

Natural Resources Commission
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Dear Sir or Madam

Thank you for offering the New South Wales Fisheries Scientific Committee (FSC) the opportunity to comment on the issues paper on State-wide review of NSW pest animal management. The FSC, which is established under Part 7A of the *Fisheries Management Act 1994* (the Act), is responsible in New South Wales for functions relating to the listing of threatened species, populations, ecological communities of fish and marine vegetation and key threatening processes as are conferred to it by the Act. The FSC also advises the Minister and the Natural Resources Commission on any matter relating to the conservation of threatened species, populations or ecological communities.

Pest animal management is not a central focus of the FSC, but is relevant to the conservation of a variety of threatened freshwater fauna. One of the Key Threatening Processes listed by the FSC is *Introduction of fish to fresh waters within a river catchment outside their natural range*, and most of the listed threatened freshwater communities (e.g. the Aquatic ecological communities in the lowland catchments of the Lachlan River; Darling River, lower Murray River Catchment and Snowy River in NSW) are also impacted by a variety of aquatic pest species.

Management of pest species in aquatic environments is fundamentally different to managing terrestrial pests, and poses a number of unique challenges:

- Aquatic environments are often linear,
- Aquatic pest species can rarely be directly observed, and leave little obvious evidence of their presence (e.g. scats, signs, etc.),
- High value aquatic environments cannot be fenced to exclude pest impacts,
- There are very few control mechanisms that can be targeted at individual species (i.e. available toxicants generally affect a broad range of aquatic species).

For these reasons, while there are benefits in having broad policy or principles applicable to both terrestrial and aquatic pests (e.g. prevention of establishment; all pests should be considered detrimental until proven otherwise; quick containment action is best), there are some clear advantages in having specific on-ground management arrangements that are focussed on individual environments (e.g. Aquatic vs terrestrial). Aquatic pest management requires a different set of skills, experience, equipment and networks to terrestrial pest management, and there is a risk of a one-size-fits-all approach seriously under-delivering in pest management outcomes.

Firstly, the FSC questions why marine (and estuarine?) pests are not covered by this review; the similarities between managing marine and freshwater pests are often greater than that between terrestrial and freshwater pests. However, given the Terms of Reference of the Review, the FSC offers the following general comments under the broad headings provided in the issues paper:

Roles and responsibilities

The roles and responsibilities are not clear for all animal groups. E.g. what role/responsibility does local government have for alien freshwater fish?

The triggers for State Government involvement in pest fish management are also not clear for freshwater 'fish' (as defined under the *Fisheries Management Act 1994*). State government is usually the only resource for effective onground management and control. Detection of new alien fish incursions should trigger a mandatory initial State Government response. Where river basins involve multiple jurisdictions (e.g. the Murray-Darling Basin), there is an apparent need for cross-border coordination to harmonise state management practices and facilitate sharing of knowledge and experience.

It is doubtful that current compliance and enforcement arrangements are effective for fish, largely because of the 'underwater out of sight' nature of pest fish issues. Illegal transfers of alien fish between catchments or waterbodies often remains undetected for years, and so it is usually too late for effective compliance or enforcement activities to take place.

The increasing popularity of ornamental fish keeping; the increasing scope of recreational fishing activities; and the increasingly multicultural nature of society means that existing resources for surveillance, education, and initial response and control options are now stretched very thinly.

Shared ownership

It is extremely difficult to encourage or facilitate community-based pest management of pest fish when we often don't understand the social drivers behind pest fish introductions. One person's desirable species may be another person's pest (e.g. Carp, trout, Redfin Perch). Similarly, it is difficult to craft education/awareness programs when the social values of particular community groups or drivers associated with the spread of particular species are not well understood. Development of education programs in secondary schools may be one way of developing shared appreciation of the risks and impacts of pest species. There are opportunities for improved data collection and sharing with industry and the broader Community, and the recent Feralfish scan initiative (a laudable cooperative effort among different levels of government, universities and NGOs) is a good example: <http://www.feralscan.org.au/feralfishscan/default.aspx>

Priority pest species

Standard pest management principles should be utilised for all pest species, both terrestrial and aquatic. The focus should be on impacts, not just numbers; what is the likelihood of successive control; are all stakeholders on board? (see the *National management strategy for carp control 2000-2005*; and the associated documents on research needs and prioritisation guidance for communities published in 2000, but effectively not implemented as a result of scarce resources). The prevention of establishment of new species at a State level should be a priority, but if established species or new incursions are confined to a particular catchment or area, then early intervention to contain or control such incursions is equally a priority. Dedicating large amounts of resources to widespread species where their impacts are not well-understood is unlikely to be a recipe for success. For example, redfin perch pose well-identified threats to Macquarie Perch and Southern Pygmy Perch in the Lachlan catchment, and so should be a higher priority than general Carp invasion with undefined impacts.

