Concept Plan SP 2020-009

Lifeplan: A planetary inventory of life

Ecosystem Science

Project Core Team

Supervising Scientist	Adrian Pinder
Data Custodian	Adrian Pinder
Site Custodian	

Project status as of July 30, 2020, 7:43 p.m.

New project, pending concept plan approval

Document endorsements and approvals as of July 30, 2020, 7:43 p.m.

Project Team	granted
Program Leader	granted
Directorate	required

Lifeplan: A planetary inventory of life

Biodiversity and Conservation Science Program

Ecosystem Science

Departmental Service

Service 7: Research and Conservation Partnerships

Background

Lifeplan is a global biodiversity survey project funded by the European Research Council and led by Professor Otso Ovaskainen of the University of Helsinki. To quote the projects website "As a fundamental data platform, we will generate standardized, global data on a range of species groups, thus allowing quantification of variation in ecological communities at spatial scales covering six orders of magnitude (from 0.1 km to 10000 km), across hundreds of thousands of species. As a key deliverable, we will develop global joint species distribution models describing the spatiotemporal structure of life on Earth. This task relies on a collaboration of a new type – a distributed sampling design involving 100 sites across the globe, with denser sampling in the Nordic countries and in Madagascar". Each of the 100+ sites will consist of paired urban and natural locations. In addition, a more intensive nested grid of sites will be established in Scandinavian countries.

Other than investigating global patterns in biodiversity, the project aims to scale up use of efficient biodiversity monitoring tools (ecoacoustics, camera trapping, and metabarcoding of aerial spores, soil and plant root mycorhizal fungi and flying insects).

A call for research groups to be involved in this work was put out in early 2020 and Ecosystem Science Program, the Botanic Gardens and Parks Authority and Swan Region submitted a nomination. This nomination was accepted in March 2020. The nominated site includes an urban location in Kings Park and a matching natural location located in Lowlands Nature Reserve, adjacent to an Ausplot (now Ecosystem Surveillance) site. Both sites will be in open *Banksia* woodlands. The project aims to utilise emerging biodiversity survey technologies to reduce sample processing and analysis costs.

Methods to be used are:

1. Camera trapping, with images analysed by automatic recogniser software (training dataset to be provided). Focus on mammals.
2. Autonomus recording units, with audio analysed by automatic recognisers (training dataset to be provided).
3. Airporne spore/pollen sampling, analysed using metabarcoding.
4. Malaise traps for flying insects, analysed using metabarcoding.
5. Soil sampling for fungi, analysed with metabarcoding. There may also be root sampling for mycorhizial fungi.

The project will be carried out over six years, with sampling alternating between the natural and urban areas.

Aims

- To survey and contrast the biodiversity values of a large semi-rural nature reserve and a large urban bushland with similar dominant overstorey vegetation (*Banksia* woodland). This will contribute to an understanding how much biodiversity has been retained in the urban setting as a result of historical and current management, acknowledging that the 'natural' area is not undisturbed.
- To improve understanding of the broader biodiversity values of a Threatened Ecological Community (*Banksia* woodlands of the Swan Coastal Plain)
- To contribute to a global project that aims to characterise global patterns in biodiversity distribution, contrast urban and natural areas and to upscale emerging technologies for biodiversity survey.
- To gain an insight into the application and effectiveness of efficient biodiversity survey methods

Expected outcome

- Experience with the implementation and utility of efficient biodiversity survey technologies

- An understanding of the biodiversity values of a large urban bushland in comparison to a similar vegetation type in a relatively more natural setting.
- Knowledge of the broader conservation values of an example of an extensive threatened ecological community (*Banksia* Woodlands of the Swan Coastal Plain).

Strategic context

DBCA Strategic Directions 2018-21

Undertake world-recognised science to build and share biodiversity knowledge to support evidence-based decision making and management.

Develop and deliver programs that enhance the conservation and survival of native species, and promote the conservation of wildlife through national and international partnerships

- This project is an international partnership that will promote community and scientific understanding of the biodiversity values of two significant sites on the Swan Coastal Plain. It will result in a number of co-authored publications. and provide us with experience in sampling for and analysing associated data.

Science Strategic Plan 2018-21

Goal: Adequate knowledge of biodiversity is available to support the department's conservation and management of terrestrial, estuarine and marine ecosystems (ESP Approach: Conduct biological survey, including genetic survey, in priority management areas, and for key species and ecological communities).

Goal: Science is innovative and agile in assessing and adopting new technologies and methodologies, where appropriate (ESP Approach: Identify and realise opportunities for adoption of technical advances and innovative approaches for conservation).

- This project will use novel/emerging technologies, including metabarcoding and audio and visual automatic recognisers, to survey biodiversity of two significant sites on the Swan Coastal Plain.

Expected collaborations

- The project is a global collaboration, with 100 other sites, managed by the University of Helskinki.
- Swan Region (Geoff Barrett) and the Botanic Gardens and Parks Authority (Steve Easton) have been involved in site selection and will be involved in setting up sites. In alternate years BGPA will run the sampling program. Geoff Barret will help coordinate Birdlife WA volunteers to provide bird call training datasets.
- Birdlife Australia, who will help coordinate volunteers to provide training data (identified bird calls) for the audio recordings.

Proposed period of the project

Sept. 1, 2020 – Sept. 1, 2026

Staff time allocation

Role	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6		
Scientist (BCS)	0.05	0.05	0.05	0.05	0.1	0.1		
Technical	0.2 (BCS)	0.1 (BGPA)	0.2 (BCS)	0.1 (BGPA)	0.2 (BCS)	0.1(BGPA)		
Swan Region staff	0.05	0.05	0.05	0.05	0.05	0.05		
BGPAstaff	0.05	0.05	0.05	0.05	0.05	0.05		

Indicative operating budget

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Internal BCS (note sampling years cross over financial years)	7000	1000	7000	1000	7000	1000
Internal BGPA (note sampling years cross over financial years)		750	250	750	250	750
External (primarily equipment costs). Estimated spread across years	42500	1500	1500	1500	1500	1500
Note. EU Research Council providing approx. $50000 worth of support, mostly for equipment (shipped from Finland) in first year. but will also replaced damaged/non-functional equipment and cover costs of mailing samples to Finland during life of project. All equipment and consumables except ethanol and two car batteries provide	None	None	None	None	None	None