Concept Plan SP 2015-018

Identification of threats and critical aspects of the ecology of the threatened Pilbara Olive Python (*Liasis olivaceus barroni*) to aid management.

Animal Science

Project Core Team

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Project status as of Feb. 7, 2020, 2:21 p.m.

Pending project plan approval

Document endorsements and approvals as of Feb. 7, 2020, 2:21 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

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Biodiversity and Conservation Science Program

Animal Science

Departmental Service

Service 6: Conserving Habitats, Species and Communities

Background

None

Aims

BACKGROUND

The Pilbara Olive Python (*Liasis olivacea barroni*) is a large species (up to 5 m in length) restricted to the Pilbara and northern Ashburton regions of Western Australia. It is listed as “Vulnerable” under the EPBC Act 1999 and "Threatened" under Schedule 1 of the Wildlife Conservation Notice 2014 (WA). Limited information is available on its distribution, ecology, population structure and trends, and conservation threats.

Its massive size at maturity, restricted habitat preferences, probable low densities and a diet containing large vertebrates (including a number of threatened species) makes the Pilbara Olive Python (POP) potentially vulnerable to a range of changes to its habitat. No decline in the overall population size or the distribution has been detected, but there is insufficient historical and recent data to establish any trends. A number of potential threats could result in local or wider extinctions including: habitat destruction or alteratlion by infrastructure or mining projects; habitat degradation around water bodies due to cattle and frequent fires; predation of young by foxes and feral cats; and the loss of important food species (e.g. fruit bats, quolls, rock-wallabies) due to such factors as feral animals or inappropriate fire regimes. Information is available on the distribution of POPs (Smith 1981, Pearson 1993) and some ecological work has been undertaken by the Department in association with community groups (Pearson 2003, 2007, Tutt *et al*. 2002, 2004).

In the last decade, the rapid expansion of resources projects and their associated infrastructure in the Pilbara has resulted in numerous referrals under the EPBC Act concerning the presence or probable presence of POPs on mining leases. Its cryptic nature has frustrated attempts to survey and monitor the species and made assessment of what constitutes a “significant” impact from development problematic.

This project seeks to examine critical aspects of the ecology and population dynamics likely to be affected by feral animals and changes caused by fire and cattle. For instance, radio-telemetry (Pearson in prep.) suggests that juvenile pythons rely on thick vegetation around water bodies to hide and to capture prey, while the nesting sites of adult females may be remote from usual home ranges. Females are "capital breeders". They breed infrequently, relying on depositing substantial fat reserves to enable the production and incubation of eggs. Loss of preferred prey items can potentially delay or halt reproduction. The project will focus on life history parameters such as diet, habitat preferences, reproductive patterns and recruitment of POPs, as well as determining appropriate techniques for survey and monitoring of the species.

AIMS

1. Collate existing information about the Pilbara Olive Python and publish research data on diet and foraging activity.
2. Clarify the distribution, population structure and conservation status of POPs.
3. Establish the reproductive requirements of female POPs in relation to body condition and preferred nest sites.
4. Develop techniques to monitor the recruitment of juveniles, the population cohort likely to be most affected by feral animals.

5. Trial, investigate and improve survey and monitoring techniques to enable better assessments of potential and future impacts of resource projects and management activities on POPs.

Expected outcome

The project will dramatically improve our knowledge of the ecology of the Pilbara Olive Python, techniques to survey and monitor populations and what management actions may be required to maintain its populations. It will allow the Department and other agencies to better assess the likely impact of resource developments and management activities on POPs and techniques to mitigate those impacts (if necessary) and monitor their effectiveness. It will provide direction to consultants on the best ways to locate POPs and establish monitoring programs.

To communicate this information, the following outputs are envisaged:

Peer-reviewed papers (with tentative titles) could include;

1. Re-description of the POP based on genetics, meristics and morphometrics.
2. Diet and foraging behaviour of the POP.
3. Distribution, population structuring and conservation status of the POP.
4. Habitat preferences and activity patterns of the POP.
5. Reproductive behaviour in POPs: a large capital breeder in an arid land.
6. Survey and monitoring protocols for a large cryptic predator- the POP.
7. Radio-telemetry and other monitoring techniques for large cryptic predatory snakes.
8. What role does fire management and feral cat control have in the recruitment and survival of the threatened POP?

