ecosure

31 January 2019

Committee Secretariat
Standing Committee on the Environment and Energy
PO Box 6021
Parliament House
CANBERRA
Canberra ACT 2600

Dear Committee Members

RE: Inquiry into controlling the spread of cane toads

Thank you for the opportunity to contribute to the Standing Committee on the Environment and Energy's inquiry into the Department of the Environment and Energy's annual report 2017-18 focusing on controlling the spread of the cane toad (*Rhinella marina*). This submission will address the terms of reference for the inquiry, specifically:

- The effectiveness of control measures to limit the spread of cane toads in Australia
- Additional support for cane toad population control measures.

Ecosure is a privately-owned company which has been operating for over 20 years, primarily in Queensland. We are a multi-disciplinary environmental consultancy that leads the industry through innovation and excellence in environmental science. Our approach combines current best practice science and practical field application to deliver a truly integrated service. Our company values are based on ethical, commercial and social practices and relationships that are fair and sustainable. We employ approximately 100 staff and are one of the largest ecological and environmental companies in Queensland, with offices on the Gold Coast, Brisbane, Rockhampton and Townsville, as well as in Coffs Harbour and Adelaide.

1. Effectiveness of cane toad tadpole control

Ecosure is an affiliate of the Cane Toad Challenge (CTC) established by the University of Queensland's, Institute of Molecular Bioscience (IMB). The aim of the CTC is to work with communities to try and manage the environmental and economic impact of cane toads in Australia. The IMB have developed a cane toad tadpole attractant bait over several years. The basis of the attractant is a chemical taken from the parotoid gland of adult cane toads. The attractant chemical induces an innate predatory behaviour within cane toad tadpoles to feed on cane toad eggs as an opportunistic food source or in an effort to ensure the fittest of the

species survives[1]. The isolated chemical is turned into a water-soluble attractant which is placed in a simple trap within a waterbody where cane toad tadpoles are present. The tadpoles are drawn into the trap following an attractant plume released from the bait. Captured cane toad tadpoles are then manually removed and humanely euthanised.

Attractant baits were used in a pilot cane toad tadpole trapping program conducted by Ecosure on behalf of Brisbane City Council (BCC) and the CTC between October 2017 and April 2018. A second trapping program, which commenced in November 2018, is underway with estimated completion in April 2019. Through this experience, we have developed a thorough understanding of cane toad tadpole trapping including use of the attractant bait, trap design, trapping locations and ideal trapping conditions. We recognise the advantages and limitations of cane toad tadpole trapping which we believe is valuable information for the inquiry.

Attractant baits can be used to support cane toad control in two scenarios; a) eliminating tadpoles from waterbodies at the invasion front, and b) reducing the cane toad population by removal of tadpoles from waterbodies within areas where the species is established. Both scenarios can be supported using an attractant bait along with other cane toad control measures.

Attractant baits enable collection of large volumes of cane toad tadpoles (1,000s of tadpoles per day) with minimal effort. Traps can be set and emptied on the same day enabling efficient removal of tadpoles from waterbodies.

Effective cane toad tadpole trapping for population control needs to be systematic and coordinated and used in concert with other control strategies such as adult toad exclusion from breeding waterbodies. The CTC comprises a large number of community groups and local governments that are using attractant baits and are actively completing cane toad tadpole trapping. However, there is currently no coordination of trapping effort across the cane toad's range or determination of where trapping effort should be directed, e.g. within high conservation value areas.

Recommendation: determine a mechanism to prioritise and coordinate trapping and control efforts.

As the cane toad is continually extending its range, mapping should be updated concurrently. The Commonwealth Department of Environment and Energy's most recent cane toad distribution is dated 2008. A known extent of occurrence allows trapping effort to be directed to the invasion front and target habitat where cane toads are likely to colonise. It also allows trapping effort to be focused at areas where threatened fauna species are known to occur in an effort to limit cane toad impacts to these species.

[1] Crossland M.R, Shine, R (2010) Cues for cannibalism: cane toad tadpoles use chemical signals to locate and consume conspecific eggs. *Oikos*, 120(3), 327-332

Recommendation: resources should be allocated to update the current cane toad population extent and density mapping.

The cane toad tadpole trapping conducted by Ecosure on behalf of BCC and the CTC was small scale, targeting 15 waterbodies in western Brisbane. To better understand the effectiveness of tadpole trapping, ongoing research is needed to analyse the success of cane toad tadpole trapping programs at a landscape scale. Results of this research will assist in developing strategies which can manage this pest species in existing populations and thereby improve the effectiveness of cane toad management. In addition, sustained resources to coordinate and implement a systematic approach to cane toad control is required to provide up to date information on coordination, processes and successes.

Recommendation: ongoing research is needed to analyse the success of cane toad tadpole trapping programs at a landscape scale.

