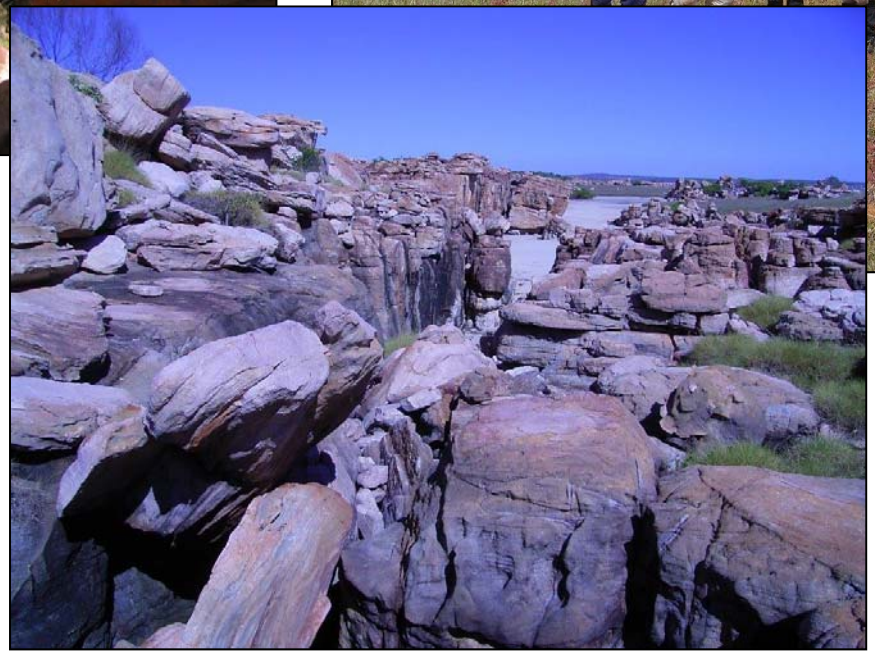
Scoping in Environmental Impact Assessment



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Scoping; how consultants decide what to do in EIA.

Make intelligent use of the methods available to us: how much effort is enough?

How we meet expectations/requirements of stakeholders (client, govt, public).

Without scoping, risk of ‘recipe approach’ as if all projects are more or less the same. They aren’t. We do assessments; not surveys.

Today; share and challenge in equal measure.

Review of EPA comments and consultants' experience to progress towards guidance for scoping – so we can do what we do better.

Objective of EIA from the EPA

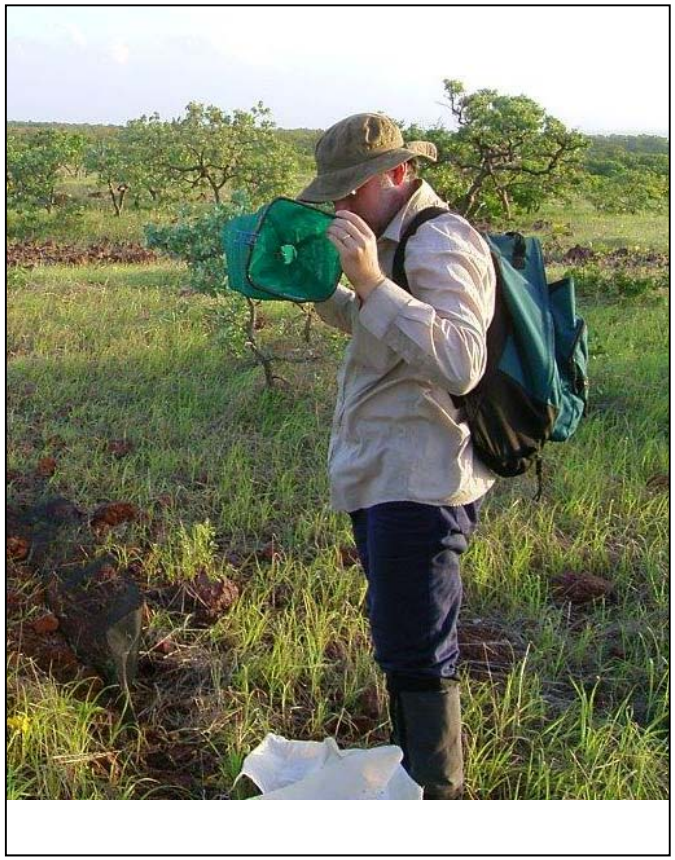
"…maintain representation, diversity, viability and ecological function…..through avoidance and management of impacts".

