Fauna Investigations in EIA; are we asking the right question?

Mike Bamford (1982)
Bamford Consulting Ecologists

Regulators responsible for EIA:

EPA, DWER, DMIRS, DBCA (WA); DCCEEW (C'wealth)

Guided by legislation:

EPBC Act (C'wealth)

Biodiversity Conservation Act (State)

Environmental Protection Act (State)

Animal Welfare Act (C'wealth/State)

EPA's key objective with respect to development and fauna is to:

"protect terrestrial fauna so that biological diversity and ecological integrity are maintained".

Aiming for a balance between development and nature conservation....

The Economy versus Biodiversity ?

The role of environmental consultants

Consulting industry has developed to inform regulators to meet this objective…..provide the information needed to assess the risk to biodiversity posed by development.

This industry is worth >$150 million/annum

(fauna; pre-approval only). A lot of conservation dollars

What do consultants do for those $$$$?

They work with guidance statements, referral guidelines, conservation advices, significant species survey guidelines (DCCEEW), policy statements (Commonwealth and State), comments and feedback….

Types of investigations from guidance:

- **Level 1** (‘Basic’). Desktop and site habitat interpretation…a very powerful approach.
- **Targeted.** Includes MNES for DCCEEW.
- **Level 2** (Detailed).

Guidance statements (state and federal) focus on surveys; what is there? *Assumes we need to know (and it is possible to know) what is there to assess impacts and inform the key objective.*

Surveys:

- **Targeted**: conservation significant species (vertebrates but a few invertebrates). MNES guidelines – survey not habitat.
- **Detailed:** inventory of vertebrates - frogs, reptiles, birds, mammals. Nil on invertebrates (but 80% undescribed). 30 year study in a single garden yielded 2,673 invertebrate species (Owen 2010).

Surveys therefore focus on <5% of the fauna assemblage

Targeted surveys for significant species because they are vulnerable to impacts. But ***'absence of evidence is not evidence of absence'*** e.g. Northern Quoll, Olive Python.

You can't confirm absence….do we need to confirm presence?

…and 'detailed' surveys for frogs, reptiles, birds and mammals; how do the results of such surveys inform the EPA's key objective? What about the majority of the fauna assemblage ('other invertebrates')??

The detailed survey approach can be long, expensive…and the results far from detailed.

