Northern Australian Mammal Decline: Progress and Prognosis
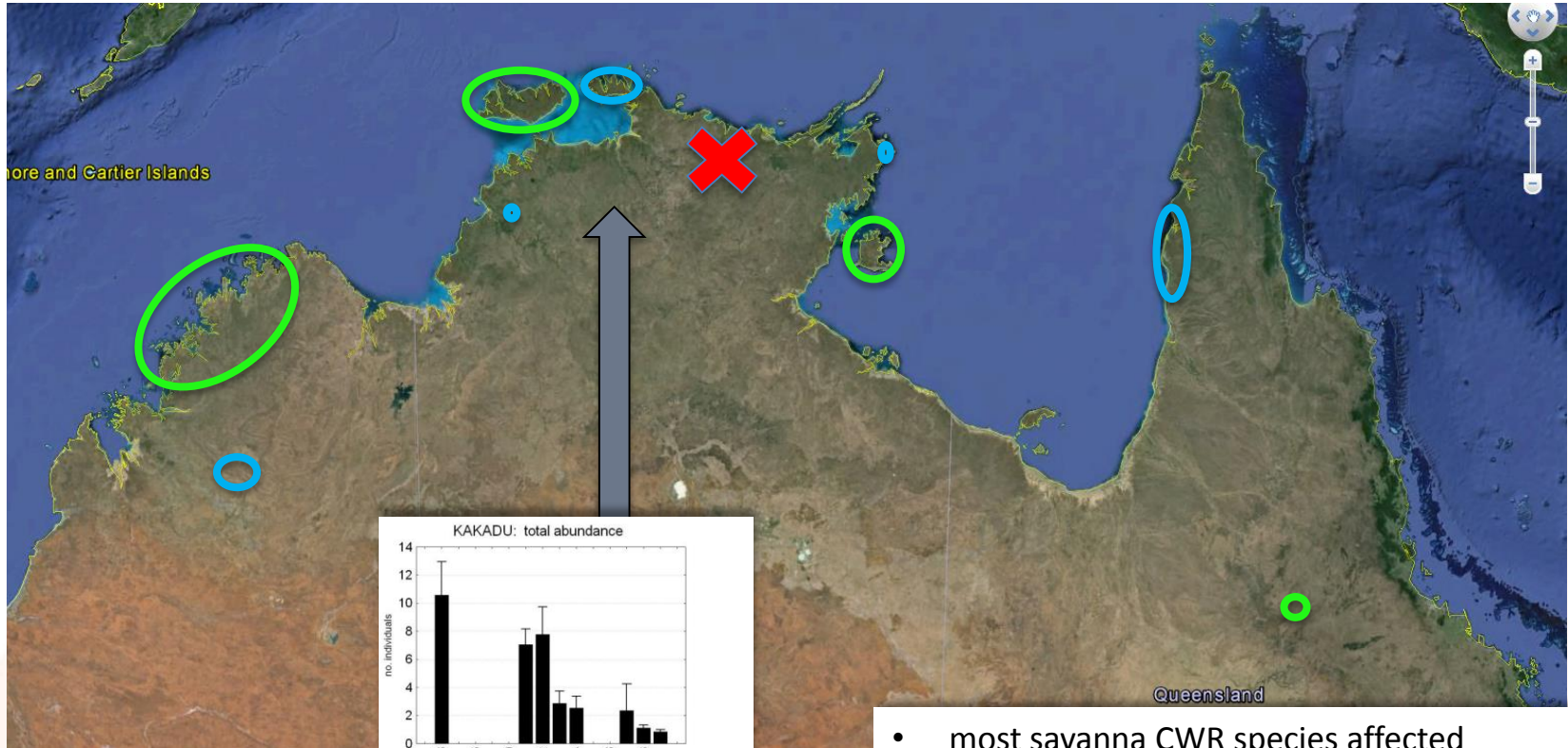
Graeme Gillespie and numerous others

What we do and don't know

- Considerable effort and outputs in past ~ 5 years; much work currently underway or planned

