NESP 2.5

Defining metrics of success for feral animal management.

CSIRO | JCU | DSITI | AAK PUUL NGANGTAM | KALAN ENTERPRISES

12 February 2018

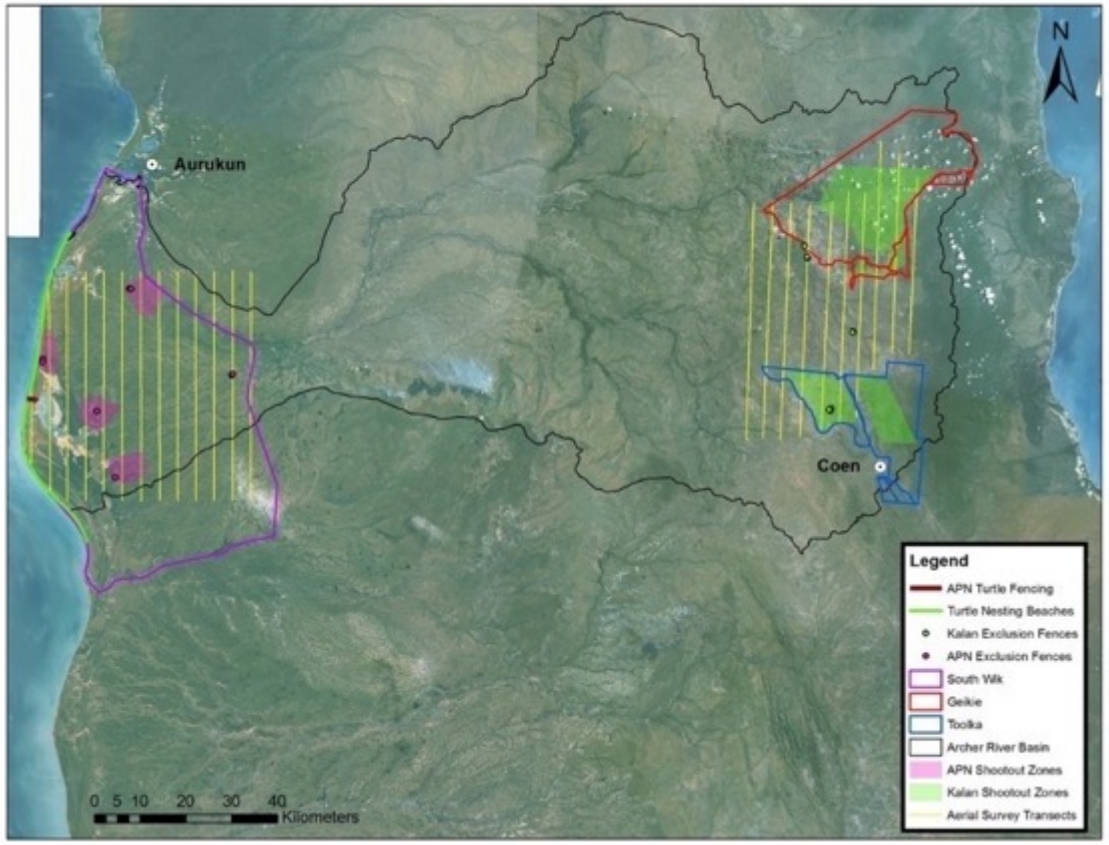
Project collaborators and contributors

- JCU (water quality, aquatic biodiversity)
- CSIRO (Terrestrial fauna, cultural values, management, feral animal distribution)
- QLD government (DSITI/EHP) (Wetland processes, feral impact and insects, wetland typology, waterhole mapping-new,)
- Aak Puul Ngangtam (APN) (Management)
- Kalan Enterprises (Management)
- Djelk (Bawinanga) (Management)

Associated projects and funding

- APN – QLSR, ILC, Nest To Ocean, PM+C
- Kalan – WOC
- CSIRO – Nest To Ocean, DAFF (Ag. Productivity white paper)

Study region



Seven years ago…

- *….. "support indigenous landholders currently conducting feral pig abatement activities….*

….significantly enhance, expand and demonstrate improved biodiversity outcomes from pig abatement activities."

How did our cape York Partners define success?

- Pig population in exclusion areas (pig proof fenced) reduced to 10% of year 1 census level (important lagoons, high density turtle nesting beaches and springs).
- Pig population in areas controlled maintained at year 2 census level
- Health of flora, fauna, habitat directly impacted by feral pigs stabilised and improving more rapidly then a comparable un-managed area.
- Indigenous land holders conducting census and biodiversity assessments relying on technical support only to analyse data.
- effectively responding to data analysis and adapting operational activities to improve impact on population and biodiversity.

Refining the aims

- Pig population in exclusion areas reduced maintained for 2 years.

- Health of flora, fauna, habitat directly impacted by feral pigs stabilised and improving more rapidly then comparable un-managed areas.

Indigenous land holders:

- conducting monitoring and analysing data using external providers only to support landscape scale analysis and methodology refinement.
- continuing to effectively respond to data analysis and adapting operational activities to improve impact on population and biodiversity
- Income from feral pig abatement and biodiversity management sustaining and expanding employment opportunities. Payments support on-ground abatement, technical support and monitoring activities (Eco-system service payments).
- Feral animal management conducted by local people with technical support. Activities supported by the community and protecting and enhancing local values.

Monitoring for success. Management feedback.

- Feral pig distribution and density

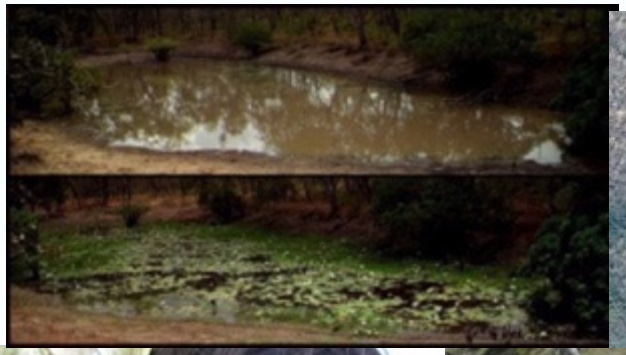
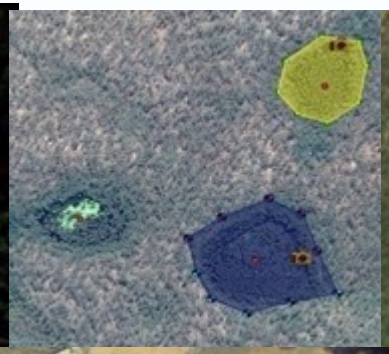
- Marine turtle nesting success (with and without pigs)