Other written outputs would include:

1. Report on protocols to survey and monitor POPs for mining companies and consultants.
2. Annual reports to funding bodies.
3. Articles in Landscope and other popular magazines.
4. Media releases.

Other communications:

1. TV/documentaries- large pythons are popular with the public- I have been involved in 2 documentaries in relation to POPs in the past (German VoxTierzit and Wildlife Rescue on Australian TV). I would anticipate future approaches from documentary production companies and television networks.

Strategic context

The Pilbara Olive Python is an iconic threatened species in the Pilbara and its possible presence on mining leases has resulted in numerous EPBC referrals in the last decade. Consultants working on behalf of resource companies have struggled to find POPs and have not developed effective ways to monitor the impacts of mining activity on the species. POPs occur in several national parks and conservation reserves managed by the Department. It is WA's largest snake and a species popular with the wider public and Pilbara residents in particular.

It is a listed "Vulnerable" species under the EPBC Act and "Threatened" under WA legislation. The aims and outcomes of this proposed project are consistent with the research priorities identified by the Commonwealth Conservation Advice on *Lialis olivaceus barroni* (Threatened Species Committee 2008) as outlined below:

"Research priorities that would inform future regional and local priority actions include:

- Design and implement a monitoring program.
- More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening processes.
- Undertake survey work in suitable habitat and potential habitat to locate any populations/occurrences."

It also aligns with the seven projects identified by Pearson and Morris (2011) in "Project Plan- The ecology and conservation of the Pilbara Olive Python 2011-2016" (Department of Parks and Wildlife):

1. Review of published and unpublished literature.
2. Development of survey and monitoring techniques.
3. Pilbara Olive Python genetics and population structure.
4. Detailed field ecology of Pilbara Olive Pythons.
5. Developing strategies to minimise Pilbara Olive Python mortality.

6. Reducing the impact of mining and infrastructure on Pilbara Olive Pythons.
7. Monitoring Pilbara Olive Python populations.

A POP workshop was held at the Department of Parks and Wildlife offices at Kensington on December 10, 2013 and identified the following research requirements:

"1. Undertake a literature review.
2a. Develop survey techniques.
2b. Develop monitoring techniques.
2c. Better understand habitat requirements.
2d. Better understand breeding biology.
3a. Better understand prey relationships.
3b. Better understand predator relationships."

The proposed project examines the most critical of the research priorities identifed by these three documents, focussing on reviewing available literature, developing and testing survey/monitoring techniques, resolving population relationships and structure via genetic techniques, identifying conservation threats and undertaking detailed ecological work to understand habitat requirements, diet and reproduction. The project will primarily use radio-telemetry to follow the fate of a number of olive pythons in response to fire management and feral animal (cat) control.

Note that the project has a five year life on account of the apparent low reproductive frequency of female POPs to enable determination of factors associated with this. Funding required for Years 4 and 5 would each be similar to Year 3.

Expected collaborations

A range of collaborations are anticipated.

The project will work synergisitically where possible with existing Northern Quoll work at Yarraloola and Red Hill funded by Rio Tinto (and managed by Keith Morris). It will involve Pilbara regional staff wherever possible in site selection, capture of study animals, radio-telemetry and other aspects.

Outside the Department, the project will seek the involvement of indigenous ranger groups and the general public to report sightings, collect scales and roadkills, and potentially radio-track pythons. Environmental consultants will be asked to contribute scale samples for genetic analysis and will be consulted in relation to survey and monitoring techniques they are currently using or have attempted to apply.

A co-operative study of the genetic distinctiveness of POPs in relation to other populations of olive pythons is already underway with Dr Peter Spencer of Murdoch University. A preliminary report was produced, but a better geographic spread of samples collected during this project would allow a more thorough assessment of population structuring. This would involve the WA Museum in its role as custodian for samples and specimens. There may be opportunities to involve students in certain aspects of the project and this will be explored depending on funding available.

Funding for the project will most likely to come from threatened species offsets and so it will be necessary to collaborate with mining companies and their environmental sections to undertake fieldwork and to carry out any habitat manipulations such as grazing or fire management.

Proposed period of the project

Jan. 1, 2016 – Jan. 1, 2021

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	0.2	0.2	0.2
Technical	1.0	1.0	0.2
Volunteer	0.2	0.2	0.2
Collaborator	0.1	0.2	0.1

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DPaW)			
External Funding	$180,000 over three years$		