- Pattern and extent of declines

- Causes of decline
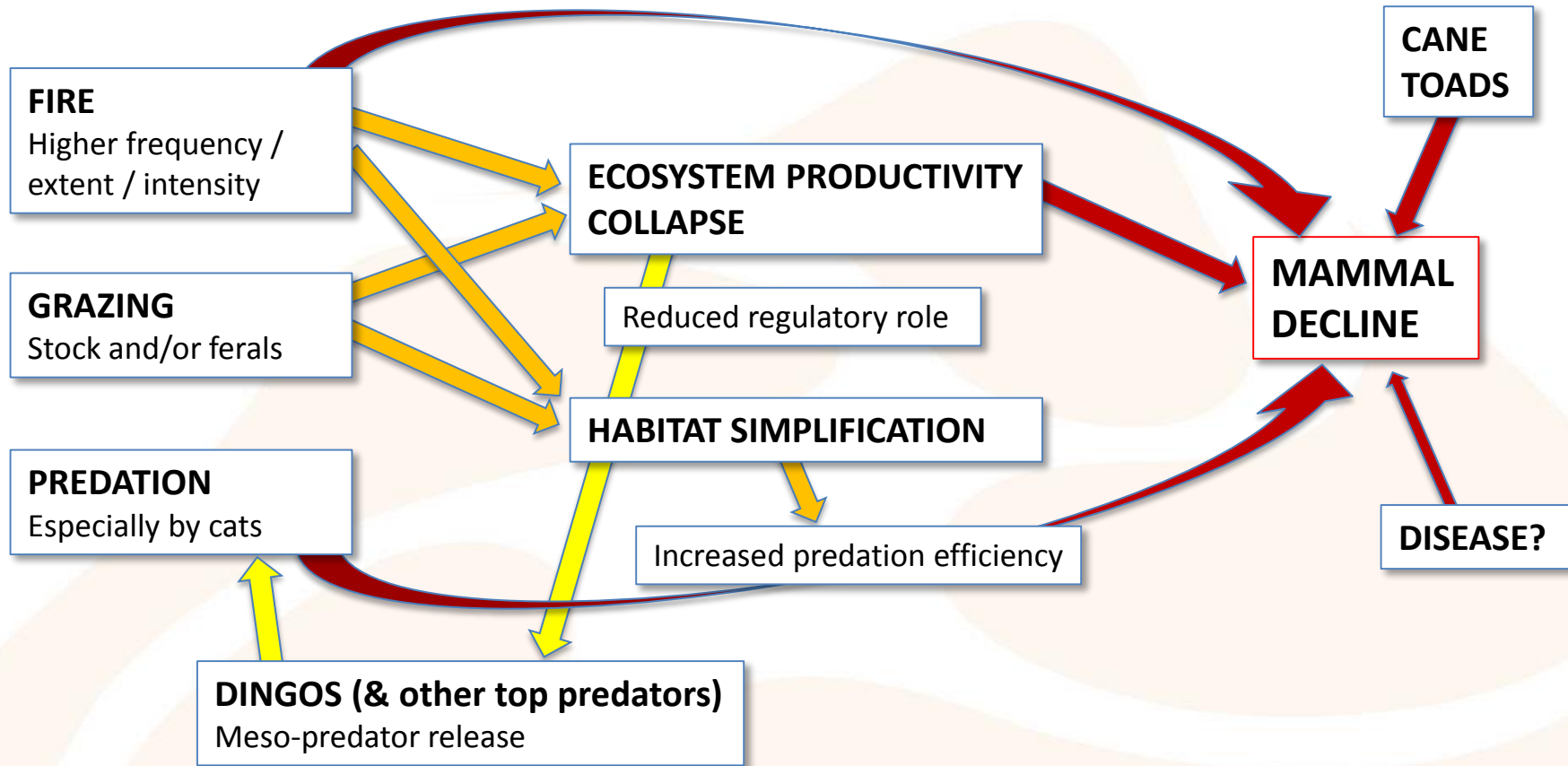
- Management response

