Local Land Services

Cane Toads

(*Rhinella marina*)

A literature review and learnings guiding cane toad management in northern NSW

October 2023 Sarah Johnson

NSW GOVERNMENT

The success of the Australian Super Toad

1. Flexible/plastic in behaviour and ecology
2. Poison – bufotoxin
3. High reproduction rate
4. Ability to exploit disturbed environments
5. Mobility and movement
6. Tough, large body shape

Trail of Destruction – Native Wildlife

There are several ways in which the cane toad impacts our native wildlife:

- Bufotoxin poisoning
- Cane toads can consume you
- Competition for resources with native species
- Cane toads transmit pathogens

Trail of Destruction – native wildlife

The Trail of Destruction – Agriculture

- Apiary industry – toads eat non-native bees
- Cane Toads consume native pollinators
- Cane Toads consume dung beetles

North Coast Local Land Services

Cane Toad Management on the North Coast, NSW

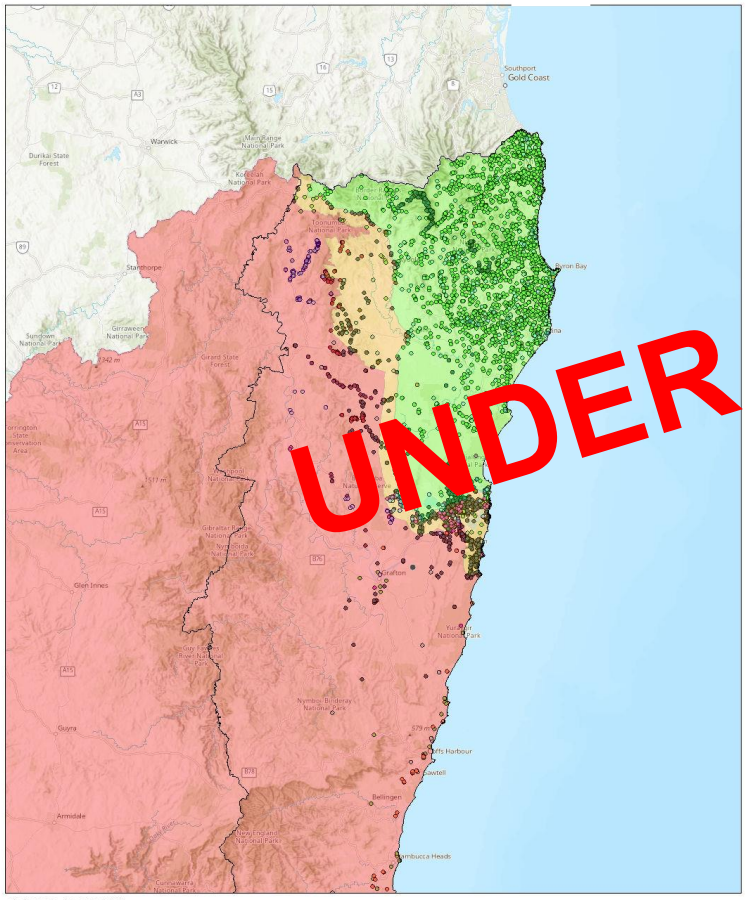
Monitoring & Control by LLS

3

Local Land Services

Cane Toad Management – NSW Biosecurity Zone

DPI Cane Toad Biosecurity Zone

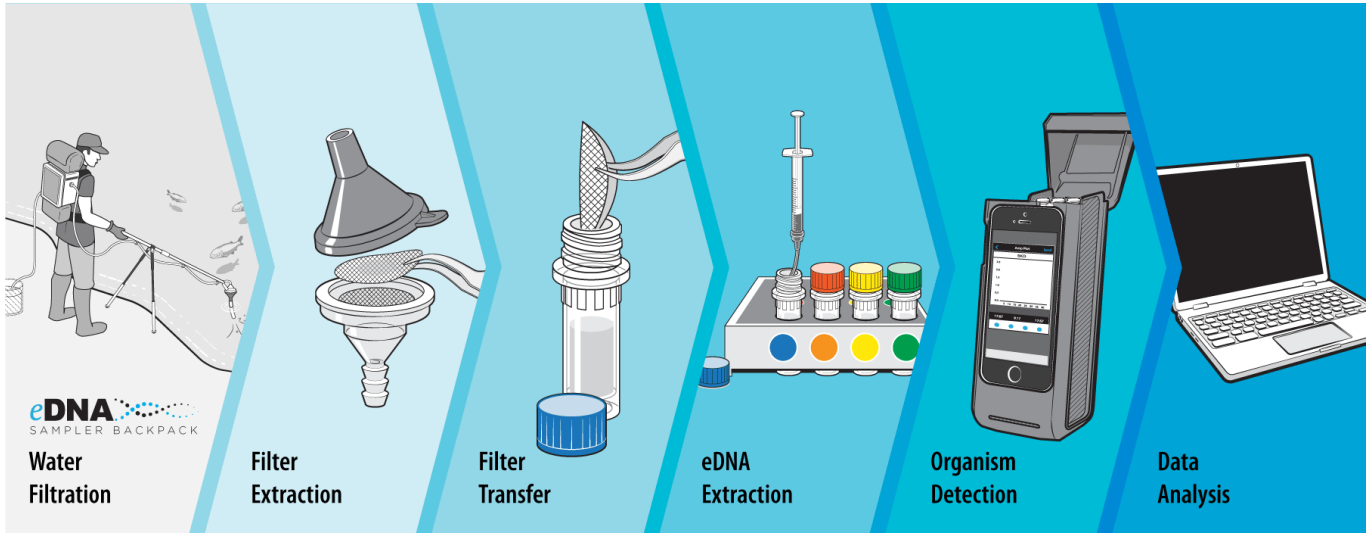


UNDER REVIEW

Area	Management
Established population **GREEN**	Prevent cane toads moving into the Biosecurity Zone Asset Protection approach
