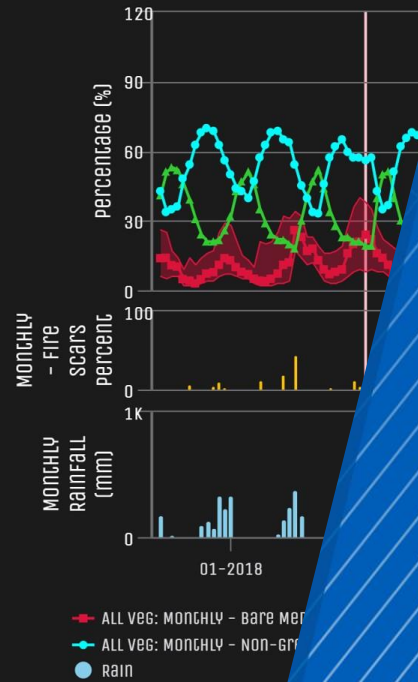
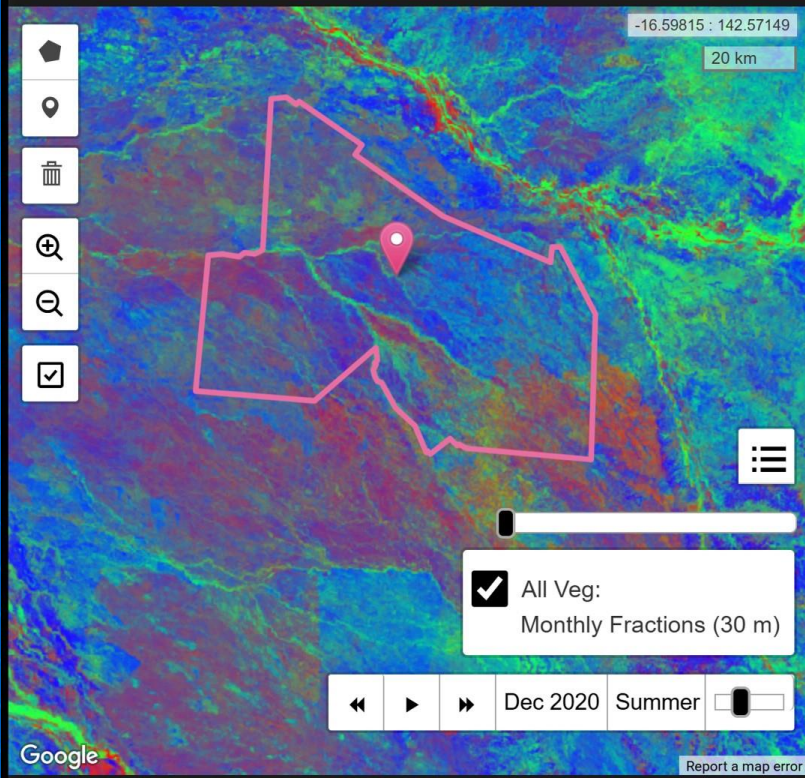


DISPLAY

CHART



VegMachine User Guide

2026

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January 2026

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VegMachine

Access VegMachine for free at <https://vegmachine.net/>

VegMachine is an online tool to summarise decades of satellite data over Australia quickly and easily. By making these datasets freely available, it can help people looking after the land to understand and communicate patterns in the landscape, and the outcomes of management decisions.

With VegMachine you can:

- **Display** satellite datasets of vegetation cover from 1988 onwards.
- **Chart** vegetation cover, fire and rainfall datasets through time for user-defined areas.
- Instantly **connect** these charts with the image display, to better understand vegetation patterns through time and space.
- **Extract and summarise data** to conduct your own analysis.

It is available as a mobile app and for desktop use through an internet browser. The app offers best performance on mobile, while the desktop version is better for examining maps and charts in detail.

To use as a mobile app, go to the [webpage](#) then save it to your phone's home screen. A separate mobile quick guide is also available, as some features are slightly different.