- Impacts on wetlands \ fauna (with and without pigs)
- Cultural values

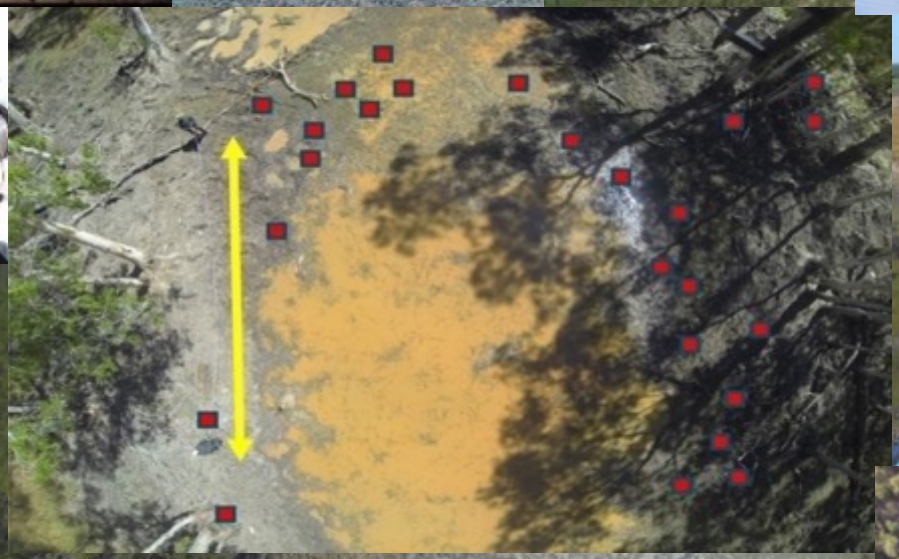
- Analysis and reporting

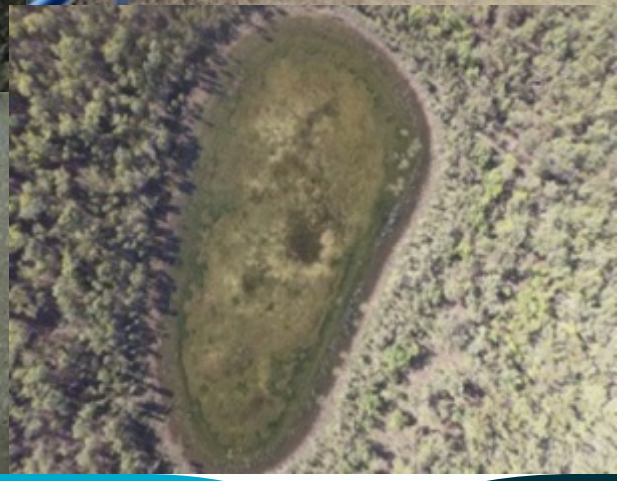
NESP 2.5 jobs to be done.

1. Accurately record feral animal management activities. Costs and effectiveness.
2. Understand the distribution and ecology of feral animals in the study region.
3. Monitor changes to ecosystems alongside management interventions.
4. Understand the impact of large feral animals on cultural values.
5. Integrate cultural values and understanding into management ,monitoring and reporting.
6. Develop useful ways of reporting results to traditional owners, land managers, funders and government policy (Report Cards).