Buffer/Active Control Area (Biosecurity Zone) **AMBER**	LLS/Landcare contracts and eDNA monitoring
Cane Toad Free Area (Biosecurity Zone) **RED**	Eliminate incursions

NCLLS – Monitoring using eDNA

- Rate of toad DNA decay **less than** rate of shedding
- Detects cane toad presence **if** the cane toad has used the waterbody over the last 2-3 days
- Presence AND absence – Biosecurity Zone



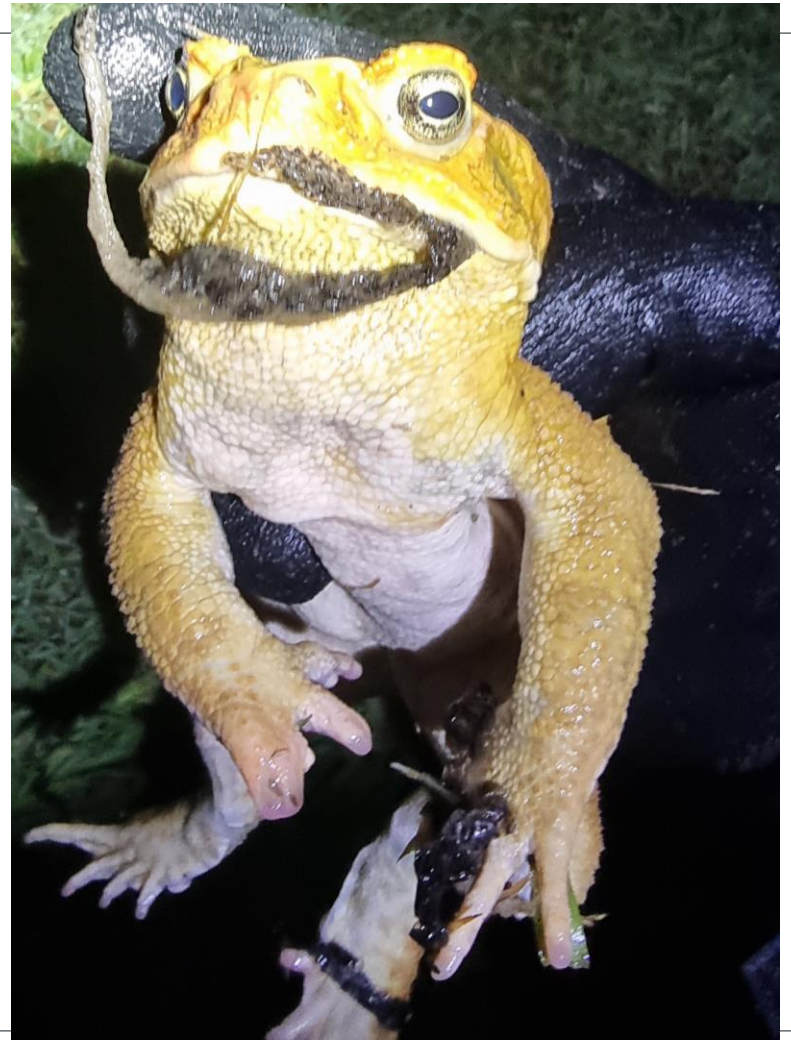
NCLLS & Landcare Cane Toad Control

Population suppression method	Life stage targeted	Time-frame	Barriers to implementation
Hand collection	All life stages	Short-term	High reproduction and dispersal means long-term reductions are difficult
Fencing waterbodies	Adults / juveniles	Short-term	North Coast climate, fence maintenance, collateral impacts
Adult traps	Adults	Short-term	High reproduction and dispersal means long-term reductions are difficult
Tadpole traps	Tadpoles	Short-term	High reproduction and dispersal means long-term reductions are difficult
Suppression pheromones	Tadpoles	Medium-term	High reproduction and dispersal means long-term reductions are difficult
Using native species to reduce toad numbers	Tadpoles	Short-term	Effects on non-target species
Pathogens	All life stages	Medium-term	Effects on non-target species, suitable option currently not available