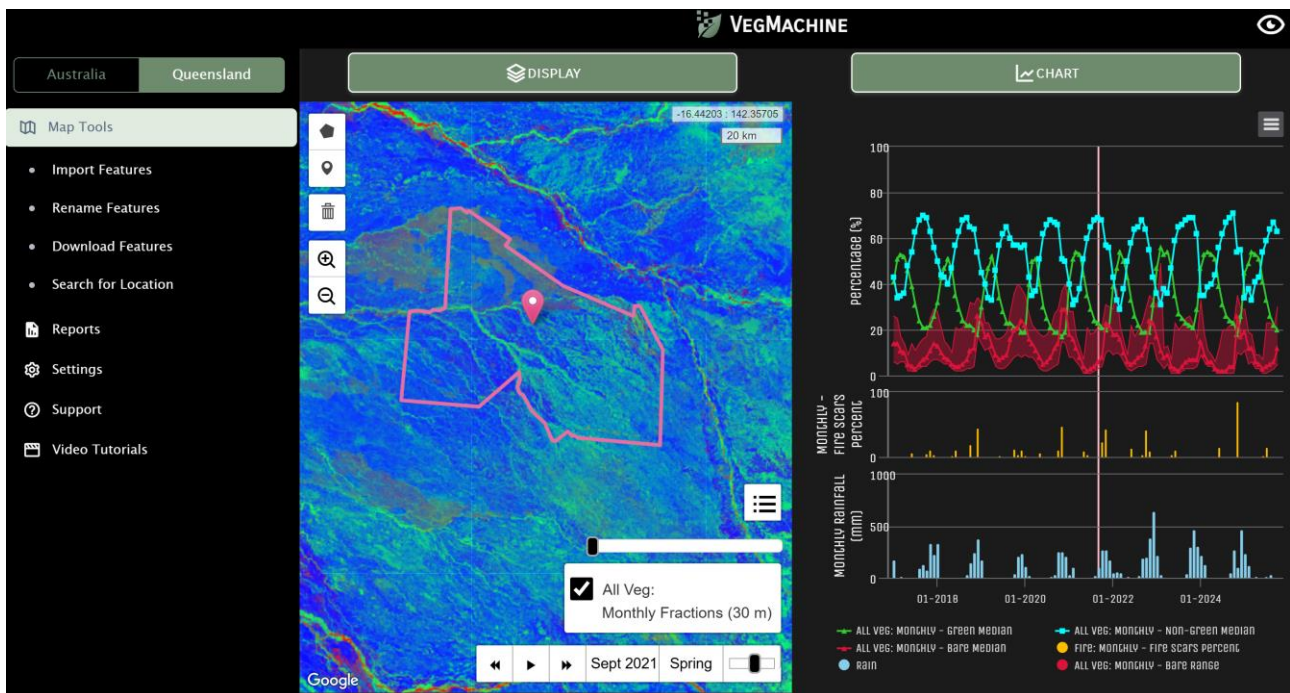


Figure 1 – Example of VegMachine desktop interface.

Display

Navigate the map window by clicking and dragging to your preferred location.

Zoom to your preferred scale by scrolling in or out or using the magnifying tools.

On mobile, zoom to your current location using your phone's GPS.



Search for a location or upload your own spatial data using the [Map Tools](#).

Select a particular dataset to display in the map window display by clicking the 'Display' tab and choosing one of the options. (On mobile, you will need to click 'Display' twice).

Find out more on [Which dataset should I use?](#) (page 7). There are some datasets available Australia-wide, and more available just in Queensland. To access these, activate the *Queensland* region button at the top of the main menu on the left. Once you have selected a dataset, you can then:

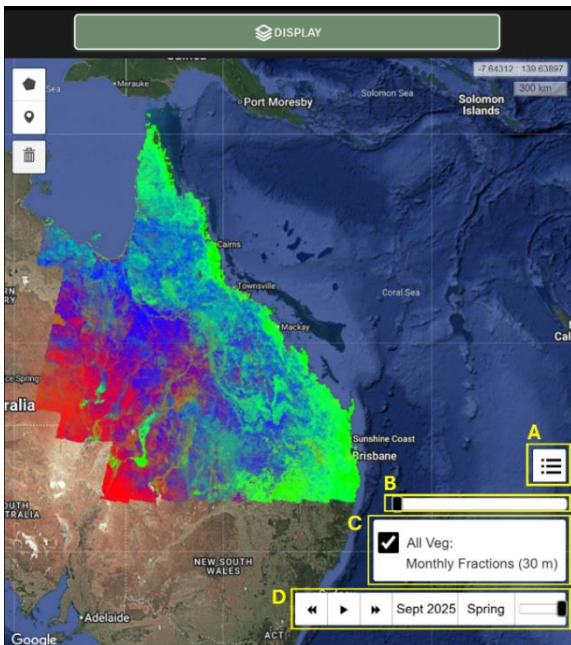


Figure 2 – Example of VegMachine map window display

- Make the legend visible by clicking the legend button.
- Change the transparency of the satellite dataset using the transparency slider.
- Remove the dataset layer using the tick box
- Explore back and forth through time using the time slider.

