Concept Plan SP 2019-048

Investigating the causes of change in forest condition

Ecosystem Science

Project Core Team

Supervising Scientist	Katinka Ruthrof
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Project status as of April 14, 2020, 3:56 p.m.

Approved and active

Document endorsements and approvals as of April 14, 2020, 3:56 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

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Biodiversity and Conservation Science Program

Ecosystem Science

Departmental Service

Service 8: Implementation of the Forest Management Plan

Background

The mid-term review of the Forest Management Plan 2014-2023 highlighted concerns regarding the decline in vegetation density in the northeast of the FMP area (KPI 1) and recommends investigations into the “cause of decline in vegetation density”. Although the decline is broadly consistent with climate change prediction models, other factors may be contributing. The aim of this project is, therefore, to investigate the cause/s of decline in vegetation density and further examine contributions by other factors.

Aims

The aims of this project are:

1) To examine the methods and assumptions used to determine vegetation change in the FMP audit documentation . This will include an analysis of the temporal and spatial trends in vegetation cover.

2) To investigate the factors contributing to vegetation density decline. A preliminary examination suggests a number of factors that could be contributing to vegetation density decline in the eastern forest. These will be investigated to answer the following questions:

a. What are the landscape, stand, and site factors associated with the vegetation cover decline, such as aspect, elevation, soil type, vegetation type, stand structure, pests, pathogens, salinity, hydrological shifts in quality and quantity, fire regimes, and fire behaviour? Interactions will be important here, such as aspect and recovery from fire.
b. What is the recovery time for different forest ecosystem types to a range of fire severities? Results will be incorporated into vegetation density change trend maps for the next FMP, if necessary.
c. What are the climatic influences that have occurred in the eastern region of the forest? For example, what is the extent and severity of rainfall decline, temperature increase, frost events, and chronic or acute shifts in vapour pressure deficit (VPD)?

Expected outcome

The expected outcome is a clearer understanding of the factors contributing to decline in vegetation density in the south-west forests. A review examining and collating all current and relevant remote sensing data, published and grey literature will be undertaken. Outputs will include: journal papers, conference presentations, summary bulletins for stakeholders and the wider community, and other outreach materials as required and as opportunities arise.

Strategic context

The project aligns with the Science Strategic Plan; particularly the Strategic Themes "Impacts of climate change on biodiversity and ecosystem function". The associated Strategic Goal is: "impacts of climate change on biodiversity are better understood and adaptation strategies are incorporated into conservation management and planning". The project will contribute to the theme and goal by helping better understand the impacts of climate change on the forest ecosystem. The project also addresses strategic themes of "Pressures and threats to ecosystem composition, function and values" and "Availability of scientific information for evidence-based decision making".

Expected collaborations

The project is particularly cross-disciplinary, and will include internal and external collaborations. From DBCA: remote sensing and spatial analysis team, FMB and BCS will collaborate regarding the vegetation cover trend analysis and incorporate new information into future analysis, if necessary. Together with DBCA hydrologists, entomologists (e.g. Allan Wills, to examine the beetle in *E. wandoo*), fire practitioners (e.g. Hills District), foresters, and nature conservation staff, the landscape, stand and site factors (as well as interactions) that are potentially involved in vegetation decline will be investigated. Pathologists to investigate the fungal species associated with *E. wandoo*, forest ecologists, climatologists (e.g. Prof. Giles Hardy, and Drs Joe Fontaine and Jatin Kala, Murdoch University, respectively), and an ecohydrologist (Prof. David Breshears, University of Arizona), will also advise on this part of the project.

A number of small student projects are likely to arise from this research but would require separate funding.

Proposed period of the project

June 19, 2019 – Jan. 31, 2021

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	0.5	0.5	0.5
Technical	0.4	0.4	0.4
Volunteer			
Collaborator			

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	18	18	14
External Funding			