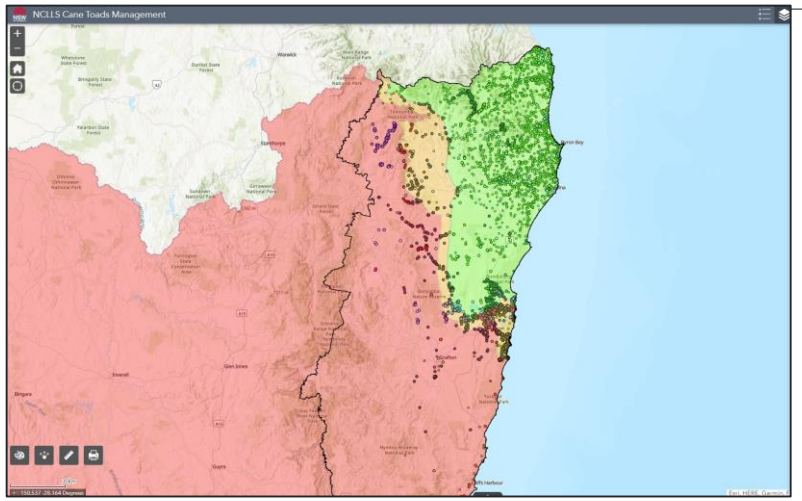
Adapted from New Weapons in the Toad Toolkit, Tingley et al., 2017

The Future of Cane Toad Management

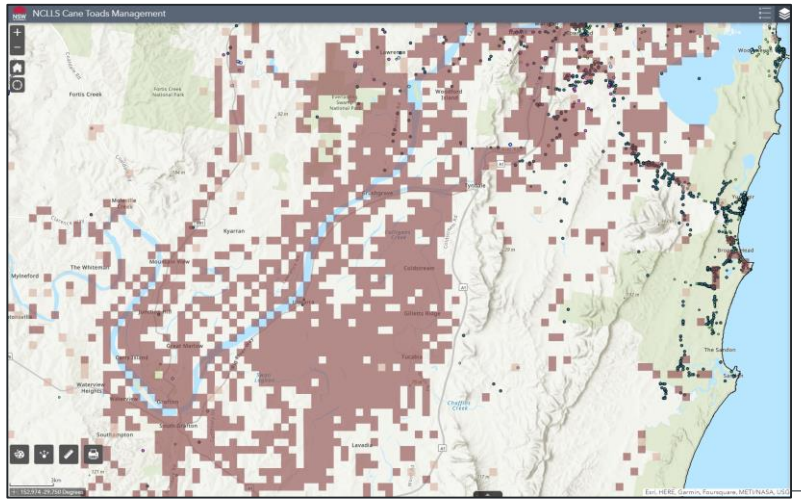
- Central data system
- Data driven decision making
- Collaboration between agencies, and academia
- Improved monitoring and control options for the North Coast
- Management focused on exploiting ‘ecological traps’; understanding the toad
- NSW focused (lots of NT & QLD research approach)



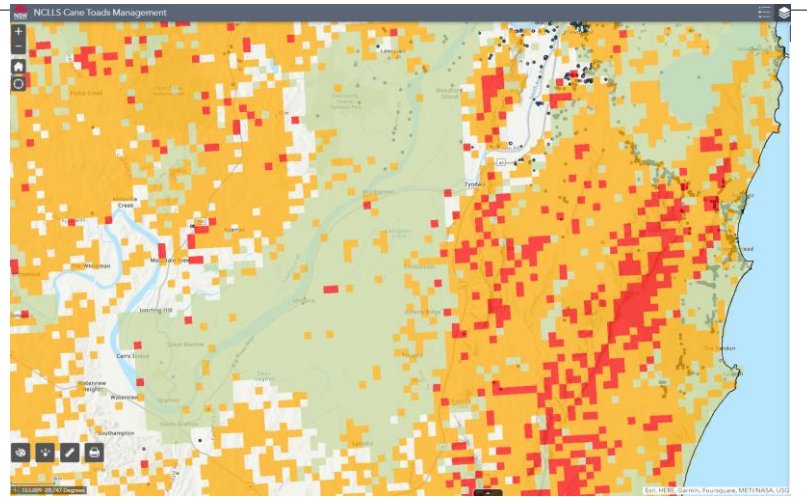
Centralised database – Cane Toad Interactive Mapping Tool (IMT)