For Queensland, it is also possible to view property boundaries via the Vector Overlays option under the dataset list.

The first time you zoom to a particular location, the imagery may take a few moments to load. For future visits, this imagery is cached and will load more quickly. To cache all imagery, click the 'play' button on the time slider.

Map Tools

Use *Map Tools* in the lefthand menu (see Figure 1) to import, rename and download your own spatial features and search for a location.

- Import Features.** Most spatial data formats are supported for import. Multifile formats, such as shapefiles, need to be in a single zip file.
- Rename Features.** Multiple features can be selected for manual renaming. This is most useful for features drawn within VegMachine.
- Download Features.** Features drawn within VegMachine can be downloaded in GeoJSON format. All features are downloaded, not just those selected. While features persist across sessions, downloading them as a backup is advised if you wish to analyse the same areas in the future.
- Search for Location.** It is possible to search via address or coordinates within Australia, and also via property details (i.e. Lot on Plan) for lots greater than 5 ha within Queensland.

Charts

One of the most powerful aspects of VegMachine is summarising years of satellite data over a particular area. First *create* and *select* an area of interest, then *extract* and *summarise* the data.

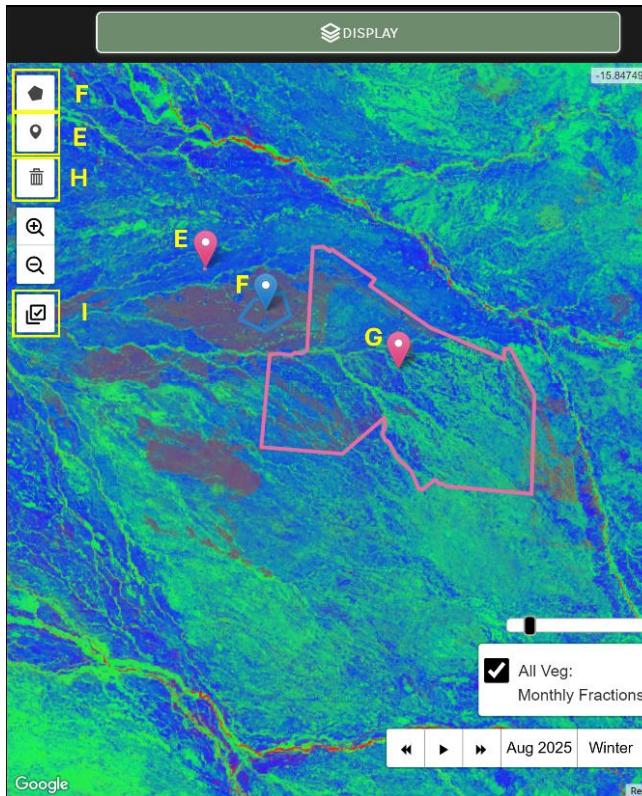





Figure 3 – Creating and deleting areas of interest

Create or delete an area of interest

Create your area of interest by:


- E. Using the marker tool  to make ~1 ha circle around a point; or
- F. Using the polygon tool  to manually create an area; or
 - On mobile, logging a point at your current location via the GPS tab; or
 - Uploading a spatial file (via [Map Tools](#)).
 - Within Queensland, property boundaries (available under Vector Overlays) can also be used to create an area of interest.

Delete an area of interest by:

- G. Clicking on the rubbish bin tool,  then clicking on the polygon(s) you would like to remove.

To confirm this deletion, press 'Save'. To cancel the deletion, press 'Cancel'. To delete all polygons, press 'Clear all'.