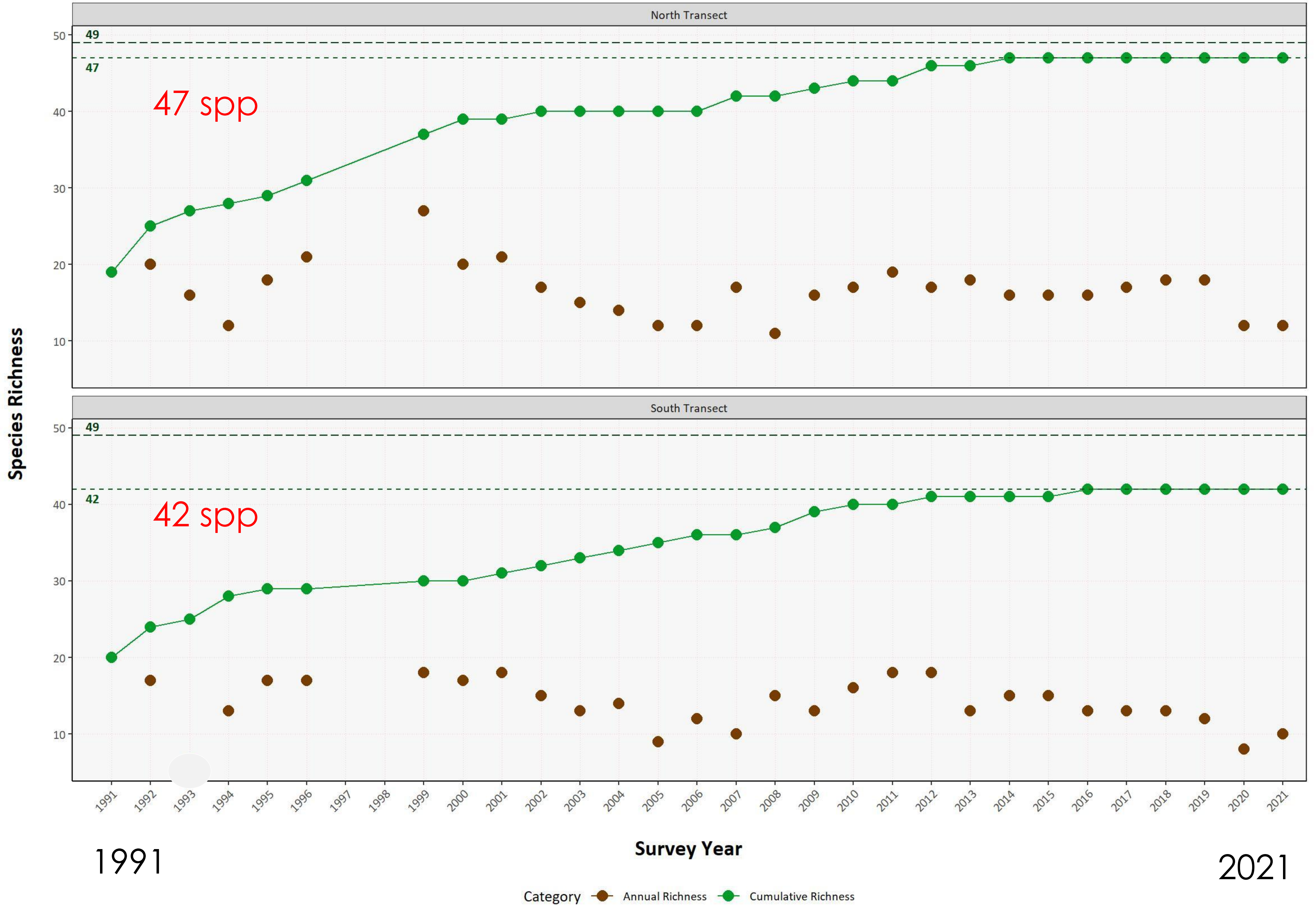
10-14 days with 4-6 people and $5-20K/day. Much of that cost and effort for reptiles and small mammals.

Are such surveys worth it if they often only confirm presence of common species expected to be present;

and when they are not even very good at doing that?

In a long-term monitoring study (Tronox; Cooljarloo), it took **24 to 26 years** of annual sampling to confirm the assemblage of frogs, reptiles and small mammals….just on two sites.

Birds took a bit longer (and still adding species).


North Transect
South Transect
49
47
42
47 spp
42 spp
Species Richness
Survey Year
1991
2021
Category
Annual Richness
Cumulative Richness

Cooljarloo vertebrate species accumulation 1991-2021

Two sites, 400m apart in the same environment.

Site 1: up to 19 species/year. 42 species at asymptote (26 years). Models suggest 45 to 52 species.

Site 2. Up to 27 species/year. 47 species at asymptote (24 years). Models suggest 52 to 61 species.

AND….49 species across the two sites – they had slightly different assemblages after 30 years.

Seven additional reptile species detected on nearby sites in similar vegetation type (Beta diversity).