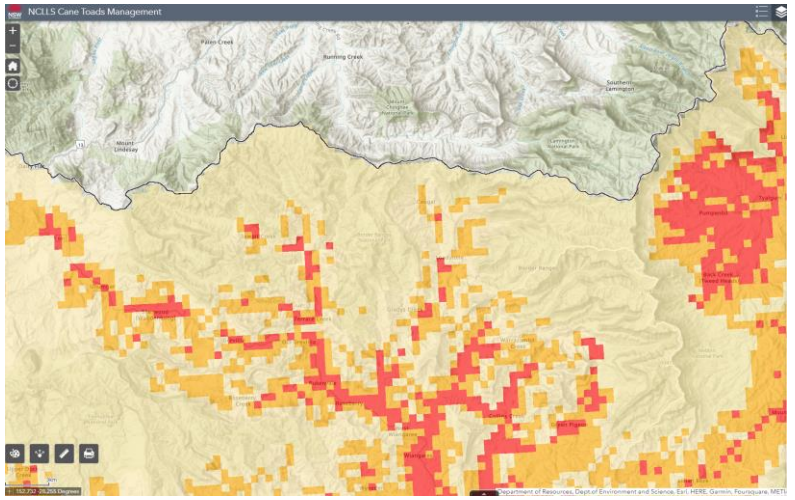
1. Cane Toad record consolidation



2. Cane Toad Potential Movement Pathways



3. Native species habitat hotspots



4. Cane Toad Potential Habitat

What we know – breeding

Function	Control solution
Toads require water to hydrate and breed	Focus control efforts at breeding waterways and target tadpoles

What we know – communication

Function	Control solution
Tadpoles use olfactory cues to actively search for toad eggs to consume	Use bufotoxin to attract tadpoles

I am a tasty cane toad egg…eat me!
- **Bufotab**

I can smell cane toad eggs (bufotoxin)
- **Cane Toad tadpole**

Cane toad eggs are a tasty treat AND I will reduce competition from other cane toads!
- **Cane Toad tadpole**

What we know – nature-based solutions

Function	Control solution
Toads prefer gently sloping, bare dams to breed	Impede CT access to waterbodies using native vegetation
Toads require water temp>16 C for eggs to develop	Shade dams to reduce water temp = shorten breeding timeframe?

What we know –nature-based solutions

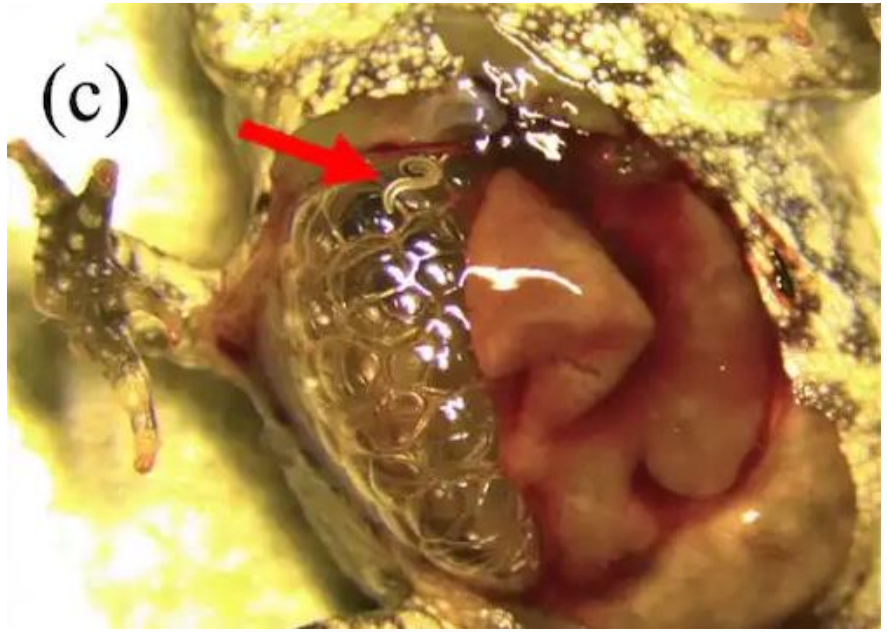
Function	Control solution
Toads are not immune to predation by some native species	Create habitat specific to cane toad predators - Arthropods - Birds who have adapted behaviour - Rakali
Cane Toad tadpoles compete with native frog tadpoles	Improve habitat for breeding by native frogs - Green Tree Frog tadpoles specifically increases the larval stage of CT tadpoles and decreases

Image credit: Australian Geographic

Image credit: Australian Geographic

What we know – biocontrols using pathogens

Function	Control solution
Toads are susceptible to pathogens	- Entamoeba - Lungworm - Virus’



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Thank you to Dr Matt Greenlees and Hunter GIS for assistance over the past 12 months.

Thank you

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