Attractant bait is currently manufactured from the parotoid glands of adult cane toads. This means that adult toads must be captured, humanely euthanised and then dissected to remove the glands. The IMB receives glands, processes them and then manufactures the bait. This is a laborious process requiring capture of adult toads, humane euthanasia, storage of frozen toads, dissection of glands and transport to the IMB. Attractant bait is an efficient means of removing tadpoles from waterbodies and can be considered an essential tool for cane toad population control, therefore, the provision of support to develop an artificial bait should be a priority. While attractant bait production process is streamlined, the collection and transport of adult toads is not coordinated and relies on a 'handshake agreement' in so far as the attractant bait is provided to CTC affiliates as along as glands are supplied. In lieu of an artificial bait, a coordinated effort is required to ensure an adequate supply of toads is supplied to the IMB.

Recommendation: support for ongoing research for a synthetic attractant bait that is effective, affordable and easily accessible to users.

2. Additional support for ongoing control measures

Euthanising cane toads and tadpoles

After collecting cane toads; the euthanising, dissection of parotoid glands and disposal of individuals are an important consideration. The Royal Society for the Prevention of Cruelty to Animals (RSPCA), details three methods for the euthanising of cane toads which have been described in the Standard Operating Procedure for the Humane Field Euthanasia of Cane Toads (SOP)[2]:

a) spraying with Hopstop® (an aerosol spray specifically developed for killing cane toads and commercially available)

[2] Sharp T, Lothian A, Munn A and Saunders G (2011) CAN001 Methods for the field euthanasia of cane toads. Australian Government, Department of Sustainability, Environment, Water, Population and Communities.

b) stunning followed by decapitation

c) prolonged exposure to carbon dioxide.

A fourth method, cooling followed by freezing was previously utilised but is currently listed as unacceptable due to assumed pain felt by animals as ice crystals formed in body tissues. A recent study by Shine et al. (2015)[3] found that, at least for cane toads, that brain activity declined slowly during cooling with no obvious signs of pain. They suggest that this may be an ethically suitable form of cane toad euthanasia with several benefits. These being that there is no requirement for specialist knowledge (stunning and decapitation required practice and knowledge), or tools and equipment (CO^2 bottles) or relatively expensive sprays (Hopstop®). The process is simple (place toads in fridge overnight then place in freezer) and bags full of toads can be treated at the one time. The cooling and freezing method should be reviewed and if found suitable, be utilised as a humane method of cane toad euthanasia. This process also allows the deceased cane toads to be utilised in the manufacture of BufoTabs. To produce BufoTabs the parotoid sacs must remain relatively intact. The location instructed for decapitation removes the front third of the parotoid sac, thereby rendering this process unsuitable to euthanise cane toads for the production of BufoTabs.

As with cane toad adults, tadpoles require euthanising after capture. While tadpoles are a stage in the life cycle of an amphibian they respire and move like fish, meaning there is no specific methodology for euthanising cane toad tadpoles listed within the SOP. Several methods of humane euthanasia for fish are recommended by the RSPCA. Sick or injured aquarium fish can be euthanised via anaesthetic overdose (Aqui-S®), by utilising products containing eugenol or derivatives, or by physical means such as stunning and decapitation. Ecosure suggests that a review of cane toad tadpole euthanasia methodology also be completed with outcomes and preferred humane methods developed and published.

Recommendation: resources be allocated reviewing cane toad adult and tadpole euthanasia, particularly the cooling and freezing method, with preferred methods published.

Habitat modification through riparian restoration

The use of attractant baits is an effective means of removing cane toad tadpoles from waterbodies, however, it does not prevent further cane toad breeding within waterbodies. While resources for cane toad control have historically been channelled toward direct/physical cane toad removal, riparian restoration offers an indirect form of cane toad control through breeding minimisation and prevention. Modification of bank structure of waterbodies to include dense edge plantings creates a barrier to toad ingress. While not eliminating the ability of cane toads to enter a waterbody, a dense riparian zone limits access to potential breeding sites. Planting of canopy species shades banks and creates overhangs changing the preferred breeding site characteristics, again, reducing suitable cane toad breeding sites. Riparian restoration will also improve habitat for native frog species and in turn, a strong native frog

[3] Shine R, Amiel J, Munn A, Stewart M, Vyssotski AL and Lesku JA (2015) Is “cooling then freezing” a humane way to kill amphibians and reptiles? *Biology Open* 4(7) doi:10.1242/bio.012179.

community will provide additional competition for cane toads.

Recommendation: future riparian restoration programs should consider methodologies which reduce cane toad breeding habitat.

Recommendation: reducing cane toad breeding habitat by supporting riparian restoration/rehabilitation as part of cane toad funding programs.

A singular approach to cane toad control is unlikely to result in a significant reduction in this species. However, targeting the habitat and life characteristics of the cane toad as part of a multi-faceted management approach will increase the success in reducing the numbers and spread of this species.

Thank you for the opportunity to provide input into the Committee's review into controlling the spread of cane toads. If you wish to discuss any of the above submission further, please contact myself on or .

Yours Sincerely

Phil Shaw
Managing Director