Proposed marron farm at Landsdale

G E Dungey

Report and recommendations
of the Environmental Protection Authority

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1. Introduction and background

In March 1990 the Environmental Protection Authority received a proposal to farm marron and trout on Lot 155 Alexander Drive, Landsdale. This lot is located within the Mirrabooka Underground Water Pollution Control Area and the Mirrabooka Public Water Supply Area. Trout farms are known to produce high pollutant loads and the likely pollutant loads from marron farming using the system proposed by the proponent were unknown. Therefore the Authority decided that the proposal should be formally assessed at a Consultative Environmental Review level.

Subsequent to the Authority deciding to formally assess the proposal the proponent withdrew the trout farm aspect of the proposal and agreed to undertake a trial to quantify the pollutant load from the marron farming system proposed. Agreement was reached between the Water Authority of Western Australia, Environmental Protection Authority and the proponent in regard to the parameters to be monitored, responsibilities for monitoring, supervision of the trial and public availability of data gathered from the trial. The trial began in July 1990 and ran until December 1990. The proponent was requested to prepare a report within 6 months after completion of the trial and submitted the report to the Environmental Protection Authority in May 1991. The Water Authority of Western Australia also submitted a brief report on the trial to the Authority.

The trial results indicated that the system proposed would have negligible effects on groundwater quality with respect to nitrogen, the primary pollutant of concern from marron farms located within Public Water Supply Areas.

2. Description of proposal

The proposal has changed since it was first referred to the Authority. The original proposal was for up to 500 000 marron and some trout with a low water usage. The waste water was to be discharged to a windbreak around the property consisting of 1 100 Casuarina trees.

The proponent now proposes to install sufficient tanks for breeding and growout of 5 000 marron as stage one of the proposal and then annually increase the system to a total of between 200 000 to 300 000 marron. A biological filter, such as an artificial stream would be constructed in stage one and the water would be continuously recycled.

The proposal would now be based on a communal housing tank system rather than the compartmentalized system originally proposed.

The proponent does not intend to use any chemicals.

The proponent does not propose to dispose of any water or sediment and anticipates that water drained to permit harvesting of marron would be stored in a tank and re-used.

Sediments from the tanks would not be disposed of as the proponent considers the sediments can be used to assist marron growth.

This proposal differs from conventional marron farming practice where water and sediment are disposed of annually when marron are harvested. Advice to the Authority indicates that it is likely that the proponent would have to dispose of sediment in the future.

3. Consultation

The Environmental Protection Authority has consulted with the City of Wanneroo, Fisheries Department of Western Australia, Water Authority of Western Australia, Conservation Council of Western Australia and Australian Conservation Foundation in respect of this proposal.

4. Environmental assessment

The Environmental Protection Authority considers that, with the exception of potential pollution to underground water resources, the environmental impacts associated with this proposal are not likely to be significant. In Underground Water Pollution Control Areas, elevated nitrogen levels in the groundwater are of concern.

Odours are not likely to be a problem because of the farming system proposed and the nearest residences are a sufficient distance away.

The area surrounding the farm and the farm itself are zoned rural. This proposed land use is consistent with this zone.

4.1 Groundwater protection

Although the proponent does not propose to dispose of any water or sediment the Environmental Protection Authority believes this assessment should consider the conditions under which such disposal may be permitted. Advice to the Authority indicates that it is likely that the proponent would have to dispose of sediment in the future. In order to consider the acceptability of sediment and waste water disposal the Authority needed to review the potential nutrient load from marron farming, the trial results and the nutrient load from existing activities.

During consultation regarding this proposal concern was expressed that groundwater pollution could result if the tanks containing marron burst and discharged their contents onto the ground. The Authority considers that this is unlikely to occur frequently and that the nutrient loading from one tank would be sufficiently diluted by groundwater flows so as not to be of concern. Furthermore the sludge, which would hold most of the nutrient load, would be able to be cleaned up and carted away.

4.1.1 Potential nutrient load from marron farming

An initial assessment of the nitrogen load per year from the quantity of feed to be used in the original proposal was undertaken by the Water Authority. The feed which would be supplied to 500 000 marron would provide a nitrogen load in the order of 800 kg per annum. The export of nitrogen from the system would be influenced by many factors such as the growth rate and harvesting rate of the marron, the conversion of left-over food into algae eaten by the marron and microbiological de-nitrification processes. Many of the factors noted above are affected by water temperature. Therefore it was not possible to determine the likely nutrient load on a theoretical basis, and a nitrogen loading of 800 kg per annum would be considered unacceptable.