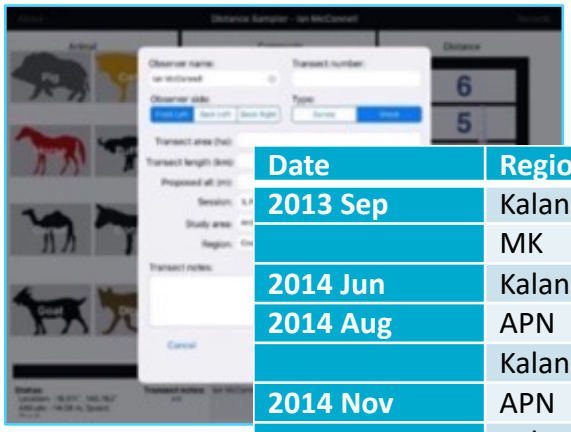



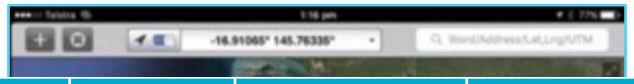




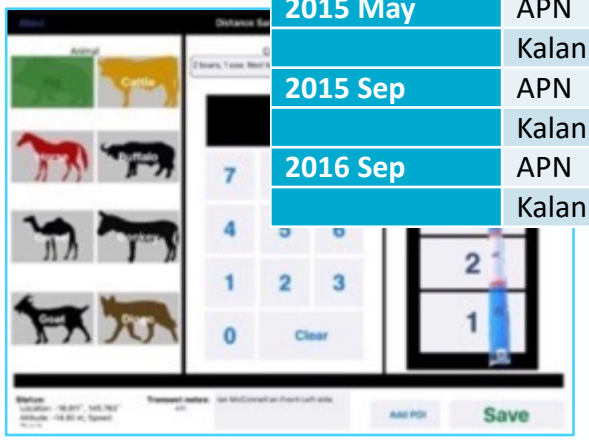



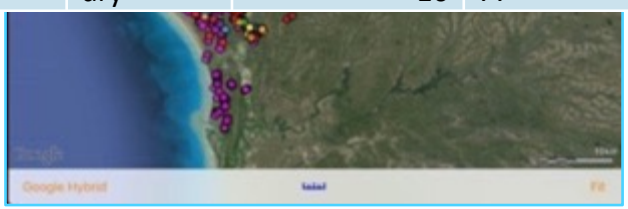
Feral pig distribution and density



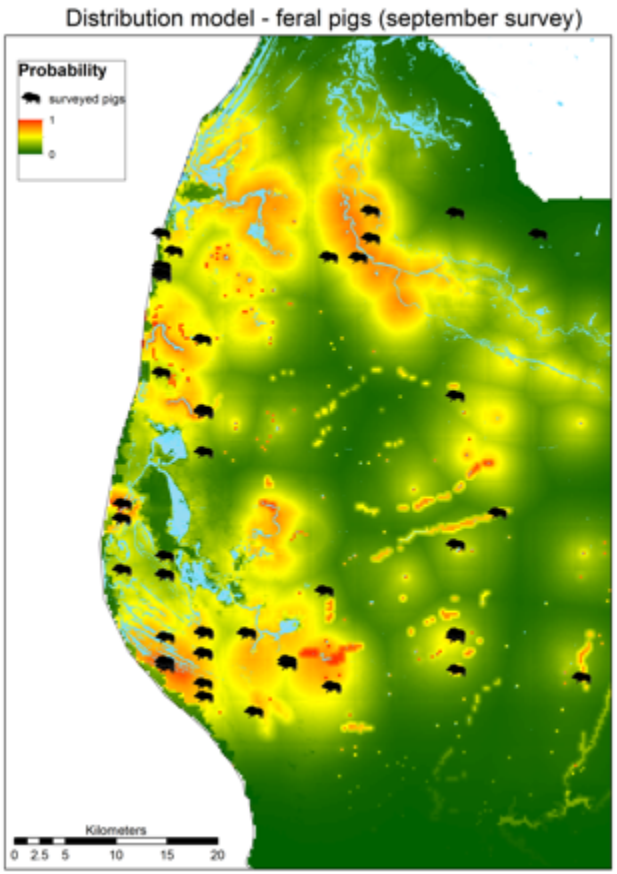


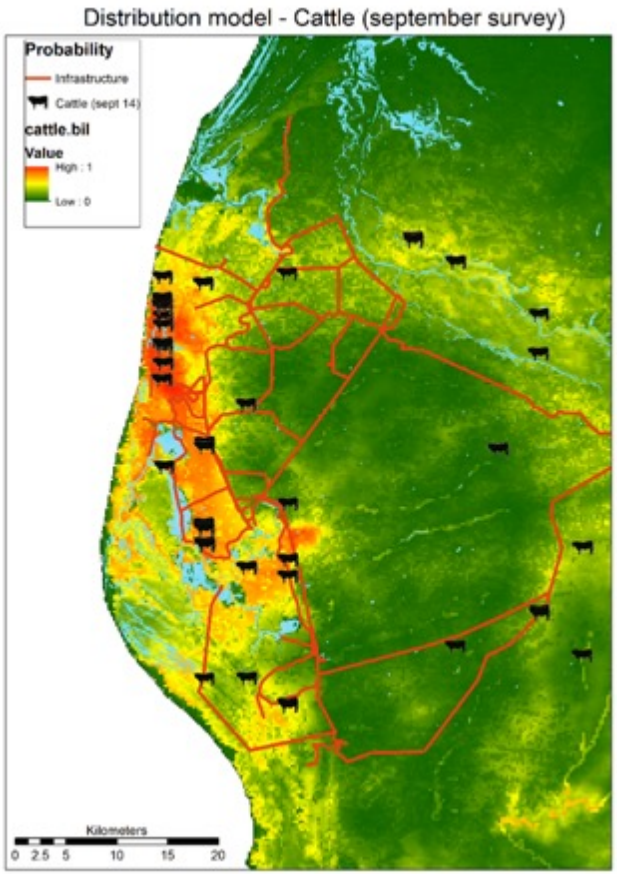
Date	Region	Season	Observations	Total pigs
2013 Sep	Kalan	dry	53	222
	MK	dry	21	39
2014 Jun	Kalan	wet	16	56
2014 Aug	APN	dry	53	291
	Kalan	dry	17	74
2014 Nov	APN	dry	14	235
	Kalan	dry	10	104
2015 May	APN	wet	59	296
	Kalan	wet	12	18
2015 Sep	APN	dry	50	389
	Kalan	dry	23	186
2016 Sep	APN	dry	28	233
	Kalan	dry	16	77

