



Manaaki Whenua  
Landcare Research

## North Island National Pasture Productivity

**Title**  
New Zealand National Pasture Productivity

**Creator**  
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**Date**  
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**Description**  
The New Zealand National Pasture Productivity map is a multi-temporal approach to estimating pasture (dry matter) yield in New Zealand's grassland area. The approach uses a model generated from collected historical records of pasture yield in 21 locations around New Zealand. It was hypothesised that yield of a paddock planted with pasture species would correlate with some average of normalised difference vegetation index (NDVI) observed at that location. The temporal median of NDVI of vegetated images across New Zealand's grasslands was obtained by calculating the median NDVI of all observations for each pixel where vegetation (NDVI > 0) was observed. Paddock polygons were manually created to surround each of the locations where yields had been obtained, and the spatial means within these polygons of the median NDVIs were plotted against the measured yields. A linear relationship between these quantities was created, which was applied to paddock polygons at a national scale. The uncertainty of the model is +/- 2.2 t/ha/yr for a 70% confidence interval. The data presented in this geodatabase is a segmentation of New Zealand grasslands using an automated multi-temporal approach presented by North, Paiman, and Belliss (2019). The parameters of this segmentation process were selected to achieve minimal missed boundaries between true paddock units. As a side-effect, some boundaries were created between sub-paddock areas with differing spectral response, such as in areas of strip grazing, areas divided by ridges or gullies, and areas with different management patterns. While these artefacts may improve the spatial accuracy of the pasture yield, the result is not intended to provide a one-to-one mapping between true paddock areas and their average pasture yield. The model was applied to each of these polygons. Because the data used to develop the initial model had generally high yields, the model has only been applied to polygons representative of higher-producing grasslands. Where median NDVI for a polygon was outside the domain of the assessed polygons, the model was deemed unfit to estimate pasture yield. Polygons with low median NDVI therefore have an assigned yield of zero. A full list of attribute definitions can be found in the attached PDF. The data used to generate the model has been derived from various published sources, in combination with Sentinel-2 imagery. Complete sets of Sentinel-2 for five passes covering mainland New Zealand were assembled and cloud-cleared in an automated manner using TMASK techniques. The resulting valid data was used to create medians of vegetated images on a per-pixel basis. The segmentation of New Zealand grasslands was derived by initially taking selected Sentinel-2 passes which gave suitable coverage of New Zealand's agricultural land, and applying the automated multi-temporal approach to boundary delineation. Around 200 passes from January - November 2018 were used to achieve the segmentation. These polygons were overlaid with the union of polygons from LCDB v5.0 (<https://iris.scinfo.org.nz/layer/104400-lcdb-v50-land-cover-database-version-50-mainland-new-zealand/>) which were either High-Producing or Low-Producing Grassland in both 2012 and 2018, and had not changed class between those dates.

**Coverage**  
-47.228737 167.337926 -34.292073 179.445279

**Type**  
vector

**Subject**  
Pasture

**Subject**  
Productivity

**Subject**  
Yield

**Subject**  
Dry matter

**Subject**  
Biomass

**Subject**  
Vegetation

**Subject**  
NDVI

**Subject**  
Grassland

Subject  
| Downloadable Data  
Subject  
| farming  
Subject  
| environment