- Research needs

Pattern and extent of decline

KAKADU: total abundance

- most savanna CWR species affected
- mixed signal for smallest rodents and dasyurids
- poor data for bats, some macropods

Causes of decline

Causes of decline - fire

Numerous studies showing negative impacts of fire on some small mammal species:

- Fire variables (frequency and size) <u>partially</u> explain the relative extent of decline for Kakadu mammals;

- High fire frequency leads to decline in several species due to <u>reduced recruitment</u> (Kapalga);

- High intensity fires lead to decline in two rodent species due to <u>high mortality</u> (Mornington);

- Mortality was strongly linked to <u>predation</u>, with cats (and dingos) concentrating on burnt areas;

- Sustained high frequency fire reduce habitat quality (food plants, midstorey, hollows, logs);

- GOAL: significant increase in areas of savanna with >4 year fire-return ?

- Which fire variables (frequency, extent, intensity) are most important? Mechanisms & Thresholds?

- Timing of major fire regime changes cf. mammal decline? And note Arnhem Land declines.

Causes of decline – cats

- Increasing knowledge of cat ecology in northern Australia (and public profile);

- Improving tools for monitoring cats;

- Even few cats can readily extirpate local mammal populations (Wongalara);

- Cat numbers concentrated and predation more effective in recently burnt areas; and other low cover areas (eg. heavily grazed)

- Is there a timing discrepancy with cats also?

- Is there a threshold density above which cat predation becomes critical?

- What role do dingos (or other top predators) really play??
    - Model of strong top-down regulation in high productivity areas
    - Some evidence of dingos suppressing cats, or at least reducing cat predation
    - May be significant predators on small mammals in some areas

Management responses

- Management levers
  - **Fire**   (careful landscape scale management to reduce frequency; increase patchiness; increase extent of longer-unburnt areas)
  - **Grazers**   (feral herbivore control; selective destocking; reduction of grazing intensity in concert with fire management)
  - **Cats**   (reduce predation effectiveness through habitat management; strategic suppression or exclusion?; dingos?; baiting?)
  - **Conservation security**   (island biosecurity; exclosures; toad-averseness; ex situ populations)

- Successful recovery of small mammal populations following destocking at Mornington;

- Mammal recovery most pronounced with destocking PLUS substantial reduction in fire frequency;

- BUT - no similar recovery yet in other, more easterly trials (?threshold of stuffedness)

Management responses

Short term

- Landscape-scale trials across north Aust. of 'levers' of fire improvement and grazing pressure reduction.

- Identify priority 'refugia' and strengthen their conservation security

- Consider where ex-situ intervention is essential

- Test cat baiting for strategic suppression

- Investigate "mammal-healthy" areas

- Extend knowledge of cat ecology

- Deploy new tools for increased ranger & community monitoring

Longer term

- Strategic cat suppression; or large exclosures where required.

- Scope for reintroductions?

- Secure funding for monitoring and improve integration

- Refine management thresholds for fire regimes

- Improved fire management policy across broad landscapes, esp. protected areas

- Systematic feral animal management

- Clarify role of dingos; integrate into management policy

- Research programs around disease, long-term weather patterns, climate change

Research priorities

- See above, and for discussion

- Research embedded in adaptive management, at landscape-scale

- Greater focus on process & mechanisms

Presentations

- John Woinarski – context
- Graeme Gillespie – mammal decline in Kakadu
- Terry Mahney – mammals in Arnhem Land
- Rosemary Hohnen – GBTR North Kimberley
- Brydie Hill – BTRR Cobourg Peninsula
- Dani Stokeld – camera-trap cat detection
- Terry Mahney – cross-cultural methods cat occupancy
- Katherine Tuft – role of cats
- Hugh McGregor – fire, grazing and cat predation
- Sarah Legge – fire regimes and rodent decline
- Jenni Low Choy – fire, ferals, dingos – Fish R
- Tony Griffiths – fire (Kapalga)
- Ian Radford – conceptual model Kimberley
- Alaric Fisher – progress and prognosis