So aim is to protect biodiversity through the identification and management of impacts

Objective of EIA from the EPA

"…investigations for EIA provide government agencies with sufficient information to address biodiversity conservation and ecological function values with respect to development".

That is what consultants do.



Further objectives from the EPA

"…field sampling results for EIA contribute to greater understanding of biodiversity…"

A benefit of EIA not directly related to impact assessment

Further objectives from the EPA

"…information collected should lay foundations for future monitoring of impacts or to meet completion criteria".

And….

"…should use experienced personnel" (hence no section in this workshop on bird studies)

…and from the EPA on scoping

"…the scope of each survey conducted for the purposes of EIA depends on the scale and nature of the impact of a proposal and the sensitivity of the receiving environment…."

'sensitivity' means significance as much as fragility. Environment includes the fauna assemblage.

Therefore guidance from the EPA for EIA…

EIA process is about protecting biodiversity, information to aid decision-making, taking account of scale of impact and significance of what is being impacted, thinking about long-term research; and contributing data to long-term records.

Consultants have a lot to think about.

So where do consultants fit in and how do they know what to do?

The role of consultants in EIA

provide information so that someone else can make a decision to protect biodiversity.

scope their work in terms of the proposal and its potential impacts upon the fauna assemblage; and other EPA expectations.

An extreme case study

Rottnest Island; site for nuclear weapons test.

EIA report required for the EPA.

Your role: what are fauna ‘values’ and what would be the impact on those values.

Not human impacts, marine impacts; just objective focus on terrestrial fauna.

Scoping Rottnest

Abundant information on the terrestrial fauna of Rottnest: Quokkas, sub-species of reptiles, isolated populations of landbirds and frogs, migratory shorebirds, breeding colonies of Wedge-tailed Shearwaters and the EPBC listed Fairy Tern. Probably Short Range Endemic invertebrates.

Scoping Rottnest

Impact would be total loss of all terrestrial fauna values. So we know impact.

Combination of known fauna values and known impact makes scoping easy.

Simple literature review with no field trip to provide the information needed for government to make a decision.

Scoping Rottnest with a change to proposal -

Reduce area of impact to half the island.

Which part?
Can the impact be moved?

Scope now expanded as more information required to predict impact.

How are fauna values distributed?

Scoping Rottnest was hypothetical; what do consultants do in the real world?

All sorts: from tiny patches of remnant bushland in the suburbs to the sites of massive mines and the routes of major highways.

They all have to be scoped.

Example of recent projects

EPA has proposed two levels of investigation:
Level 1. Desktop and site inspection.
Level 2. Desktop and comprehensive field investigations.

Examined the last 25 projects by my team and found they could be divided into six levels.

Level of investigation	Description of investigations	Number of projects
Level 0.5	Desktop and advice only	4
Level 1	Desktop and site inspection	4
Level 1.5	Desktop, site inspection and targeted work on significant species	8
Level 2	Desktop and comprehensive field investigations	1*
Level 2a	Fauna relocation	3
Level 3	Research and monitoring	5
		25

Is this anything like typical?

All are studies related to the EIA process.

Level 1.5 a result of emphasis on field studies on significant species but not more general fauna assemblage.

Very few level 2 surveys.

