

Concept Plan SP 2020-006

Ecology, threats and monitoring of the Pilbara Olive Python (*Liasis olivacea barroni*)

BCS Animal Science

Project Core Team

X X **Supervising Scientist** David Pearson
Data Custodian David Pearson

Project status as of May 16, 2023, 11:54 a.m.

X X Update requested

Document endorsements and approvals as of May 16, 2023, 11:54 a.m.

X X
Project Team granted
Program Leader granted
Directorate granted

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Program

BCS Animal Science

Departmental Service

Service 7: Research and Conservation Partnerships

Background

Monitoring is a vital component of threatened species conservation and management. The monitoring of species that are cryptic, not trappable using conventional means (physical traps or cameras), have highly seasonal behaviour or occur at low densities is particularly challenging. The threatened Pilbara Olive Python (*Liasis olivacea barroni*) has all these characteristics. It occurs in rocky ranges in the Pilbara region, including many mining areas. Attempts to monitor mining impacts on the species have been based on a limited understanding of its biology and the use of techniques that are unlikely to be sensitive to population changes. Road driving counts, remote cameras and eDNA sampling from water bodies have either not detected Pilbara Olive Pythons, or find few individuals on each sampling occasion. The use of a few mammal prey items as a 'surrogates' for monitoring Pilbara Olive Pythons is unlikely to be informative, because the diet is diverse and as a gape-limited predator, young pythons consume different and smaller prey than adults.

The Pilbara Olive Python is listed as Vulnerable under the EPBC Act 1999 and "Threatened" under Schedule 1 of the Wildlife Conservation Notice 2014 (WA). Little information is available on its ecology, population structure/trends and conservation threats. Potential threats include: habitat destruction or alteration by infrastructure or mining projects; habitat degradation due to cattle and frequent fires; possible predation of young by feral animals; and the loss of important food species. Information is available on the distribution of Pilbara Olive Pythons (Smith 1981, Pearson 1993) and some ecological work has been undertaken (Pearson 2003, 2007; Tutt 2002, 2004).

The rapid expansion of resources projects in the Pilbara has resulted in numerous referrals under the EPBC Act concerning the presence or probable presence of Pilbara Olive Pythons on mining leases. Better survey and monitoring techniques are required to assess and mitigate the impact of mining.

This project seeks to determine critical aspects of the life history and population dynamics that can be incorporated in monitoring protocols. For instance, female pythons are "capital breeders". They breed infrequently, relying on depositing substantial fat reserves to produce and incubate eggs. Loss of preferred prey items can potentially delay or halt reproduction.

The collection of baseline information on life history parameters such as diet, reproductive patterns, recruitment and the survival of different cohorts will enable more sensitive monitoring of the species. Radio-telemetry will provide behavioural data on adult and large sub-adult pythons (transmitters can last up to 3 years and be replaced) to aid the development of survey techniques reliant on searching, while experiments with models and cameras will be used to study the probable predators of juvenile pythons. A review of the use of eDNA as a monitoring technique will also be conducted.

Aims

1. Collate existing information about the Pilbara Olive Python and publish workshop outcomes and research data on the species.
2. Establish a radio-telemetric study involving several Pilbara Olive Python populations to obtain baseline data on frequency of reproduction, nesting sites, population structure, diet, growth rates and survivorship.
3. Undertake experiments to determine threats to juveniles, the population cohort likely to be most affected by feral animal predation or vegetation change due to fire or grazing.
4. Trial, investigate and improve survey and monitoring techniques to enable better assessments of potential and future impacts of resource projects and management activities on Pilbara Olive Pythons.

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 undertake surveys and assess the probable impact

of resource developments and management activities on Pilbara Olive Pythons. It will provide direction to consultants on the best ways to locate Pilbara Olive Pythons and establish monitoring programs.

Peer-reviewed papers (with tentative titles) and could include:

1. Identification of threats to the conservation of the Pilbara Olive Python.
2. Distribution, population structuring and conservation status of the Pilbara Olive Python.
3. Habitat preferences, diet and foraging behaviour in relation to the conservation of Pilbara Olive Pythons.
4. Protocols for the survey and monitoring a large cryptic reptilian predator.

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 Landscape and other popular magazines.
4. Media releases.

Other communications:

TV/documentaries- large pythons are popular with the public- I have been involved in two documentaries in relation to Pilbara Olive Pythons in the past (German VoxTierzeit and Wildlife Rescue on Australian TV). I would anticipate future interest from documentary production companies and television networks.

Strategic context

The Pilbara Olive Python (POP) is an iconic threatened species in the Pilbara and its possible presence on mining leases has resulted in numerous EPBC referrals. 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.

The project is consistent with a number of the DBCA Animal Science Program activities including:

- Address knowledge gaps to inform the effective conservation of threatened fauna species.
- Provide scientific knowledge to ensure the effective and efficient monitoring of fauna species.
- Identify, assess and apply emerging technologies and innovative approaches to fauna conservation research.
- Engage with the community to identify opportunities for involvement in fauna conservation research and to encourage knowledge transfer.
- Build capacity to deliver fauna conservation outcomes by collaborating with other science providers, government agencies, industry and NGOs.

It 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 in Perth in 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 identified by these three documents, focusing 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. 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 in synergy where possible with existing DBCA work at Yarraloola and Red Hill. 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 and potentially radio-track pythons (this was successfully done in the past with volunteers in the communities of Dampier, Tom Price and Pannawonica). 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 Pilbara Olive Pythons relative to other populations of olive pythons with Dr Peter Spencer of Murdoch University is nearing completion. A preliminary report has been produced, but further samples will enable the publication in preparation to have a better geographic coverage and updated results from newer genetic methods.

Any specimens (e.g. roadkills) will be lodged with the WA Museum.

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 prepare proposals, undertake fieldwork and to carry out any experimental habitat manipulations.

Proposed period of the project

None – None

Staff time allocation

to X X X X				
Role	Year 1	Year 2	Year 3	
Scientists	0.4	0.4	0.4	
Technical	0.1	0.1	0.1	
Volunteer	0.1	0.1	0.1	
Collaborator	0.1			

Indicative operating budget

to X X X X				
Source	Year 1	Year 2	Year 3	
Consolidated Funds (DBCA)				
External Funding	45000	45000	45000	