Select an area of interest

Select your area of interest by clicking on your chosen polygon. Selected polygons will change from blue to pink (for example, see polygons E and G above, compared to the blue polygon F). You can select multiple polygons by using the multi-select tool (I).  This multi-select tool is only visible when more than one polygon has been created. To deselect a polygon, click on it again.

Extract and summarise data

Once you have selected area(s) of interest, you can use the Chart options to *extract* summary data. Depending on the size of the area of interest, VegMachine creates summary statistics based on different spatial scales. For smaller polygons, summary statistics are based on all original pixels. For larger polygons, the pixels are rescaled according to the size of the polygons, with summary statistics calculated on these larger pixels. Summary statistics for larger polygons will thus be less precise than those for smaller polygons.

The chart does not auto-update if you change the polygon selection in the map display. To chart a new area, select the relevant area then create a new chart.

- *Feature Handling* affects how the areas of interest are analysed.
 - The 'Combine' option analyses data from all selected polygons (from one to many) as a single region.
 - The 'Compare' option allows comparison between two or more selected polygons.
- *Chart Menu* has two options.
 - 'Basic' charts show one dataset over time, using the average value across the selected area(s).
 - 'Advanced' charts allow much more customisation. Multiple datasets can be selected, as well as different statistical summaries of the selected datasets, such as the median, trimmed range (5-95%), interquartile range (25-75%) and standard deviation.

Once you have made a chart, you can scroll up and down on the chart to zoom to a particular time period. Fine detail within charts may be easier to view in the desktop browser version of VegMachine rather than the mobile version.

- J. Click on the chart legend to turn individual datasets on and off.
- K. Click on a particular datapoint to sync the map display to the relevant satellite product within the time series.
- L. Download the underlying summary data, chart image and polygon details via the chart context menu. Only datasets active within the legend will be downloaded. While polygons persist across sessions, we recommend downloading them if you wish to analyse the same areas in the future.