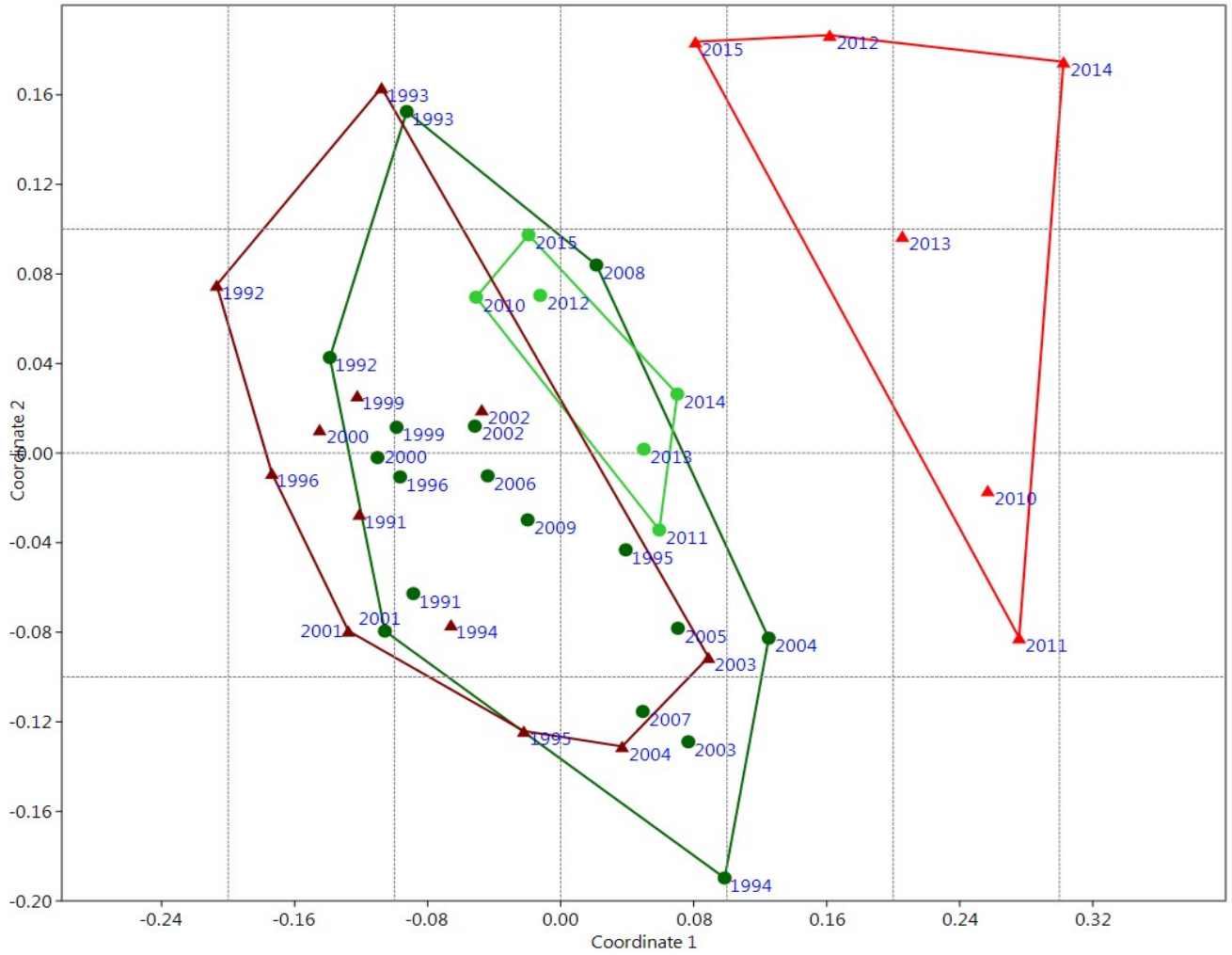
Level 3 consistent with “…lay the foundation for later compliance and audit purposes”.

Level 3; methods established early to lay basis for BACI designed investigations

Monitoring impacts on significant species.