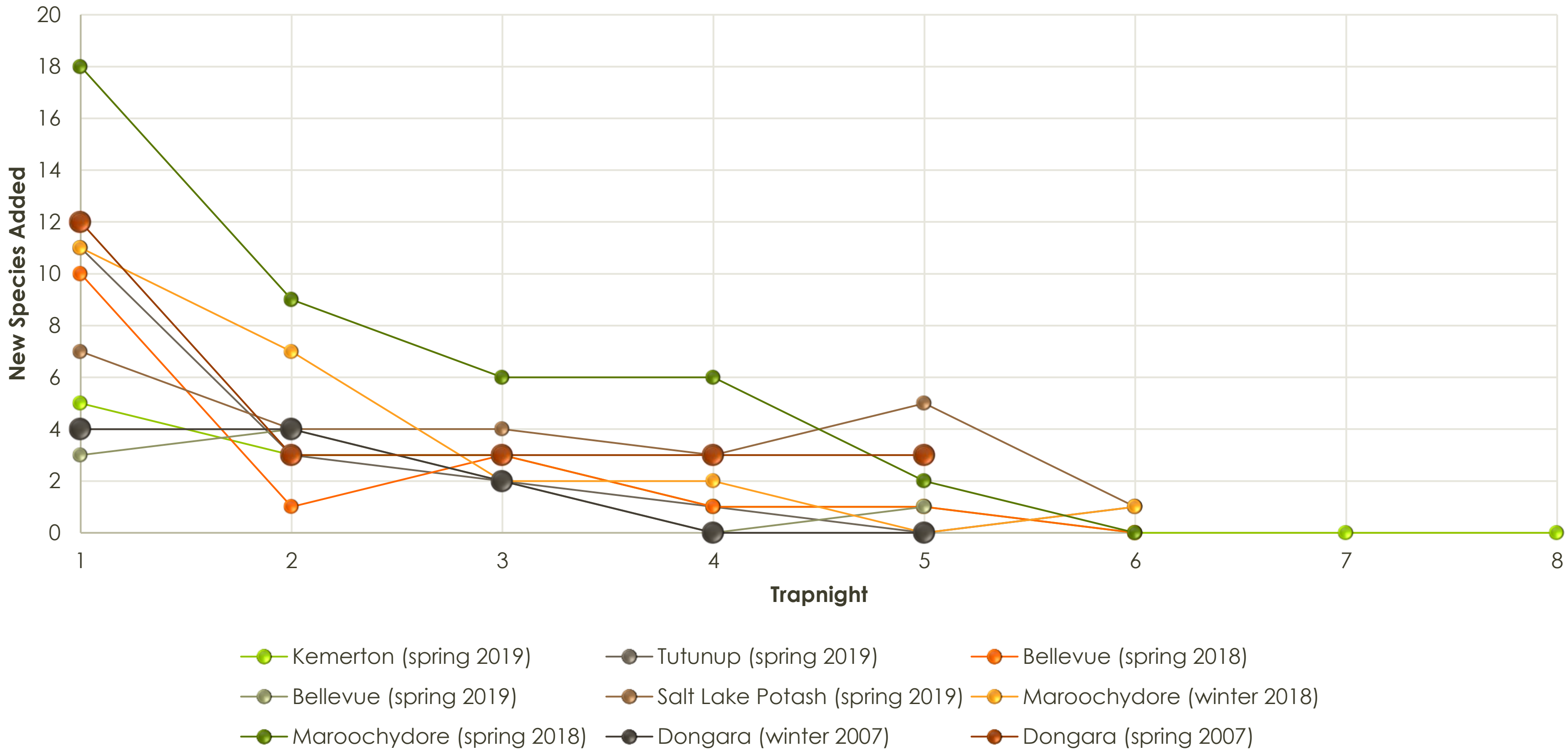
Trapping is not very efficient.

Project	N reptile species total	N species searching only	%
1	47	7	15
2	27	4	15
3	32	14	44
4	19	6	32
5	16	4	25

Recent Pilbara

N reptile species total	N species searching only	N species traps only
43	20 (47%)	9 (21%)

Reliance on trapping….return for effort.



Comparison of reptile species composition and abundance (Bamford and Calver 2013).