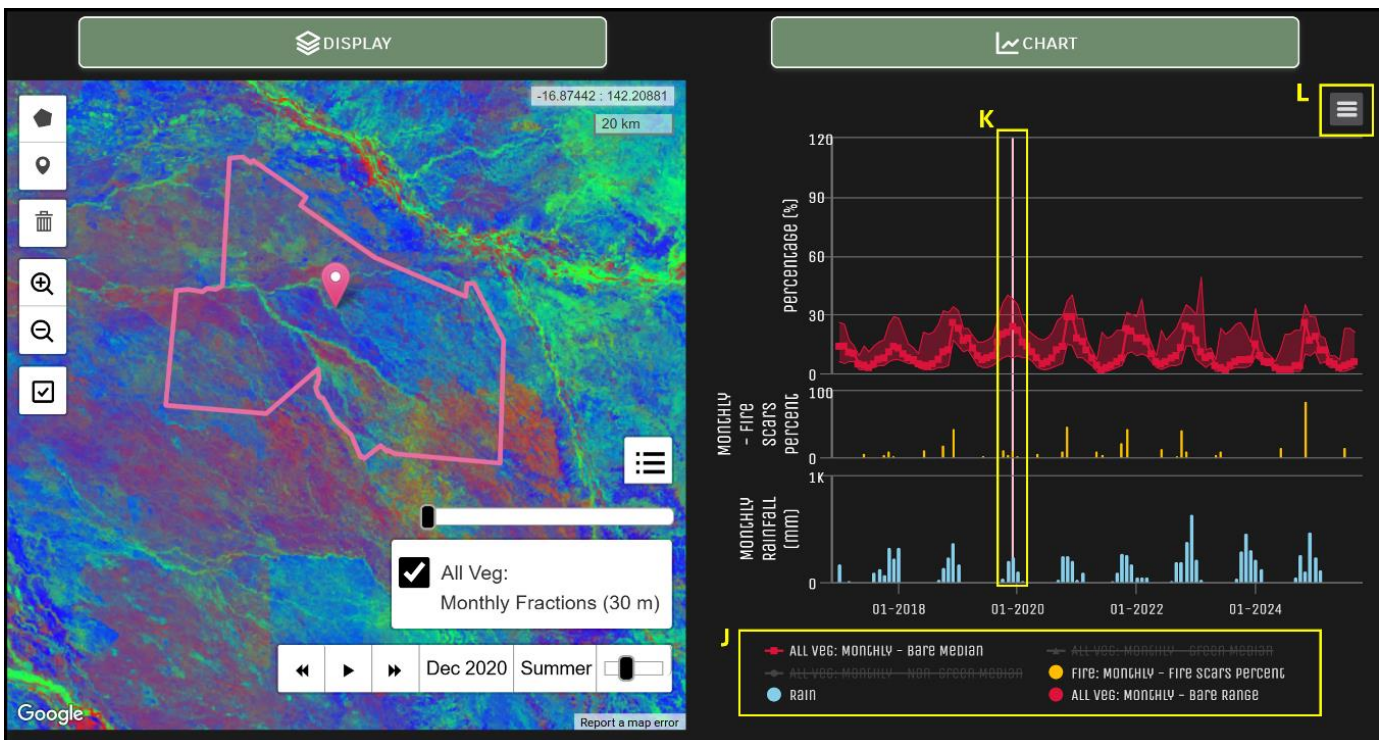


Figure 4 – Example of VegMachine map and chart window displays.

Settings

There are several options available to adjust the appearance of the charts, available via *Settings* in the lefthand menu.

- *Y-axis behaviour* allows the y-axis on charts to either stay at a consistent scale, or adjust dynamically in response to the maximum values for each dataset. For datasets with consistently low values over time, using dynamic Y-axis behaviour may make small changes more visible in the chart. Alternatively, using a consistent scale allows easier comparison between charts.
- *Rainfall grouping* determines how daily rainfall is aggregated in the chart: monthly, seasonal (3-monthly) or annual.

Reports

Generate regional ground cover comparison reports for areas within Queensland by selecting a polygon, then clicking the 'Reports' item in the lefthand menu. A pdf report will then be emailed to you. These ground cover reports are designed for large properties. They compare the median ground cover with the regional ground cover for dominant land types within the area of interest.

Which dataset should I use?

VegMachine helps you explore vegetation cover datasets available within Australia. The most useful dataset will depend on the location of your area of interest, and the relevant vegetation characteristics and timeframe (Table 1). Some advanced or monthly datasets are only available in Queensland (Tables 1 and 2). To access these, activate the *Queensland* region button at the top of the main menu on the left.

Vegetation characteristics

There are three main vegetation categories available within VegMachine: All Veg, Ground Cover and Woody Veg.

- *All Veg* datasets include both woody vegetation (trees and shrubs) and ground cover (grasses and forbs in the understory). Each pixel is then divided into either its proportion of green vegetation, dry vegetation and bare ground (Monthly and Seasonal Fractions), or proportion of total cover, i.e. green and dry vegetation combined (Monthly and Seasonal Total).
- *Ground cover* datasets provide an estimate of ground cover for areas with less than 60% woody cover. Similar to All Veg, each pixel is divided into either its proportion of green ground cover, dry ground cover and bare ground (Monthly and Seasonal Fractions), or proportion of total cover, i.e. green and dry ground cover combined (Monthly and Seasonal Total).
- *Woody cover* datasets use the persistent green dataset, based on areas that stay green over time. Due to the way this dataset is created, there is a time lag of 2 years. Note that while higher values in this dataset often relate to woody vegetation, non-woody areas with high moisture, such as irrigated golf courses or vegetation near dams and rivers, may also appear as higher persistent green.

Time

There are two dataset frequencies available within VegMachine; monthly or 3-monthly composites. Individual satellite images are not available within VegMachine. The monthly and 3-monthly composite images are created by combining multiple individual satellite images, and there may be some areas of no data due to cloud and cloud shadow. This will have a greater impact on the monthly datasets than the 3-monthly datasets, as there are fewer individual images available for the monthly composite.

To examine vegetation cover over the *longer term*, the 3-monthly Landsat composites provide almost 40 years of data, allowing exploration of patterns and trends at the expense of fine temporal detail.

For dynamic environments where vegetation undergoes *rapid* change, monthly composites are more likely to capture this change than the 3-monthly datasets. These monthly datasets are only available from 2017 onwards. Very rapid changes (e.g. crop harvesting or rapid growth of annual species following rainfall) may still not be well represented in the monthly composites. To examine very rapid changes or those occurring before 2017, advanced users may need to access individual satellite images via other platforms.

Coverage

All products are available in Queensland, with a subset available Australia-wide.