Level 3; Monitoring use of minesite rehabilitation.

Level 3; Results of monitoring use of minesite rehabilitation by fauna.



Variables that affect scoping

Based on what the EPA says, the Rottnest example and the variety of projects, can conclude that scoping needs to consider:

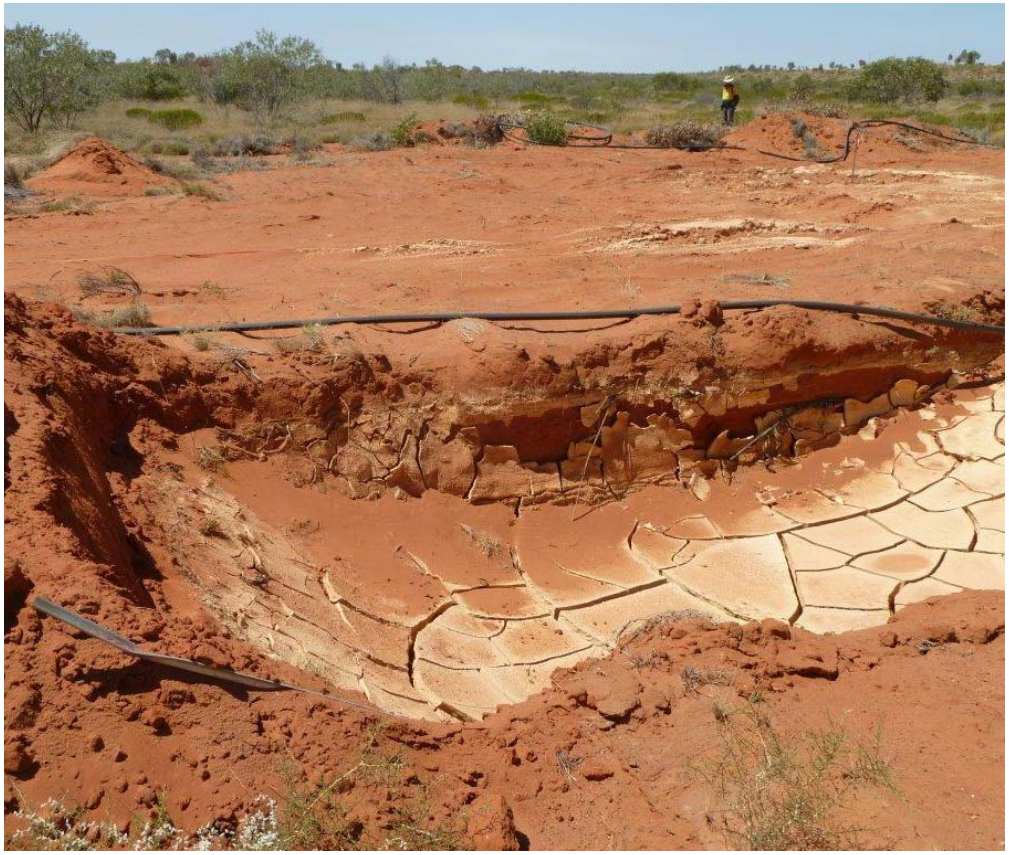
The type of project (and its impacts);
The ‘sensitivity’ of the receiving environment;
Need for post-impact studies;
Existing information on the fauna assemblage.

These factors determine what you propose to do to get the right information to decision-makers, and to do the right thing by your client.

The project and its impacts.

How does the project interact with the fauna assemblage?

Review the project against standard set of **threatening processes.**



Threatening processes.

Will the project result in…..

Habitat loss (clearing):

- population decline.
- population fragmentation.

Habitat alteration (weeds, altered fire regime, altered hydrology):

- population decline.
- population fragmentation.

Threatening processes….will the project result in…

Changes in population dynamics due to increased mortality:

direct mortality from proposal operation.

indirect mortality (changes in feral species, over-abundant native species).