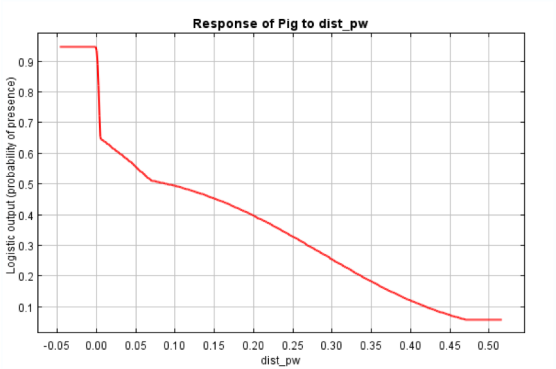


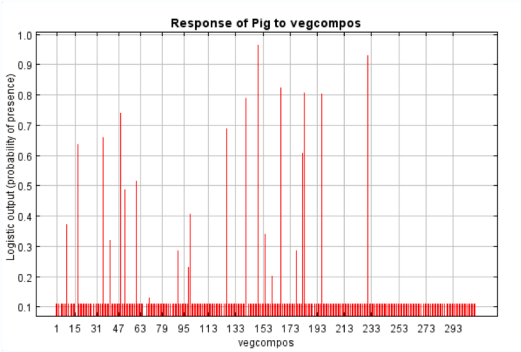


Results - Distribution model

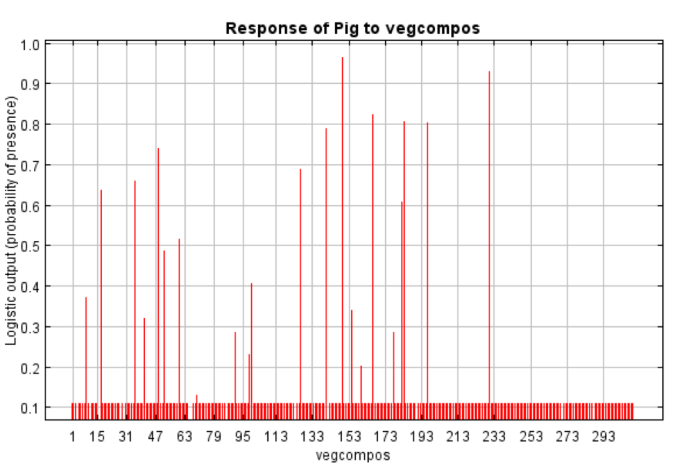


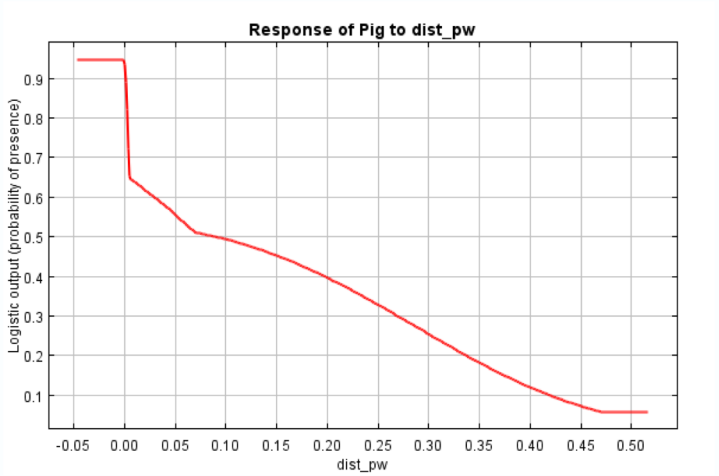




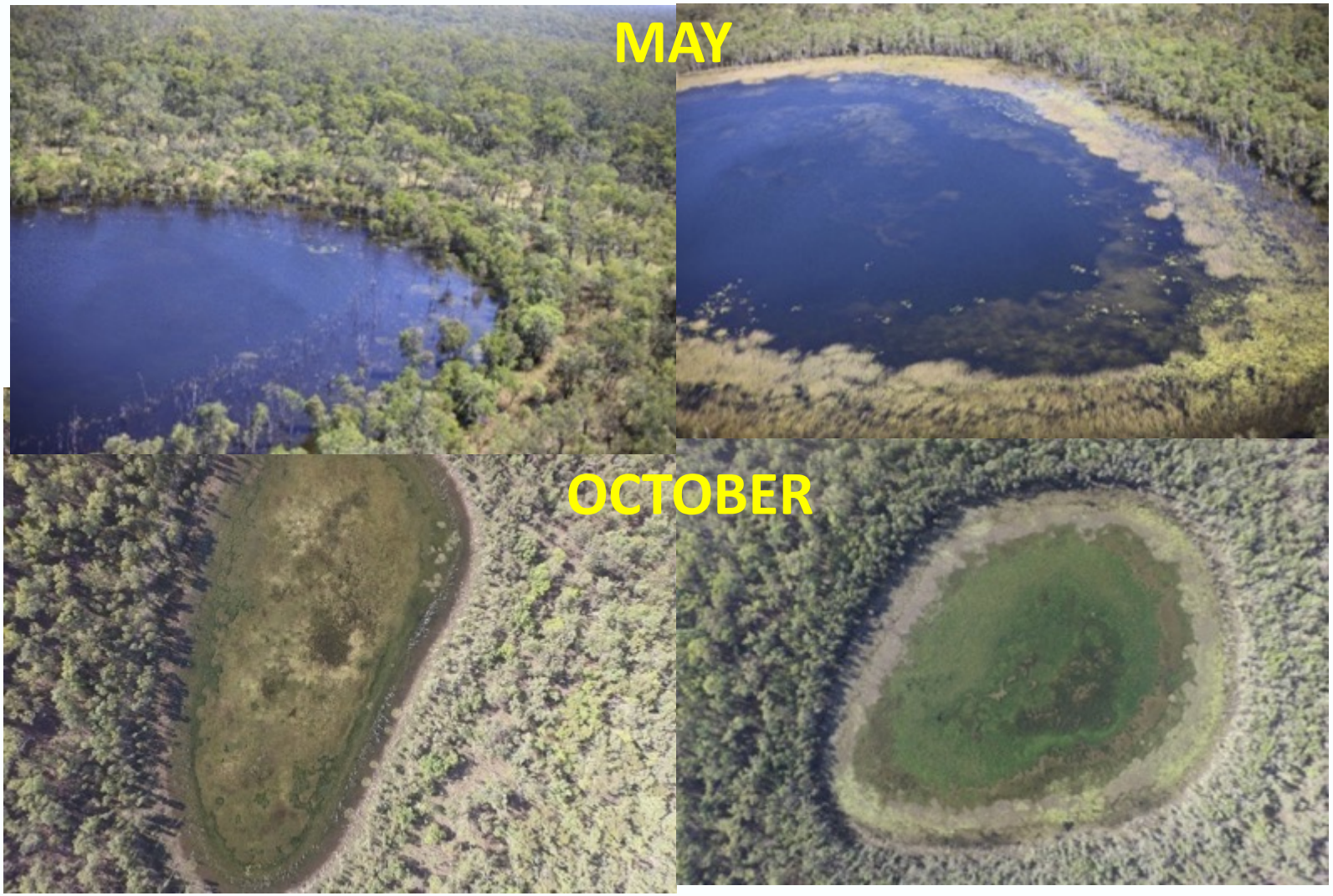


Issues – lack of temporal information on food and water availability.