The proximity of catchments with high value ecological assets but without infestations of high priority pest species to infested catchments should also be considered when deciding on the spatial distribution of management priorities. Such an approach has been used for targeting education and surveillance programs for Tilapia in Queensland.

Landscape approach

Pest fish management activities should include a mix of activities coordinated by both species and locality. So for new incursions, locality is an important consideration of priority (i.e. better to contain

or prevent spread in a largely un-infested catchment) whereas in catchments where there are a number of widespread alien fish species, targeting the species with greatest impact would be sensible.

Improved and targeted surveillance and education programs are needed to ensure early intervention in pest animal management. This includes education programs in languages in addition to English in some areas, as well as harnessing citizen science to be 'eye on the ground' (see Feral fish scan above). Mandatory reporting of high level noxious aquatic species may also assist in early detection and intervention.

Expert peer review or the development of QA/QC processes can assist in validating ad hoc reports of pest species, particularly where observation may be difficult (e.g. observations of fish). The benefits of integration of management of pest animals and pest plants can be variable, depending on the species, ecosystem, or scope of management in question. As indicated earlier, onground management of aquatic pests has always been separately managed from terrestrial pests, but the shortcomings of this were recognised nationally in the mid-2000s when pest fish came under the auspices of the previously terrestrially-focussed Vertebrate Pest Committee. The identification of priority animal pests and overarching principles benefits from a high-level integrated approach. However, onground management will likely benefit from a continued separation of terrestrial and aquatic animals, with weeds a separate program again. Combining all pest animal and plant programs at an operational level is likely to increase confusion of responsibilities and result in a dilution of effort.

Emerging issues

The continued expansion of the establishment of wild populations of ornamental fish species nationally and in NSW is a major emerging issue. Similarly, the increasingly multicultural nature of communities, which brings with it a diverse range of religious and ethnic practices, means that management of pest animal species is becoming increasingly challenging. The ceremonial release of animals from captivity is a practice common in some religions, and management authorities need to understand how best to respectfully manage such practices.

The encouragement of industries that commercially harvest pest animals such as Carp for economic gain can be beneficial, but will never be a viable method of control. Similarly, the encouragement of Carp fish-outs may have a valuable awareness-raising function, but has been shown to have little or no impact on Carp populations.

Adequate resourcing

The current resourcing and funding arrangements are not sufficient for freshwater pest species. Additional resourcing is required for broad and targeted community education, surveillance monitoring of high priority waterways, rapid response to new incursions, development of additional management tools and techniques, and research. The distribution of funding to pest management is not equitable and not necessarily matched to pest animal priorities. Existing pest management is heavily skewed towards agricultural pests, with environmental pests attracting little funding.

The current investment in research is not sufficient (e.g. amount of funding, time scale of funding) for pest fish issues. Investigation of potential control methodologies is particularly needed (there are very few control options available, with only a single chemical control method available for fish (Rotenone)). Additional research is also required into the impacts/ecology of pest fish, and what levels of control are required to demonstrate a reduction of pest fish impact. How to better harness or fund the additional research investment required for pest fish is difficult to define, given the almost total lack of a national framework for establishing priorities for pest fish management (e.g. the Vertebrate Pest Strategy). In NSW the recent release of biosecurity legislation and the pest fish strategy gives some hope for better resourced and focussed research.

While pest management should be collaborative and involve all stakeholders, care must be taken to ensure that no one stakeholder captures or drives prioritisation of activity or expenditure. Similarly, just as involvement of stakeholders in setting the pest management agenda is appropriate, it is also appropriate that where stakeholders generate pest animal management risks and/or benefit from pest animal management actions, they should contribute to the costs.

Knowledge building

A barrier to the development and/or implementation of best practice pest management is the lack of funding. Some funding for PhD scholarships at universities would be a cheap and effective way of generating new knowledge and developing and testing control technologies. While this funding may be available for projects with an agricultural focus, little is available for environmental problems, particularly aquatic ones.

Current surveillance activities in aquatic environments are highly unlikely to identify new pest animal incursions in a timely manner. In the aquatic environment new pests are rarely seen until they are established. An aquatic monitoring program, possibly utilising eDNA technologies and genetic bar coding present real opportunities for aquatic pest monitoring in the future.

For further information regarding this correspondence, please contact the FSC's Executive Officer, Maryrose Gulesserian by phoning 02 8437 4975.

Yours Sincerely,



Assoc. Prof. Mark Lintermans
Chairperson
Fisheries Scientific Committee
30th November 2015