

# Water Quality Protection Note

## Aquaculture Projects

### Purpose

To provide information for activities that may impact on the quality of the State's water resources.

These notes provide a basis for developing formal guidelines in consultation with key stakeholders.

### Scope

These notes apply to premises used to propagate aquatic vegetation or commercially "farm" aquatic animals including fish, crustaceans eg marron and shellfish in areas where terrestrial and estuarine water resources may be affected.

### Preamble

As manager of the State's water resources, we aim to ensure that aquaculture activities do not pose a threat to water resources. Land based aquaculture projects potentially are a source of significant water draw, and have the potential to affect water resource quality as a result of releases of salty water, sludges, discoloured water, and nutrient-rich wastes to the receiving environment. Those located within water bodies may pollute with excess feed and metabolic wastes.

The following conditions reflect our current position. They are recommendations only and may be varied at the our discretion.

### Site Selection

#### Aquaculture projects in public drinking water source protection areas (PDWSAs)

A Public Drinking Water Source Area (PDWSA) is a term used to describe Water Reserves, Catchment Areas and Underground Water Pollution Control Areas declared to protect waters used for public water supplies. They are proclaimed under the *Metropolitan Water Supply Sewerage and Drainage Act (1909)* and the *Country Areas Water Supply Act (1947)*. By-Laws enable this agency to regulate potentially polluting activities and land use, inspect premises and take action if sites become contaminated. We manage the PDWSAs using priority classification areas. These areas are termed P1, P2, P3, and reservoir (RPZ) and well-head protection zones (WPZ).

The development of aquaculture activities is incompatible with P1 source protection areas, RPZ and WPZ.

In P2 and P3 areas, aquaculture is a restricted activity where the WRC sets conditions to protect water quality by appropriate pollution containment and management practices. All development proposals within P2 and P3 source protection areas in PDWSAs should be referred to this agency for assessment.

Where aquaculture projects are situated on permeable soils, e.g. sand or gravel over aquifers or near surface waters that are suitable for human consumption or stock and irrigation water supplies, care must be exercised to prevent contamination of these water resources. Wastes discharged to soakage must not contain any persistent toxic substances. Buffer distances of at least 200 metres should be maintained to any established well, bore or wetland.

The disposal of wastewater rich in organic matter and nutrients can result in noxious odours, bacterial slimes fouling screens associated with water bores, and contribute to algal blooms in wetlands.

## Aquaculture projects located on or near rivers and estuaries

As a result of the shortages, depletion or difficulty of harvesting wild stocks of certain aquatic organisms, aquaculture is gaining popularity in Western Australia. Estuarine waters and marine embayments often provide ideal conditions for salt water aquaculture.

Where an aquaculture proposal is within a declared **Waterways Management Area**, approval for the establishment of an aquaculture activity must be sought from this agency and the local Waterways Management Authority, in accord with Regulation 7 of the *Waterways Conservation Act (1976)*.

Applications for approval of commercial aquaculture must also be made to the Inter-departmental Committee on Aquaculture (IDAC). This committee, consisting of a number of state government agencies, makes a recommendation to the Fisheries Department, which is the licensing body. This agency has a statutory role to play in providing advice.

Although aquaculture is an increasingly productive source of food, we need to consider the potential impacts to water resources when assessing applications for commercial operations.

This agency, where appropriate with advice from the Waterways Management Authorities, will consider the following issues when assessing the potential impacts of aquaculture projects on water resources:

- Potential impact on bottom dwelling plants and animals, particularly the potential for smothering and shading,
- The effects on bed and banks of waterways,
- Established and potential local water uses, e.g. recreation, commercial fisheries,
- The potential for introduction of disease and other exotic organisms,
- Water quality as a result of production of metabolic wastes,
- Production of other wastes or by-products of farming procedures,
- Quality of effluent where infrastructure is not on or in a waterway, but involves a wastewater discharge to a waterway,
- The potential for outbreaks of toxic and other deleterious micro-algae.

## Waste management

The operations of aquaculture projects should be managed so that wastes are not released in sufficient quantities so as to damage the environment. Part V *Environmental Protection Act 1986* make it an offence to release wastes that pollute water resources.

Aquaculture projects must be operated so they pose a minimal threat to the surrounding environment. Sludge, silt, discoloured water, toxic chemicals and organic material must not be discharged in to watercourses as a result of pond overflow, cleaning or emptying. Provisions should be made to initially deal with these materials on-site, pending treatment or export.

