, 1994*. Please ensure that all statutory reporting obligations are provided.

- **Public and stakeholder consultation**

Outline consultation framework with relevant government agencies, community groups or neighbours in relation to the proposed activity. Who are the key stakeholders (e.g. community, Strahan Aquaculture Community Forum)? Provide details of consultation approach.

Part E – Other

- **Biosecurity**

Identify biosecurity risks and detail risk management measures to reduce fish stress and fish susceptibility to Atypical Aeromonas and Pilchard Orthomyxovirus (POMV)

- **Fish Health**

- Outline a program of pelagic monitoring to ensure that no plume is released during waste capture, extraction and transport.
- de-watering of waste is expected to be land based.
- fish health reporting requirements under their marine farming licence are to be followed
- Reporting of any other unusual disease event e.g. increased morbidity should also be considered as an indicator of fish health

- **Social aspects and alternatives**

- Describe the alternative options to this proposed activity, and explain the benefits and disadvantages of alternative options that have been considered. Include early harvesting of 2016 class fish as an alternative approach and put this into the context of key project risks such as environmental, biosecurity, fish health, risk to property from floating debris and reputational risk. Does the proposal “stack up” in this context?;
- Describe of the social and economic issues associated with the proposal.

Table 1: Description- Monitoring – Salmon Industry – Waste Capture Project Macquarie Harbour

Monitoring pre waste capture	Monitoring During waste capture	Waste testing and characterisation	Project closure Monitoring	Success to be measured by:	Further comments on measuring success
<p>Determine benthos condition Pre-condition of benthos beneath cage using ROV</p> <p>Detailed infauna analysis via grab samples</p> <p>Benthic respiration studies</p> <p>Metals and metalloids (totals and dissolved) REDOX Nutrients BOD COD DO TOC Sulphides</p> <p>Water Quality (control site & fallow site)</p> <p>Physico-chem (full vertical profile, 1m intervals) turbidity, pH, temperature</p> <p>Grab samples “down-current” and “up-current” but immediately adjacent to the cage. Collect samples at depths 0m, 10m, 20m, 30m (Needs to try and capture stratification and density)</p> <p>Analyse for: Nutrients (total and dissolved) fine particulates TOC DOC</p>	<p>Roll out schedule Monitor progress of installation to pens Monitor rate of growth of biomass against biomass cap</p> <p>Feed Total feed volume Feed TN and TP levels</p> <p>Waste settlement Record settlement time of uneaten food and faeces into capture device.</p> <p>Determine effectiveness of waste capture With capture device in place: ROV of fixed cameras on the outside of the cage Sediment traps</p> <p>Monitor rate of waste capture Monitor for escape of waste from capture systems</p> <p>Determine benthos condition Condition of benthos beneath cage using ROV</p> <p>Detailed infauna analysis via grab samples</p> <p>Metals and metalloids (totals and dissolved) REDOX Nutrients BOD COD DO TOC Sulphides</p> <p>Water Quality – determine if waste material captured is impacting water quality (including during extraction events)</p> <p>Real time monitoring of key success parameters (oxygen saturation at depth, oxygen demand at depth, sediment redox potential?)</p> <p>Physico-chem (full vertical profile, 1m intervals) turbidity, pH, DO, conductivity, temperature</p> <p>Grab samples “down-current” and “up-current” but immediately adjacent to the waste capture system. Collect samples at depths 0m, 10m, 20m, 30m (Needs to try and capture stratification and density)</p> <p>Analyse for: Nutrients (total & dissolved) fine particulates TOC DOC</p>	<p>Chemically characterise captured waste Metals and metalloids (totals and dissolved) REDOX Nutrients BOD COD DO TOC</p> <p>Physically & chemically characterise cake % Moisture Volume Metals and metalloids (totals) REDOX Nutrients TOC</p> <p>Physically and Chemically characterise supernatant Volume Metals and metalloids (totals) Sulphides REDOX Nutrients Turbidity BOD COD DO TOC</p>	<p>Determine benthos condition Condition of benthos beneath cage using ROV</p> <p>Detailed infauna analysis via grab samples</p> <p>Metals and metalloids (totals and dissolved) REDOX Nutrients BOD COD DO TOC Sulphides</p> <p>Benthic respiration studies</p>	<p>Adherence to roll out schedule</p> <p>No ‘new’ waste on harbour bottom after waste capture systems have been installed.</p> <p>Faeces and uneaten food capture approaching 100%</p> <p>Measurement of waste capture (as a % of feed input)</p> <p>Cake classified and disposal/management criteria achieved</p> <p>Supernatant classified and disposal/management criteria achieved</p> <p>Measurements of faeces vs uneaten food capture</p> <p>No or no unacceptable impact on pelagic water quality arising from capture of material or subsequent extraction.</p> <p>No serious or material environmental harm, or environmental nuisance.</p>	<p>It is understood that food types may be varied to optimise waste capture, discuss trade offs and provide capture targets.</p> <p>In determining whether the project is a success:</p> <ul style="list-style-type: none"> - estimate or measure volume of the waste that is currently escaping pens - measure waste that is captured expressed as a % of feed input - calculate O₂ consumption of the waste material assuming no capture - estimate (reduction of) O₂ consumption assuming complete capture of waste - calculate (reduction of) O₂ consumption based on waste actually captured <p>Findings are to be presented in terms of a conceptual model of the harbour. In particular it may be useful to present conceptual models without waste capture and with waste capture.</p>