Using the farming system which is currently proposed, nutrients are typically in low concentrations in the water but do accumulate in sediments in the tanks. The sediments are typically rich in phosphate and should be disposed of off-site.

Marron can live in water with nitrate concentrations of up to 1 000 mg per litre, however will die if ammonia concentrations exceed 0.4 mg per litre.

The Water Authority of Western Australia has sufficient powers under its legislation and regulations to control the disposal of effluent waters and sediments in Underground Water Pollution Control Areas.

4.1.2 Trial results using individual compartments for marron

A six month trial using 600 marron was undertaken to determine the likely nitrogen and phosphorus loadings from the proposal. The trial found that nitrogen levels could be maintained at between 0.5 and 1 mg per litre by carefully managing the feeding rate. Phosphorus levels

were generally less that 0.5 mg per litre, except for one reading of 9 mg per litre which was attributed to an overfeeding event.

Using the system originally proposed by the proponent, the trial indicated that the nitrogen load contained in volume of water which was likely to be disposed of would have been negligible. The phosphate levels would need to be monitored over a longer period in order to obtain valid results.

4.1.3 Nutrient load from existing activities

The proponent has an orchard with 2 000 fruit trees and a 2.5 ha deer farm on Lot 155. Fertiliser applications associated with these activities using conventional farming methods would typically be greater than 9 kg of nitrogen per hectare per annum, which is the maximum rate which the Water Authority considers acceptable within Underground Water Pollution Control Areas.

The proponent has advised the Environmental Protection Authority that he intends to remove 1 200 peach and nectarine trees during winter 1991 and may remove the remaining trees in the future. Fertiliser application to the 1 200 trees to be removed have ceased.

The deer pasture is currently under review by the proponent. The existing kikuyu paddocks are being replaced with strawberry clover and this has reduced the quantity of fertiliser broadcast over the property. The proponent anticipates that when all paddocks are replaced with strawberry clover there would be no need to apply any nitrogen based fertiliser.

It would seem unreasonable to require this proponent in isolation to reduce existing fertiliser applications to rates recommended by the Water Authority unless similar action was taken in respect of adjacent landowners. The need to take such action is best considered by the Water Authority of Western Australia which has a responsibility to protect public water supplies.

Given that this is a new proposal the Environmental Protection Authority considers that the marron farm proposal should not add to the existing nutrient load to the property, and as consequence of a change in existing land uses, a reduction will be achieved.

4.1.4 Need for compliance monitoring

The Environmental Protection Authority considered the need for compliance monitoring using a groundwater monitoring bore installed by the proponent on the property. The Authority concluded that it would not be necessary for the proponent to install a groundwater monitoring bore because the trial results indicated that the annual nitrogen load from the farm is likely to be small.

5. Conclusion and recommendations

The Environmental Protection Authority concludes that the proposal by Mr G Dungey to farm marron, as modified since originally proposed, is environmentally acceptable.

In reaching this conclusion the Environmental Protection Authority identified the main environmental factor requiring detailed consideration as the potential impact of the proposal on groundwater resources used for public water supply.

The Environmental Protection Authority concludes that this can be addressed adequately by Water Authority of Western Australia legislation and the Environmental Protection Authority's recommendations in this report and accordingly recommends that the proposal could proceed.

Recommendation 1

The Environmental Protection Authority concludes that the proposal by Mr G Dungey to farm marron, as modified since originally proposed, is environmentally acceptable.

In reaching this conclusion the Environmental Protection Authority identified the main environmental factor requiring detailed consideration as the potential impact of the proposal on groundwater resources used for public water supply.

The Environmental Protection Authority concludes that this can be addressed adequately by the Environmental Protection Authority's recommendations in this report and accordingly recommends that the proposal could proceed.

Recommendation 2

The Environmental Protection Authority recommends that sediments from the marron tanks should be disposed of off-site to the satisfaction of the Environmental Protection Authority on advice of the Water Authority of Western Australia and Health Department of Western Australia.