PIRSA procedure

Government of South Australia
Primary Industries and Resources SA

PIRSA FISHERIES

ESCAPED AQUACULTURE FISH

CONTENTS

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1. Introduction

Aquaculture is an important industry in South Australia with an estimated direct output value of $244m, consisting of $188m on farm and $55 million in downstream economies (Econsearch 2006).

Successful management of aquaculture farms require the assessment and management of key environmental risks associated with these developments, which include managing the risks associated with escape of farmed fish into the wild. PIRSA currently requires that every aquaculture operation has a fish escape prevention strategy, developed based on risk assessment undertaken by PIRSA.

Nonetheless, fish escapes do occasionally occur as evidenced in the recent escapes of kingfish in Spencer Gulf, the potential for significant biological and environmental harm resulting from such events is of community concern.

This paper provides background on the risks associated with fish escapes and documents a policy position on measures needed to mitigate adverse ecological impacts in the event of an escape.

Whilst the escape of gametes from aquaculture fish may also have ecological impacts, they are usually indistinguishable from wild populations. This paper considers escaped gametes where they are directly attributable to aquaculture operations. The paper focuses on marine species only.

2. Background

Fish may escape in small numbers through operational leakage in farm cages or in large numbers through damage to the facility from incidents such as storms, interactions with marine mammals, vandalism and human error (Goldburg et al 2001). Whilst planning and operation of aquaculture farm developments can minimise the risk of fish escapes, they can not be eliminated.

Aquaculture has historically also been an important vector for exotic species. Escaped fish from aquaculture operations may have a range of impacts including the introduction of wild exotic populations, genetic shift in indigenous populations, ecosystem impacts though competition and predation and increased disease and parasite risk (Goldburg et al 2001).

A number of exotic fish species are farmed in South Australia, including Atlantic salmon and barramundi. However, establishment of feral fish populations from escape events for these species are highly unlikely due to a combination of breeding requirements and the culture systems used. While Pacific oysters are also exotic they do not establish through the escape of adults, but through the distribution of gametes. PIRSA Fisheries officers have identified significant wild populations of Pacific oysters in bays on the west coast.

The majority of fish farmed in South Australia are native species. As farmed fish are often either selectively bred or bred from a limited number of broodstock, the genetic make-up of farmed stock may differ significantly from that of wild stock (Goldburg et al 2001). Escapes of farm stock can lead to interbreeding with wild stock and a change in the genetic structure of these stocks. A review of literature relating to salmon farming described 10 studies where the genetic structure of farmed stock differed from that of native stock (Weir and Grant 2005). The review also indicated that there is limited research data on the consequences of escaped fish on wild populations.

However, those species currently farmed in South Australia are not selectively bred, although there remains a future risk that wild populations can be affected by selective breeding (eg kingfish).

Presently, all farmed aquaculture stock in South Australia are first-generation offspring of wild-caught broodstock. Of the species currently farmed, all are based on a reasonably large pool of broodstock (mulloway is the smallest, with probably 25 adults having contributed to the current aquaculture population). Some farming systems (e.g. abalone in semi-open systems) have management controls placed on them that maintains the genetic integrity of farmed populations with nearby wild stock.

It is important to note that not all fish that escape survive or compete with other fish effectively. Pillay (2004) indicated that the generally accepted view is that escaped fish have lower survival rates and are at a competitive disadvantage to wild stock. Studies on Atlantic salmon (summarised in Weir and Grant 2005) have found that escaped farmed stock generally have lower survival and fitness than wild stock. This is consistent with surveys on gut content of escaped salmon in Tasmania (Steer and Lyle, draft paper) and escaped kingfish in South Australia (Fowler et al, 2003), which indicated that escaped farm fish lack the foraging skills required for high levels of survival outside farming systems.

Disease, caused by infectious agents, may be more common in farmed stock than in wild stock due to a variety of factors (Goldburg et al 2001), resulting in an increased likelihood of infection of wild fish that come into contact with escaped farmed fish. However, if the parasites and disease agents are already present in local waters, such infection is unlikely to have measurable population-level impact. Recent surveys have indicated that wild fish are infected with the same parasite species that affect farmed fish as well as being infected with additional parasite species not observed on farmed fish (Hutson et al. 2006). Although wild fish may be infected with a greater number of parasite species, farmed fish are more likely to have greater burdens of parasite infection and more significant disease as a result of infection, which may have an impact on wild populations. As a result South Australia has regulatory measures for the management of serious disease outbreaks in farmed fish.

If the parasites or disease agents in farmed fish are not endemic in local waters, there is much greater potential for significant impact at the population level, because local wild fish would be naive to infection/infestation. Currently, all ‘imports’ of farmed food fish in South Australia are subject to health certification requirements.

3. Current aquaculture arrangements

All applications for an aquaculture licence are subject to an Environmentally Sustainable Development (ESD) assessment. This assessment includes risk analysis of escape, potential genetic effects, disease and other factors that influence the risks associated with escapes of farmed stock. Regulations and licence conditions are tailored to the level of risk posed by industry activities. This level of risk is assessed using information from applications, EMP Reports and Production Returns.

3.1 Reporting of escapes

Regulation 21 of the *Aquaculture Regulations 2005* requires an operator to report any escape of farmed fish or any damage to a structure that may lead to an escape within 12 hours of becoming aware of the event.