Typology: All wetlands aren’t equal to pigs

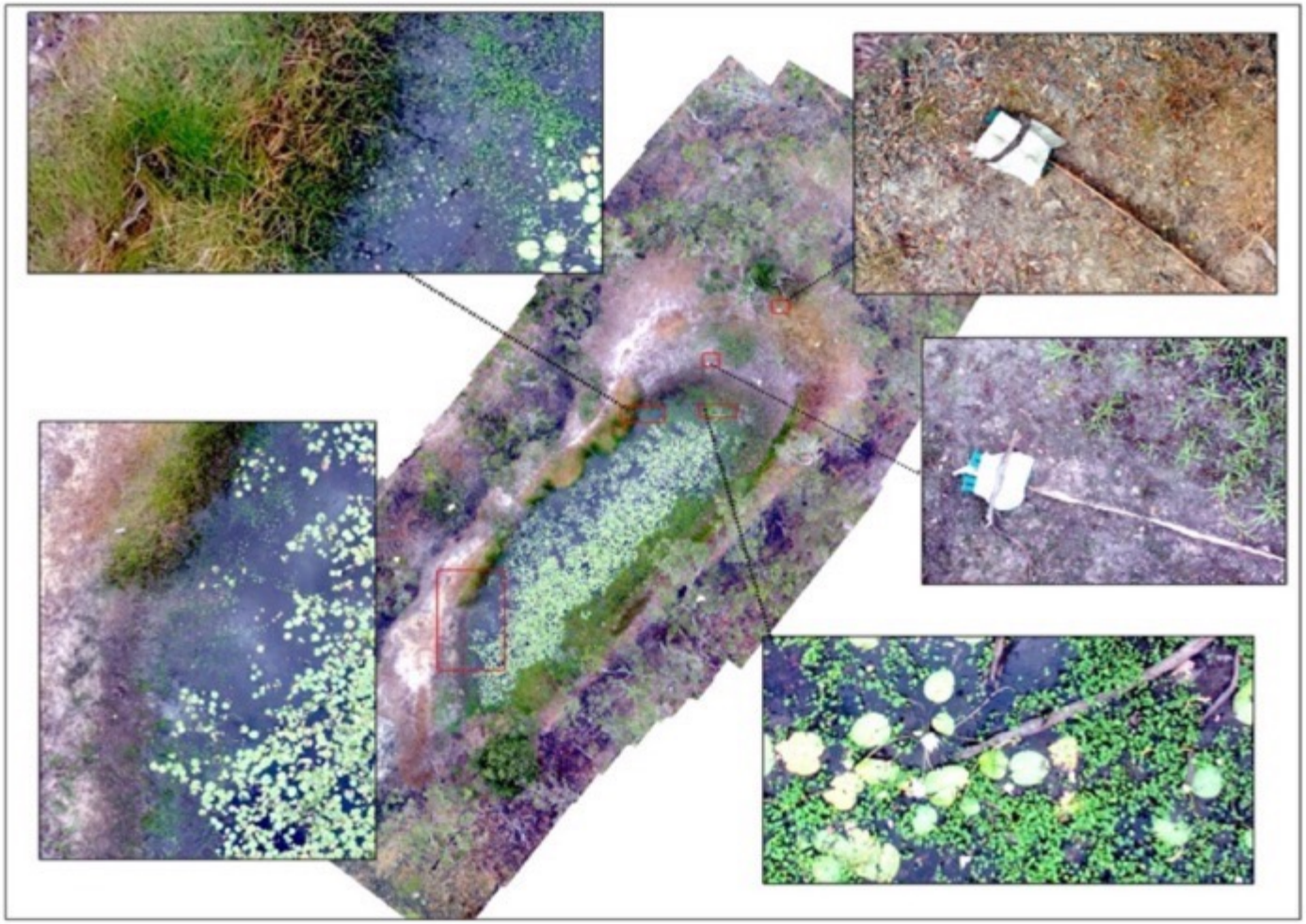


Type 3

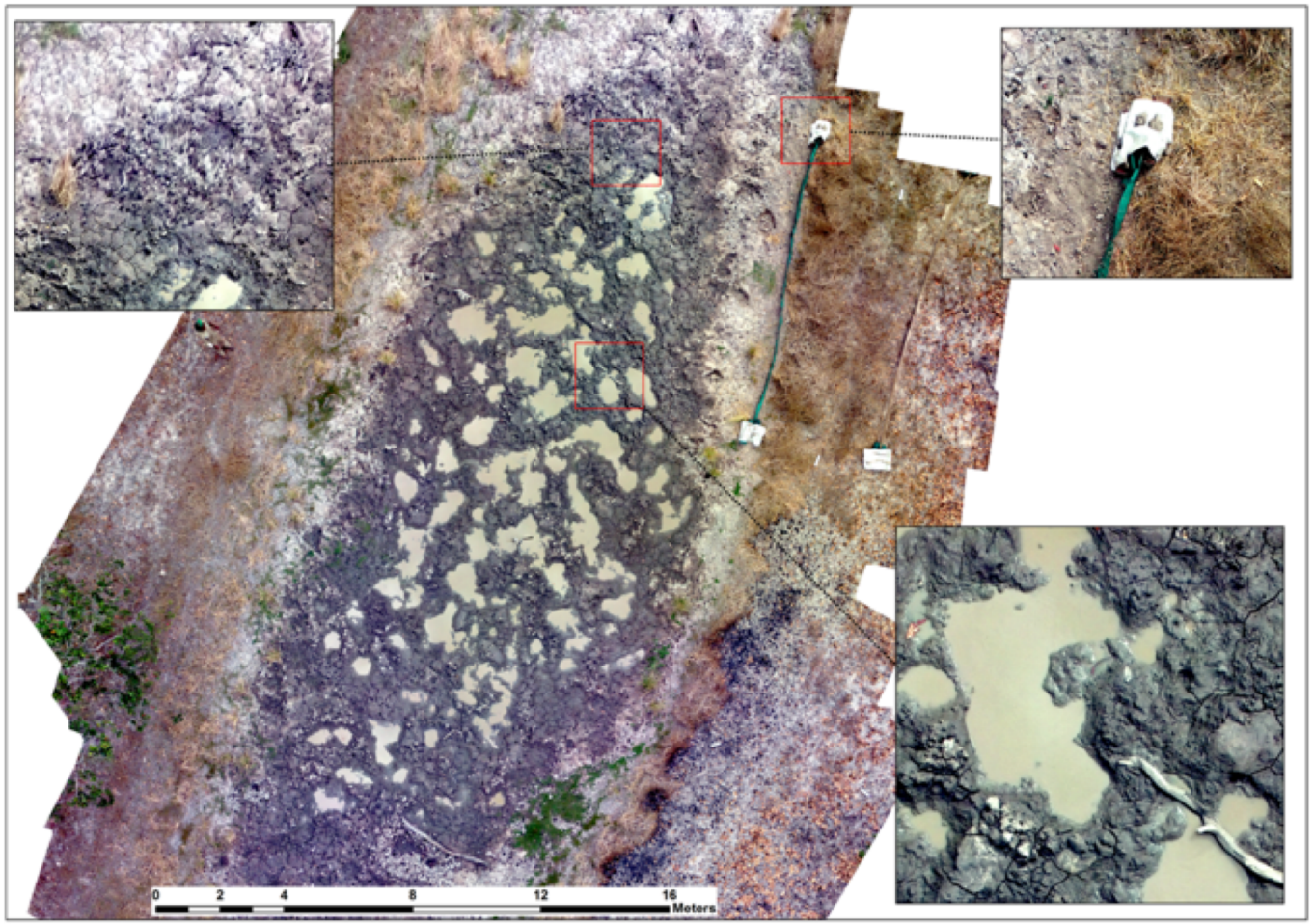
Typology (wetland pair with fencing)

Typology (wetland pair without fencing)

Wetlands are better without pigs.

