# The Habitat Condition Assessment System (HCAS)

Progress update for stakeholders: June 2019

What is it?

The Habitat Condition Assessment System is addressing the need for nationally consistent, landscape-wide, fine-scale data on habitat condition: i.e. the condition of terrestrial areas in terms of their predicted capacity to support the wildlife expected there under natural conditions.
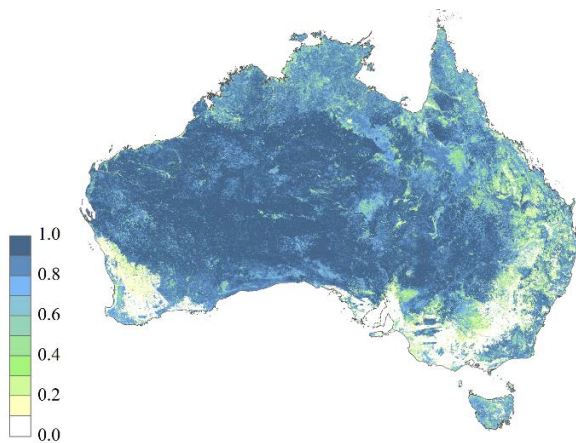
Why has it been made?

Like any management challenge, conserving Australia's wildlife and natural heritage requires reliable information on the assets being managed, what condition they're in, and how this is changing over time. These assets are many (e.g. species, ecosystems, wetlands, mountains, national parks, forests etc) and while their condition can be assessed in different ways, the concept of habitat condition, as used in the HCAS, is applicable across them all.

High habitat condition at a location indicates the potential intactness of natural assets, such as interacting species populations and functioning ecosystems (note: the HCAS does not include threats, such as feral predators and pathogens, that don't affect vegetation cover/function).

A landscape wide, fine-scale dataset on habitat condition has many practical uses in conservation decision making and reporting. It can be used to

generate maps of habitat connectivity, and integrated with assets datasets (e.g. areas of high threatened species density) to inform on priorities. While previous datasets, based on inferred binary natural areas mapping, have served this purpose, the HCAS extends this in a number of novel and significant ways and provides a platform for continuous improvement into the future.

When will it be available?

Work on the HCAS commenced in 2013, firstly as a CSIRO 'proof of concept' and from 2014/15 as a collaboration between CSIRO and the Department of the Environment and Energy (DoEE).

The HCAS version 2 Beta dataset (see image left) was developed in 2018. A detailed report on this version is in preparation, for release later in 2019. It will outline a range of limitations to be addressed before finalising the revised HCAS V2 dataset as a credible nation condition assessment. V2 is anticipated to be published in May 2020.

The team has also commenced work to develop a change-over-time reporting capacity, with a view to being able to inform the 2021 Federal State of the Environment report.

Technical overview

The HCAS combines environmental data, remote sensing data and intact condition reference sites to provide a consistent estimate of habitat condition for all locations across Australia. The model uses these three data sources to compare how a pixel actually appears (as seen from satellite) with how it would be predicted to appear if it was in good condition, benchmarked against the nearest reference sites. The difference is used to derive a condition score between zero and one.

The current version (V2 Beta) is at approximately 250m x 250m pixel resolution, using MODIS-derived satellite data for the period 2011 to 2016.
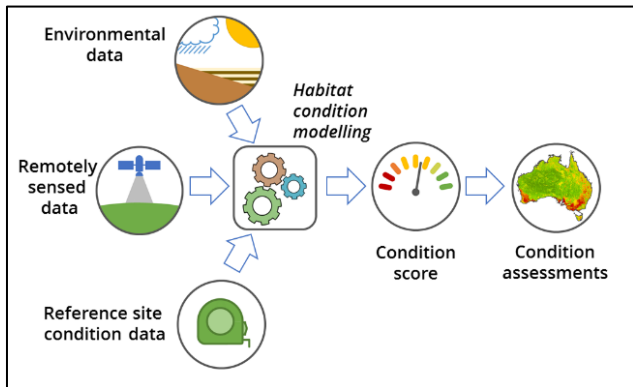
Governance and Stakeholder engagement

The HCAS project is one of a number of DoEE-CSIRO collaborative biodiversity knowledge projects. This collaboration ensures the model's development is in tune with DoEE's needs, and reflects an understanding of national needs in biodiversity information for decision making and reporting. The Department's Knowledge and Technology Division is building a strong literacy around the model's design and engages closely with potential users and stakeholders to ensure appropriate application and communication of the model.

The HCAS team has published a technical report and a peer reviewed article (see further information, below), and has presented at national forums. Stakeholders have been informally engaged across government, industry and research institutions. More formal engagement with stakeholders is planned for the next few months.

The team recognises that this is key to ensuring this potentially high-value national dataset is clearly communicated, well understood, and appropriately applied to support better decision making for a more sustainable Australia.

Any stakeholders wishing to better understand the HCAS its possible implications for their work are encouraged to contact the HCAS team.

Who

The HCAS project is a collaboration between CSIRO (Land and Water) and the DoEE (Knowledge and Technology Division, ERIN).

The joint team leaders are:
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Further information:

Project website
https://research.csiro.au/biodiversity-knowledge/projects/hcas/

Technical publication
Donohue RJ, Harwood TD, Williams KJ, Ferrier S and McVicar TR (2014) Estimating habitat condition using time series remote sensing and ecological survey data. CSIRO Earth Observation and Informatics Transformational Capability Platform Client Report EP1311716, Canberra.

Research publication
Harwood TD, Donohue RJ, Williams KJ, Ferrier S, McVicar TR, Newell G and White M (2016) Habitat Condition Assessment System: A new way to assess the condition of natural habitats for terrestrial biodiversity across whole regions using remote sensing data. Methods in Ecology and Evolution 7(9), 1050-1059. DOI: 10.1111/2041-210X.12579.

Image: the Rawlinson Range near Warakurna in central Australia. Scattered eucalypt trees in gorges on an otherwise rocky range with spinifex. Credit: Carl Gosper (DBCA, WA).