3.2 Preparedness

Regulation 19 under the *Aquaculture Regulations 2005* requires all operators to prepare and submit a written strategy to minimise the risk of escape. Each strategy must be approved by the Minister. PIRSA Aquaculture will assess each plan to ensure minimum acceptable standards.

In these written strategies aquaculture operators are required to address prevention issues (maintenance, anchoring, regular inspections), preparedness (skills, equipment and authorisations available) and response options.

3.3 Disease

South Australia has fish disease response arrangements in place under a variety of legislation, including the *Aquaculture Act 2001*, *Livestock Act* and *Fisheries Management Act 2007*. Policy frameworks are based on guidelines in the national Aquavetplan.

Administrative provisions for emergency response are summarised in the PIRSA Emergency Management Documents: Aquatic Animals Manual. In the event of a disease event in an aquaculture facility, PIRSA Aquaculture will coordinate a response. Should the disease spread to wild stock, PIRSA Fisheries will undertake a coordinated response to the event. The Chief Veterinary Officer is the responsible officer for South Australia in relation to fish health and coordination with this office will occur with any disease outbreak.

3.4 Ownership

Fish that escape from aquaculture structures become common property at the point at which they are no longer contained by the licensed operator. This is consistent with the approach taken in other jurisdictions.

3.5 Prosecution

Under the *Fisheries Management Act 2007* there are significant penalties for the deliberate release of farmed fish. The *Aquaculture Regulations 2005* also include penalties for failing to report an escape or damage that may lead to an escape, or failing to act in accordance with the approved written strategies required under Regulation 19.

4. Management arrangements

4.1 Preparedness

Licensed aquaculture operators are encouraged to develop strategies relating to the escape of stock that include a response plan for an escape event. A component of this section of the strategy includes proposed recovery techniques and any legal permission required to implement a response.

In order to provide certainty, it is appropriate to consider when exemptions/authorities may be issued to recover escaped fish. Under the *Aquaculture Regulations 2005* operators are required to recover any farming structure blown or washed from the lease area. Stock still contained within these structures may be recovered as part of this operation.

Exemptions and/or authorities may be granted for limited periods in special circumstances to recover escaped fish:

- Where they are clearly identifiable as farmed stock; or
- Where finfish are not clearly identifiable, but are likely to be farm stock due to size or colour consistency with farmed stock, within 500 metres of the release site; or
- Where motile shellfish (eg abalone, scallops) are not clearly identifiable, but are likely to be farm stock within 100 metres of the farm site.

Whilst stock may remain in the vicinity of the operation for some time after escape, they are unlikely to remain in the area for extended periods. Exemptions for recovery of escaped stock will not be issued for periods of more than 72 hours. This will allow a significant period to recover the fish, but minimise impact on other species. Exemptions will be limited to acceptable fishing techniques, though modifications of equipment to take small escaped fish may be considered where juvenile stock escape.

These exemptions:

- will be limited to a maximum period of 72 hours after the date of the escape;
- will be limited to recognised fishing practices (i.e. netting, hooking, hand collection, traps);
- will not allow fishing activity in closed fishing area; and
- may allow for modifications on fishing gear (smaller mesh nets).

It is important to note that there are no specific restrictions protecting escaped fish from other legal fishing activity.

4.2 Prosecutions and penalties

Under the *Fisheries Management Act 2007* there are significant penalties for the deliberate or negligent release of farmed fish.

Fish may escape through deliberate actions, negligence or through accident. A major fish escape clearly needs to be investigated and prosecution is appropriate in the event of negligence. In the event of accident (eg unexpected storm, collision with a vessel) a similar investigation will be required, but a prosecution would not proceed, unless the licensee was deemed to be negligent.

Under the *Civil Liability Act 1936*, negligence means failure to exercise reasonable care and skill, and includes a breach of a tortious, contractual or statutory duty of care. Plans prepared under Regulation 19 under the *Aquaculture Regulations 2005* will be considered in the determination of negligence. As regulatory frameworks evolve and codes of practice are developed for each industry, they may provide further information for consideration.

4.3 Recreational exemptions

There have been proposals for the provision of exemptions to change recreational size and bag limits following an escape to help normalise the populations of that species (eg kingfish).

Size and bag limits are in place to manage fish stocks. Changes to these limits may have significant localised impacts and will increase complexity of compliance for the fishery. In most cases the numbers of fish escaping are unlikely to have significant impact on a population of fish and exemptions will not be considered.

Recreational exemptions and/or changes to size, bag and boat limits will not be considered as an emergency response option for escaped fish. Changes to recreational limits may be considered over a longer term, should the release of a large number of larger fish be considered to have the potential to have a significant impact on local fish populations and the environment. These would be assessed on a case by case basis.

Established feral populations of exotic aquaculture fish

If exotic populations of aquaculture fish escape and subsequently establish in the wild, it may be necessary that these populations are removed and destroyed.

There is currently a problem with established populations of feral Pacific oysters on the west coast, which have established through gamete release from the surrounding farms. To reduce the impact on coastal environments, shellfish biodiversity and shore amenity, there needs to be a program for regular control and removal of feral pacific oysters. The oyster industry needs to recognise and accept this problem and make a significant contribution to the control program.

Populations of exotic organisms resulting from escaped farm stock should be identified and control programs developed to manage them, including cost-benefit analysis.

PIRSA in association with the oyster farming industry, will develop a regular control and removal program for feral Pacific oysters.

5. Policy Summary

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