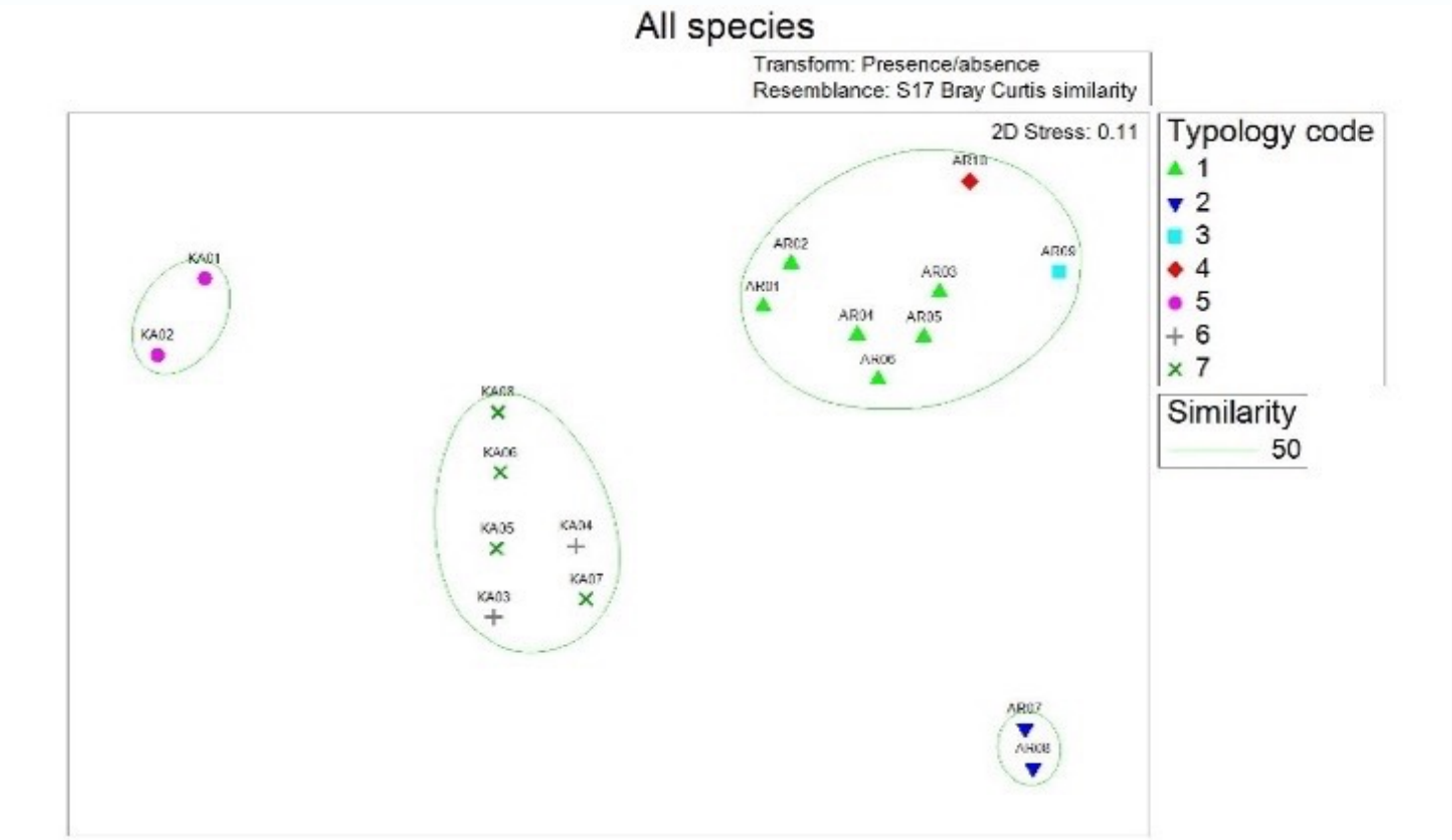


With feral pigs.



