Koala habitat deforested in Queensland 2016-2021

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Summary

Greenpeace Australia Pacific requested a desktop analysis to generate statistics for deforestation in Queensland of koala habitat in the period 2016-2021 based on Queensland's Statewide Landcover and Trees Study (SLATS) data, and the fraction of that likely to be for beef cattle pasture development.

From 2016 to 2021, of 2,207,192 million hectares of woody vegetation cleared in Queensland, 673,250 ha (31%) was federally-mapped, likely-to-occur koala forest habitat. Of this, 99% or 668,665 hectares of deforested koala habitat fell within a pasture land use in areas where beef cattle accounted for 75% or more of the livestock present.
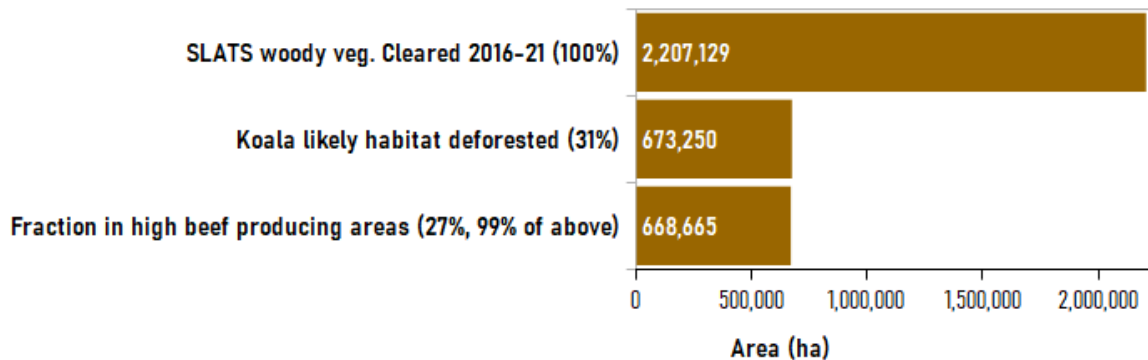

Fig. 1. Areas of woody vegetation cleared from 2016 to 2021 in Queensland, according to SLATS, of that how much was Koala likely forest habitat, and of that how much was in high beef producing areas where over 75% of stock present were beef cattle.

Caveats

Any views expressed here are the author's own and in no way reflect those of any other parties. All errors of fact or reasoning are the sole responsibility of the author.
This is a desktop analysis and therefore subject to errors in mapping of pixels as forest or deforestation. Pixelation of shapefiles to convert to rasters was the underpinning of analysis reported here and necessarily creates a small amount of error in statistics due to pixelation.

Methods

Woody vegetation clearing source

The SLATS shapefiles for the SLATS years 2016/17 to the most recent available 2020/21 were downloaded[1] and converted to a 30m pixel common template raster in the Queensland Albers Equal Area projection including only polygons representing woody vegetation clearing and excluding natural woody cover loss. These were then mosaicked into a single raster taking values 1 to 5 for the five successive years. In cases of repeat clearing for example if the same pixel was cleared in 2016/17 and again in 2020/21, it was assigned the earlier year value (eg 1).

"Undeveloped" land use filter

To avoid counting pixels as native woody vegetation clearing which were unlikely to be native (primarily plantations), the Queensland Land Use layer 2019 release was used and the following land uses extracted as relatively undeveloped:-

1.1.1 Strict nature reserves
1.1.3 National park
1.1.4 Natural feature protection
1.1.5 Habitat/species management area
1.1.6 Protected landscape
1.1.7 Other conserved area
1.2.0 Managed resource protection
1.2.2 Surface water supply
1.2.5 Traditional indigenous uses
1.3.0 Other minimal use
1.3.1 Defence
1.3.2 Stock route
1.3.3 Residual native cover
1.3.4 Rehabilitation
2.1.0 Grazing native vegetation
2.2.0 Production native forests
2.2.1 Wood production forestry
3.1.4 Environmental forest plantation
5.4.2 Rural residential with agriculture
5.4.3 Rural residential without agriculture
5.4.4 Remote communities
6.5.0 Marsh/wetland

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[1] https://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=SLATS

6.5.1 Marsh/wetland - conservation
6.5.2 Marsh/wetland - production
6.5.4 Marsh/wetland - saline
Note that the land use currency for this 2019 release ranged from 2011 to 2017 (not 2019 itself). Only Fitzroy and Burnett Mary Basins were current to 2017, so there may be some minor loss of data in these basins for the SLATS year 2016/17 where clearing resulted in land use change. However, this is expected to be minor since nearly all clearing is for pasture which does not result in a land use change.
The original woody clearing raster was filtered to only include these land uses, to exclude plantations and other "already developed" land uses at the start of the study period of 2016-2021.

Forest filter

All clearing layers derived above were filtered to exclude areas that did not meet the EU pre-clearing forest definition (strict interpretation) based on structure codes for pre-clearing regional ecosystems as mapped by the Queensland Herbarium. Methods are found in Taylor and Schoo (2023).[2]
Areas of undeveloped potentially forest cleared as derived above were further filtered to include only vegetation likely to also meet the 20% and higher canopy cover threshold prior to clearing used for the Australian Government forest definition.
The Foliage Projective Cover (FPC) layers for the years 2014, 2018, 2019 and 2020 were downloaded.[3]
SLATS clearing in the years 2016/17 and 2017/18 were filtered to exclude pixels below 11% FPC in 2014, which is equivalent to 20% canopy cover. The 2014 FPC layer had to be used because no FPC product was produced for the years 2015-2017 inclusive.
For the years 2018/19, 2019/20 and 2020/21 respectively, FPC in the commencing years (2018,2019 and 2020) below 11% were also excluded.

Koala habitat filter

The current public grids for Species of National Environmental Significance were downloaded and the Koala "likely to occur" polygons extracted and used to clip the deforestation rasters.[4]

Beef likelihood

The prevalence of beef production in the Queensland landscape was mapped using the Australian Bureau of Statistics Agricultural Commodities estimates for 2020/21 by statistical areas level 2 (SA2).[5] The total numbers of beef cattle were expressed as a percentage of all

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[2] https://www.researchgate.net/publication/375183537_Deforestation_for_agriculture_in_Queensland_2018_to_2020

[3] https://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=FPC

[4] https://www.environment.gov.au/fed/catalog/search/resource/details.page?uuid=%7B337B05B6-254E-47AD-A701-C55D9A0435EA%7D

[5] https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/2020-21

cattle and sheep numbers combined, but after first dividing sheep numbers by 8 to express their numbers in beef equivalents.[6]

Areas of Koala habitats deforested could then be tabulated according to classes of the beef fractions of all livestock within the SA2 within which it fell. The classes used were 90-100% beef, 75 to 89%, 50 to 74% and less than 50%.

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https://www.mla.com.au/extension-training-and-tools/feedbase-hub/persistent-pastures/grazing-management/stocking-rate/