Three classes of threatening processes but multiple causal agents.

Impact may not mean significance.

Significance depends upon the impact AND the ‘sensitivity’ of the receiving environment.

The destruction of individuals of common fauna species may be acceptable under legislation. Impact assessment is about determining if the impacted fauna assemblage, or components of that assemblage, ‘matters’.

‘**Sensitivity’ of the receiving environment**.

What makes a fauna assemblage ‘sensitive’. Not just significant species but any feature that can lead to unacceptable loss under legislation.

Characteristics of fauna assemblages:

Fauna values.

- Context and representation
- Significant species
- Assemblage organisation (biodiversity and habitat patterns)
- -Ecological processes

Fauna value

Context and representation. Is the assemblage in the last remnant in an agricultural landscape or at the site of a small proposed mine in a pastoral region?

Fauna value

Significant species. Under legislation, or significant in some other way such as an unusual or isolated assemblage (including islands).

Breeding colony or aggregation of a common species.

Fauna value

Assemblage organisation in its environment.

- patterns of biodiversity of fauna across the landscape.
- patterns of fauna ‘habitats’ across the landscape.

EPA mentions protection of assemblages in relation to landscape catenary units.

Fauna values.

Ecological processes or functions that maintain the assemblage.

Hydrology
Fire
Landscape connectivity

Threatening processes may alter these

Post-impact investigations

A function of project type, impact and the fauna assemblage.

Monitoring of significant or indicator species.

Can affect scoping of field investigations.

Existing information

Affects amount of additional work required; but also a function of project type, extent of impact and what the existing information reveals about the fauna assemblage.

Can affect scoping of field investigations.

Impacts and values;

a possible framework for scoping

The EPA tells us scoping needs to consider:

- biodiversity;
- information to aid decision-making;
- scale of impact;
- significance of what is being impacted;
- further studies for monitoring; and
- contributing data to long-term records.

Also that scoping can be adjusted by the amount of existing information.

Scoping happens before detailed investigations, but we do know that:

there are impacting processes to ‘look for’.

these will vary with the nature of a project.

the fauna assemblage can be broken down into fauna values.

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We also know that the amount of work required will depend upon:

the impacting processes and how they interact with the fauna assemblage

what the fauna values are

how much we already know about the fauna assemblage

if future monitoring studies will be required.

This gives us a checklist of inter-dependent variables: impacting processes, fauna values and site/project characteristics.

This checklist gives the basis for a risk assessment approach to aid with scoping. A gap analysis to direct further studies.

Impact class	Description/risk
Habitat loss	How much and what is proportional loss? Will it lead to population fragmentation?
Habitat degradation	What is the risk from weeds, changed fire regimes and/or altered hydrology? A question of vulnerability of the fauna assemblage and its environment.
Changes in population dynamics	Does the proposal increase risk from roadkill, lights, feral species, over-abundant native species, etc.?

Fauna value	Description/risk
Context and representation	Is the site in a fragmented or intact landscape? Risk is greater in fragmented landscapes.
Significant species	Are significant species known or expected? Is the assemblage significant of itself due to isolation or uniqueness? Significant aggregations of any kind?

Fauna value	Description/risk
Assemblage organisation	Is assemblage distributed across the landscape in a way that is significant with respect to the proposal?
	Are fauna ‘habitats’ distributed across the landscape in a way that is significant with respect to the proposal?
Ecological processes	What ecological processes sustain the fauna assemblage and particularly how might the proposal interact with these?

Project specific variable	Description/risk
Existing information	How much information is already available on the fauna assemblage, and how relevant is it?
Ongoing studies	Is the proposal likely to require ongoing monitoring, such as monitoring impacts or meeting completion criteria? For example, initial sampling could be a BACI design.

- This checklist provides a system for reviewing any proposal in order to scope it. The checklist also gives a system for generic scopes for the same sort of project in the same sort of area.

What would generic scopes look like?