Pitfall traps compared with systematic searching

Species	Pitfall % (N = 1,484)	Searching % (N = 83)
Legless lizard	0.1	7.0
Gecko	2.6	12.0
Small dragon	38.2	8.4
Burrowing skink	2.9	24.1

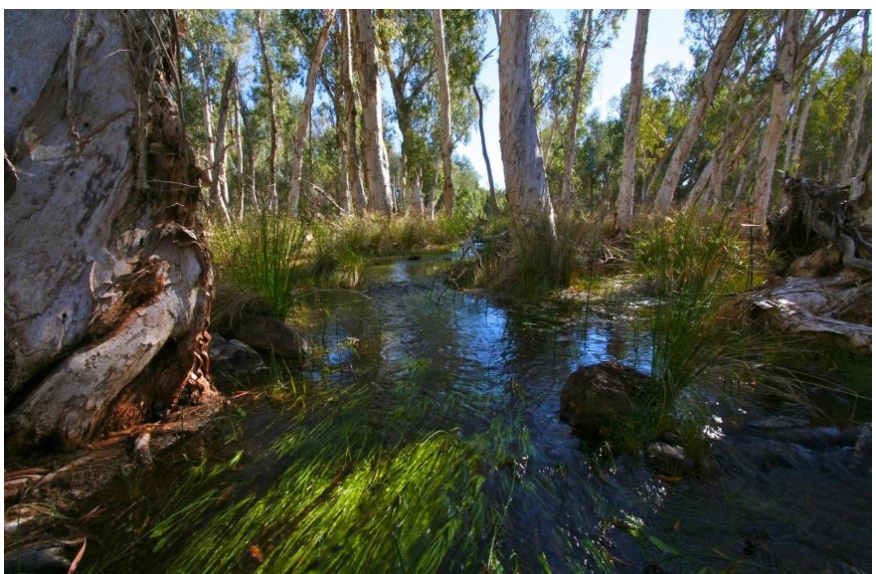
Fun facts: Systematic searching gave an absolute density of 430 reptiles/ha; 105/ha were one small, burrowing skink. Banksia woodland north of Perth.

So how do incomplete and not very reliable surveys that target common species of <5% of the fauna assemblage help to

"protect terrestrial fauna so that biological diversity and ecological integrity are maintained"?

…and where do surveys for significant species fit in if you can't confirm absence?

Pilbara Olive Python; habitat not survey



We need to ask: **if development happens, what is the consequence in terms of the key objective?**

For example:

We know there is loss of individuals, but what is the impact on biodiversity? And how much do we need to know about that biodiversity to predict/mitigate that impact?

If we ask those sorts of questions, what does the approach to EIA fauna investigations look like?

Consider impact on biodiversity as a function of how a proposal **interacts with the environment that supports biodiversity**.

Investigations could be framed around:

- Threatening processes and ecological functions.
- Context of site (proportional habitat loss).
- Significant species (habitat function as much as/rather than presence).
- Landscape/habitat interpretation.
- ….and how these interact. An **ecosystem function** approach.

May involve surveys…or not.

What role for surveys of the general fauna assemblage? What do you need to know for EIA?

….Where confirming presence of common species is useful in decision-making (eg highly fragmented landscapes where even common species may be rare).

Baseline data….consider approval not the end of EIA, but the beginning of conservation actions.

Post-approval monitoring and research. Measuring impacts, assessing restoration, population studies………… a network of fauna monitoring sites across WA?

Funding of conservation (instead of surveys). The biggest threats to biodiversity are cumulative and landscape-scale (feral species, fire, fragmentation, community attitudes, lack of awareness). Could be based upon a levy (because all development impacts biodiversity).

Future fauna investigations in EIA:

- Pre-approval investigations relevant to the site to address the question (consequences to key objective).
- Post-approval monitoring and research.
- Funding levy for conservation as a condition of approval.

Bonus slide……

Structure for assessing risk…Threatening processes and ecological functions. Will the project result in:

- Habitat loss leading to population decline;
- Habitat loss leading to population fragmentation;
- Degradation of habitat due to weed invasion leading to population decline;
- Unsustainable ongoing mortality from operations;
- Species interactions including feral and overabundant native species;
- Hydrological change;
- Altered fire regimes;
- Disturbance (dust, light, noise).