But no always – water-hole typology matters

Terrestrial fauna and typology

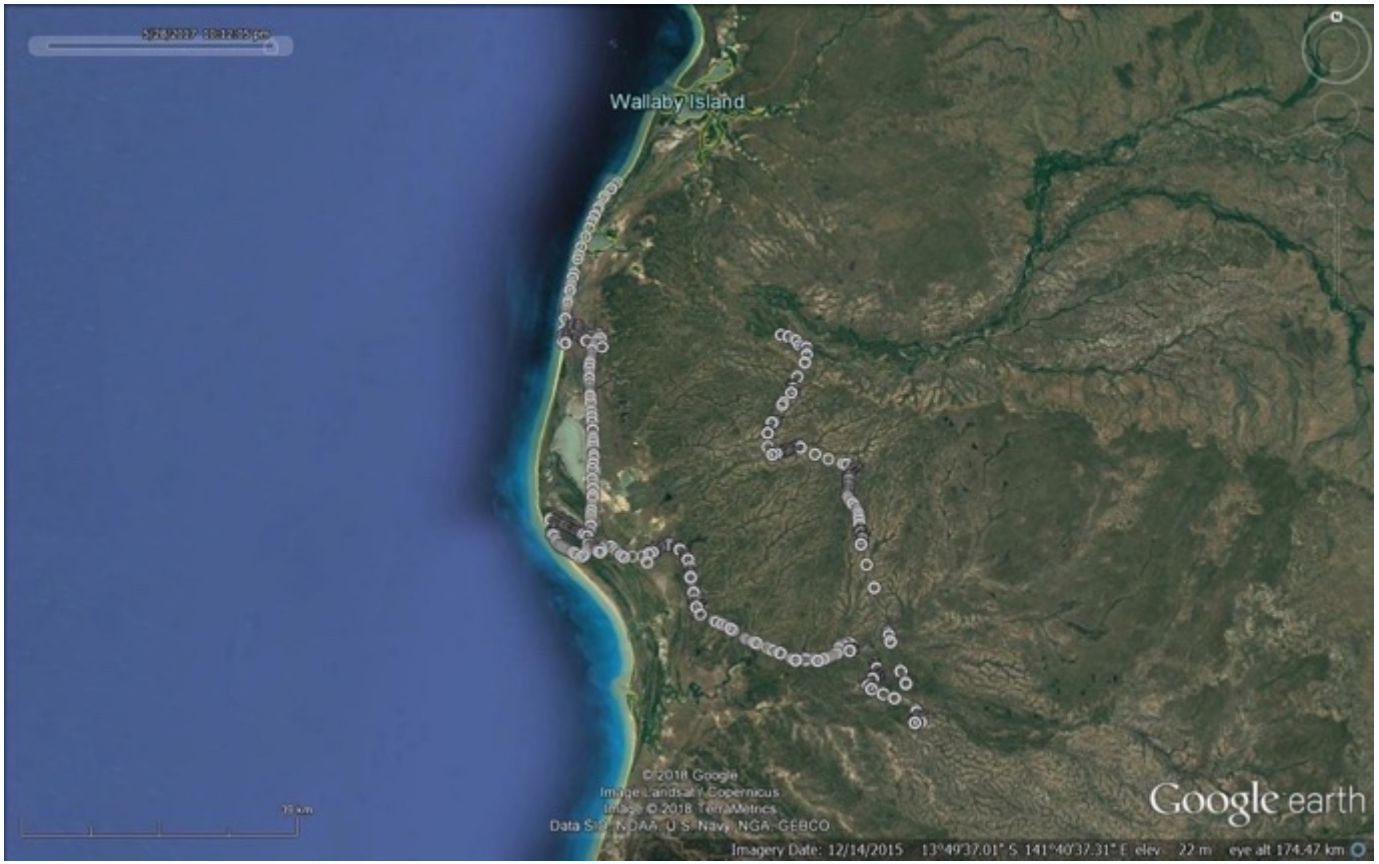


Pigs like some types more than others

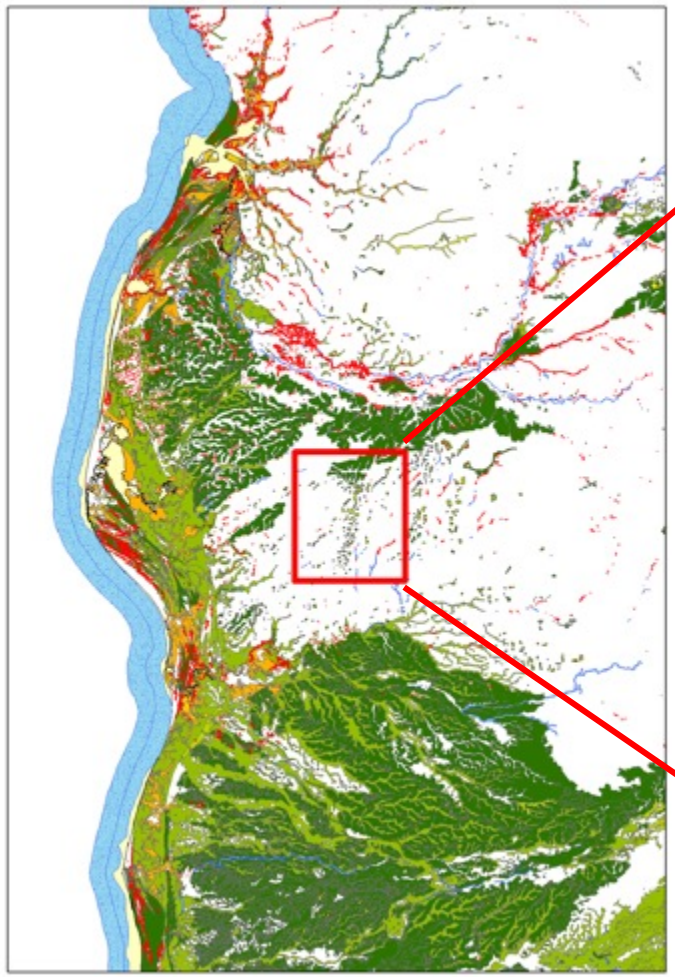
This area hasn’t received any control until last year.

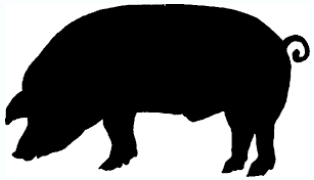
Recent typology surveys illustrate extensive impact in permanent spring fed ecosystems.

Landscape scale assessment (photos May / October 2017)



Available resources (Temporal and Spatial)





2012	**98%**	**1%**	**0%**	**1%**
2017	**2%**	**2%**	**14%**	**0%**

Land and Water
Justin Perry
Justin.perry@csiro.au

Marine turtle nest depredation

7:05 AM 99%

Cancel | Observation details | Unlocked | GPS

None | Flatback | Olive Ridley | Green | Hawksbill | Loggerhead | Leatherback | Unknown

Species: Olive Ridley

Observation type: Nest | False crawl | Adult | Hatching | Other

Turtle tag...: TagID

Nest ID: OR 34

Body pits: 0

Monitoring?: No | Yes

Age: New | Old | Unknown

Damage/predation: None | Pig | Dog | Goanna | Other

Vegetation: Bare sand | Grass area | Under shrub | Under tree | Rubble zone

Timestamp: 2016-07-05 08:35:24

Position

Latitude: -13.7452388

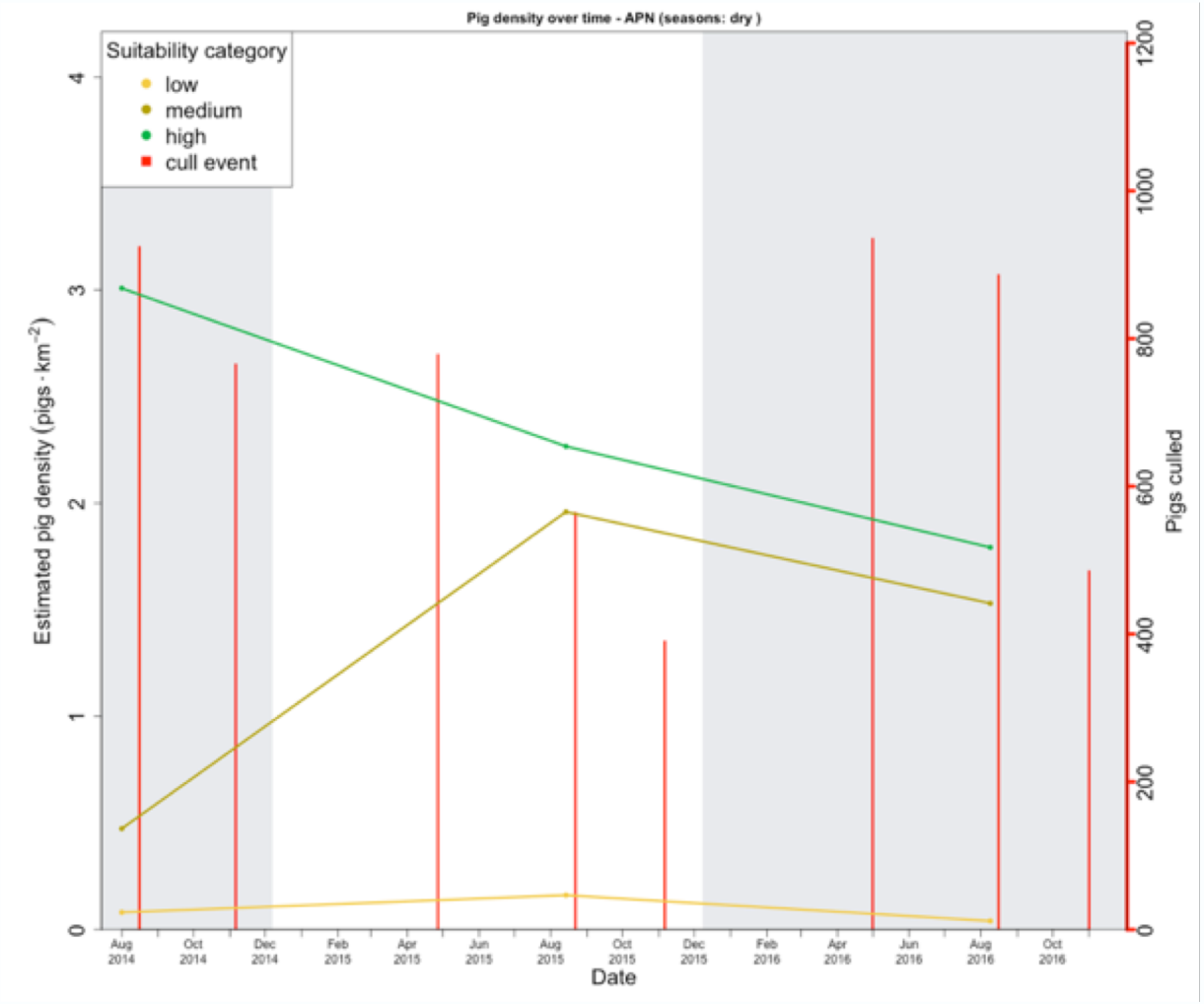
Longitude: 141.4935412

Observation notes

25/7/16. Relocated from big iPad. Nest ID changed from or234-or34
11/8/16. Missing nest.
15/8/16.