A possibility is multiple levels of investigation that make reference to **values** and **impacts**.

Level of investigation	Description	Examples of project and location
0.5	Desktop and advice only	Impact large or small but unambiguous due to abundant existing information and clear project definition. e.g. Field investigations already completed but preparation of documents for referral. e.g. Identification of constraints required; thus may be followed by more intensive work.

Level 1	Desktop and site inspection	Impact large or small but unambiguous due to abundant existing information and clear project definition. No significant species requiring further investigation. e.g. expansion of small mine with previous studies complete and no significant species. e.g. A proposed impact site with a high context value (small wheatbelt reserve or patch of urban bushland) as there is no need to demonstrate its high fauna values.

Level 1.5	Desktop, site inspection and targeted work on significant species	Impact large or small and with or without clear project definition; abundant existing information demonstrates presence or likely presence of significant species. e.g. Probably most Pilbara projects fall into this category, and most South-West projects where Black-Cockatoos and other significant species are present.

Level 2	Desktop and comprehensive field investigations including targeted work on significant species	Impact large or 'sensitive receiving environment' which can mean unusual location, significant fauna or paucity of data. Comprehensive fauna investigations to confirm as much of fauna assemblage as possible, with focus on significant species and determining patterns of distribution. Very hard to confirm majority of species

Level 2a	Fauna relocation	Permanent clearing proposed and/or species of conservation significance believed amenable to relocation expected to be impacted. Local Government requirements?

Level 3	Research and monitoring	Any impact project where there is a need to monitor impacts; significant species close to impact; relocated populations; completion criteria with respect to rehabilitation; offset research projects. This means that whatever the initial level of investigations, it is worth designing these to lay the foundation for further work.

Special cases

All EIA projects are special.

Linear corridors in general.
Impact is narrow and depends on nature of infrastructure (buried pipeline to major road/rail). Level of investigation depends heavily on context, availability of existing information and assemblage organisation.

Higher level of investigation in fragmented and/or complex landscapes.

Linear corridor worked example

Widening of wheatbelt road. Loss of almost all vegetation. Retention of some trees possible.
Road links two small reserves.
Scope using framework.

Wheatbelt road widening scoping: impacts

Impact variable	Description/risk
Habitat loss	High proportional loss in fragmented landscape. Any fauna habitat locally rare and potential for at least locally significant fauna, thus risk of local decline/extinction.
Habitat degradation	High risk of habitat degradation of any vegetation retained through weed invasion.
Changes in population dynamics	Surviving fauna likely to be exposed to increased risk of roadkill.

Wheatbelt road widening scoping: fauna values

Fauna value variable	Description/investigation required
Context and representation	Fragmented landscape; desktop interpretation.
Significant species	Some potentially present; (trapdoor spiders, SRE invertebrates, declining woodland birds). Targeted surveys.
Assemblage organisation	Site inspection to check for locally significant ‘habitat trees’.
Ecological processes	Connectivity clear from desktop.

Wheatbelt road widening scoping: project specific variables

Existing information	**General fauna assemblage is well-documented; species likely to persist in remnant vegetation known. Therefore, assemblage can be predicted with some confidence.**
Ongoing studies	Monitoring of revegetation to see if fauna recovers. Baseline data to be collected on abundance of indicator species in remnant and reserves for comparison with revegetation. Choose indicators

Wheatbelt road widening scoping. Level 3.

Desktop - identify fauna assemblage, likely significant species and connectivity.
Site inspection - targeted significant species and locate ‘habitat trees’.
Collection of baseline data on indicator species. Woodland-dependent birds (thornbills, Redthroat, Blue-breasted Fairy-wren) might be the best indicators.

Framework for scoping based on project details.

Impact variables

Habitat loss

Habitat degradation

Changes in population dynamics

Fauna value variables

Context and representation

Significant species

Assemblage organisation

Ecological processes

Project-specific variables

Existing information

Ongoing studies