Provided waste pond water is not too saline, it should be stabilised then may be applied to land to promote vegetation growth. Stabilisation may be achieved via facultative ponds or artificial wetlands. The CSIRO conducted research into ammonia reduction from aquaculture using Zeolites, which has proven promising (contact Dr. Nic Booker at CSIRO).

## Construction of land-based ponds

Ponds should be designed and constructed by qualified and experienced personnel utilising **very low permeability** ( $< 10^{-9}$  metres / sec) materials, e.g. engineered clay or plastic lined ponds, or metal / concrete tanks. Native soils, where used for pond construction, must be consistent with maintenance of the long- term secure operation of these ponds. The ponds should incorporate measures to bypass storm event run-off without over-topping, erosion or breaching pond embankments, or releasing /displacing pond contents.

Scour valves should not be installed near the base of ponds, unless the operator can demonstrate that effective measures are in place to prevent silt transfer to external surface waters or loss of aquatic species contained within the pond.

Sufficient freeboard should be maintained in these facilities to avoid overtopping during extreme rainfall events.

## Water supplies

A number of aquifers and river systems in Western Australia are proclaimed under the *Rights in Water and Irrigation Act 1914*. This Act seeks to protect the water usage rights of adjoining landowners. A licence may be required to abstract water from such aquifers and streams, except where existing water draw is for domestic use only. Such licences may impose limits on the quantity of water used and may require routine flow metering and reporting or impose other operational controls.

It is unacceptable for aquaculture projects to consume a large part of a water resource to combat evaporation or maintain pond system ecology to the detriment of other water users, particularly during dry season (low flow) periods. It is the responsibility of any site owner or operator not to interfere with another person's rights, damage property or disrupt the community's interests. Project proponents/operators should be aware of downstream water users and the effects the proposal may have on that stream's established water users.

## Waste discharge

For small-scale aquaculture projects (i.e. discharging less than 5 000 litres of wastewater per day), which drain directly or indirectly to any stream or water course, the levels of pollutants discharged in wastewater should comply with the following schedule:

- pH in the range of 5-9
- Suspended solids less than 80mg/L
- Biologically degradable matter expressed as *Five Day Biochemical Oxygen Demand* less than 20 mg/L
- Produce a salinity change in the receiving stream of less than 20%, between the upstream and downstream boundaries of the project site
- Nitrogen as ammonia less than 1 mg/L
- Nitrogen as nitrate less than 10 mg/L
- Total phosphorus less than 1 mg/L
- Other contaminants less than the ecosystem protection criteria published in *Australian Guidelines for Fresh and Marine Water Quality* (2000) prepared by the Australian and New Zealand Environment and Conservation Council
- Should cause no discolouration, odour, sludge deposition, or floating matter in the receiving surface waters.

For larger scale aquaculture projects, wastewater should be fully contained within the project site or treated to a standard acceptable to the Department of Environmental Protection and this agency prior to discharge.

## Solid waste management

Solid waste matter should be disposed of by landfill, ploughed in as a soil conditioner or exported off site for useful purposes, where approved by the local government council's Environmental Health Officer.

## Monitoring and Reporting

Aquaculture operators should monitor the quantity of water used and discharged, the quality of water discharged to the environment including pH, suspended solids concentration, organic carbon, salinity, nutrients (Nitrogen and phosphorus) and the concentrations of any chemicals or pharmaceuticals likely to be present in the effluent stream.

The monitoring data should be held on-site for a period of not less than 2 years for scrutiny by government regulatory bodies.

## Regulatory requirements of other agencies

The Fisheries Department evaluates and licences commercial aquaculture projects. The EPA assesses projects that may have a significant impact on the environment and advises the Minister for Environment and Heritage on their acceptability.

The Department of Environmental Protection (DEP) assesses aquaculture projects holding a biomass equal to or greater than one tonne, and may issue a works approval and licence.

## Agency regional contacts

Details of any project where the proponent/operator considers he or she is unable to comply with these guidelines, or where site conditions prevent the application of these guidelines, should be submitted to this agency as early as possible so that the concerns may be negotiated and resolution sought.

For information on any matter relating to the management of water resources in regional areas, please contact the Water and Rivers Commission's regional offices listed on our Internet site: [www.wrc.wa.gov.au](http://www.wrc.wa.gov.au); and open the section *About the Commission* or contact our head office in East Perth.

## More information

We welcome your comment on these notes. They will be updated from time to time as comments are received or industry standards change.

If you wish to comment on the notes or require more information, please contact our Resource Quality Branch at the Hyatt Centre in East Perth.



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