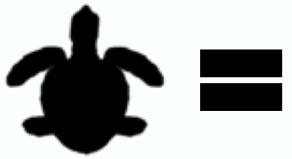
Save

Results – changes in pig density - APN



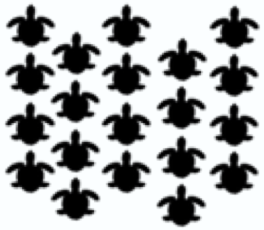
Seasonal changes in pig distribution.

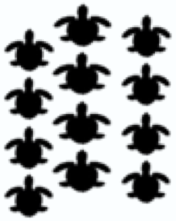
SURVEY RESULTS 2012 – 10km of beach



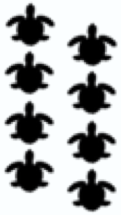
= 5 nests (~400 eggs)

OR





FB



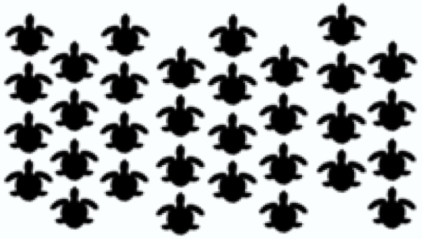
HB

100% predation

SURVEY RESULTS 2017 – 48 km of beach

= 5 nests (~400 eggs)

OR



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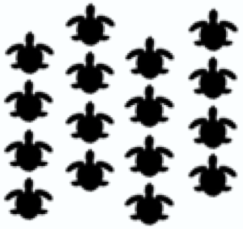
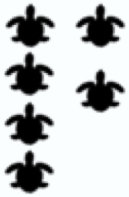
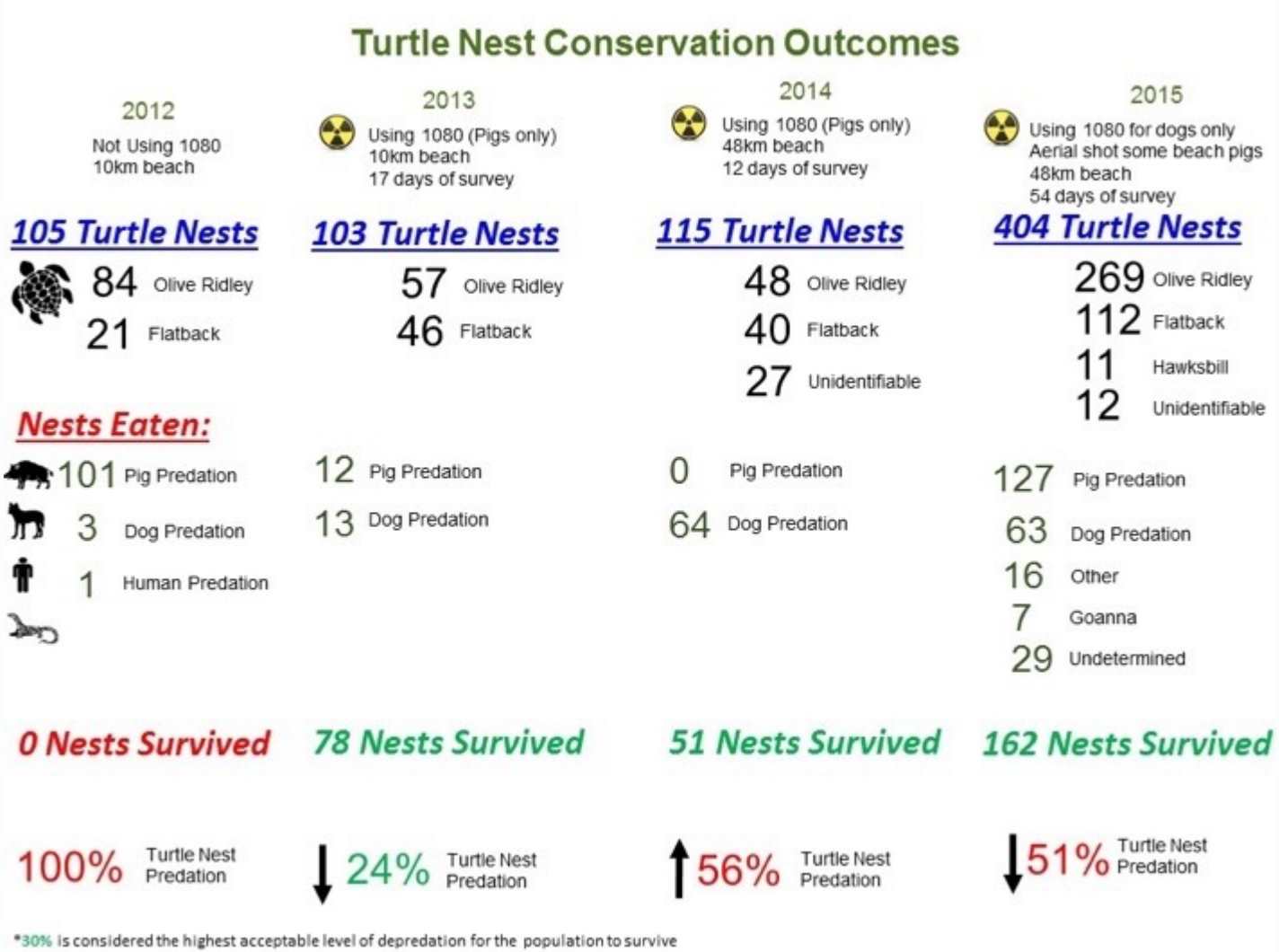


HB



What's been happening.



Results - control

Region	Date	Total culled
APN	2014 Sep	924
	2014 Nov	765
	2015 May	778
	2015 Sep	564
	2015 Nov	390
	2016 May	935
	2016 Sep	886
	2016 Nov	485

Wetland impacts – flora and fauna (with and without pigs)

- Paired lagoon fencing systems
- Fauna Surveys
- DNA sampling
- Limnology
  - Aquatic fauna surveys
  - Water quality measures
    - DO, turbidity, temperature
  - Evaporation rates
- UAS photography
  - Unbiased aerial point-time photography
- Time-lapse wetland photography
- Streamlining data collection and analyses

Making sense of the data

The type of wetland makes a big difference to pig impact and the impact of management (i.e exclusion).

What's next

- Complete cultural values work
- Integrate social, cultural and biophysical values work.
- Complete robust water hole typology mapping for the Archer River Basin
- Analyse seasonal biodiversity data in fenced and unfenced lagoons.

AIMS;

- cost benefit analysis of control methods
- conceptual understanding of feral pig impacts on biodiversity with data to back up the theory.
- A simplified reporting and data management system that will help land managers to measure their impact.