The spatial resolution of the datasets will affect the ability to measure *smaller patches of vegetation*. The Sentinel-2 fractional cover dataset and the fire scar dataset are the only 10 m resolution cover datasets currently available on VegMachine. The 10 m fractional cover dataset provides the potential to observe finer scale detail from 2017 onwards for Australia, excluding South Australia and Western Australia.

Advanced products

Several advanced products are available within Queensland.

Fire scar mapping provides a monthly estimate of burnt area at 10 m resolution. This dataset does not show currently active fires, but is useful for managing natural resources, assessing fire hazard and risk, and monitoring impacts over time. Some burnt areas may be missed or mapped later than the month they occurred due to cloud cover or misclassification. Small fires or low intensity burns under tree canopy may also be missed.

The *seasonal dynamic reference cover* method (DRCM) product allows comparison of total cover across the landscape, showing the difference between actual cover and local reference pixels. Negative values indicate pixels which have less cover than the reference pixels for the season being analysed.

Table 1: Comparison of basic products

	Vegetation characteristics			Time		Coverage		
	Include woody	Ground cover only	Separate green and dry veg	Rapid change	Longer term	Include smaller patches	Australia wide	Qld
All veg								
Monthly fractions (30 m)	X	X	X	X				X
Monthly Total (30 m)	X	X		X				X
Seasonal Fractions (10 m)	X	X	X			X	X excluding SA and WA	X
Seasonal Total (10 m)	X	X				X	X excluding SA and WA	X
Seasonal Fractions (30 m)	X	X	X		X		X	X
Seasonal Total (30 m)	X	X			X		X	X
Ground cover								
Monthly Fractions (30 m)		X	X	X				X
Monthly Total (30 m)		X		X				X
Seasonal Fractions (30 m)		X	X		X		X	X
Seasonal Total (30 m)		X			X		X	X
Woody Veg								
Seasonal Persistent Green (30 m)	X				X			X

Table 2: Comparison of advanced products

	Vegetation characteristics			Time		Coverage		
	Include Woody	Ground cover only	Separate green and dry veg	Rapid change	Longer term	Include smaller patches	Australia wide	Qld
Seasonal DRCM (30 m)		X			X			X
Fire								
Monthly Fire Scars (10 m)	X			X		X		X

Example

Fires at Staaten River National Park, southern Cape York Peninsula

Located in northern Queensland, Staaten River National Park has a mix of monsoon tropical savanna grasslands and melaleuca woodlands¹. The National Park is home to the Endangered golden-shouldered parrot (*Psephotellus chrysopterygius*), which requires a particular combination of grassland and open woodland for its nesting and feeding requirements². Providing this mix of vegetation types requires careful fire management to ensure there are both high intensity fires to maintain open woody vegetation, as well as low intensity fires to protect feeding areas and manage the timing of grass seeding^{1,2}. In this example, we show how VegMachine's advanced chart functions can be used to investigate fire and vegetation cover over time.

In this National Park, fires are frequent. Following a fire, the proportion of bare ground typically increases, then declines as vegetation regrows following rainfall. VegMachine calculates the proportion of the property with fire scars each month, shown as orange bars in the chart window (Figure 5 and Figure 6). The largest fires generally occur during the late dry season in November, as temperatures increase and vegetation dries out. In contrast, small burns are implemented by the land managers in the early dry season around June to maintain a suitable mosaic of fire intensity. An example is shown in the display window for June 2024, with the long linear fire scars typical of prescribed burns (Figure 5). In the corresponding section of the chart, this fire burnt 15 % of the National Park, compared to the higher proportions for the larger fires later in the year (85 % in November 2024, for example - Figure 6).

Comparing the *median* bare ground value with the *range* of bare values provides information on the consistency of vegetation cover amounts across the National Park. For the June 2024 fires, median bare ground is very low (2 %), but this is not centred within the range (1-12 %). In this case, most of the National Park has high vegetation cover, as there has been no recent fire, but small sections of the park have higher bare ground due to the recent prescribed burns. In contrast, the median bare ground (26%) during more extensive fires in the late dry season is centred within the bare range (10-35 %), with a more even spread of cover amounts across the National Park.

Vegetation cover is strongly linked to rainfall in this region. As can be seen in Figure 7, rainfall in this region is very seasonal, occurring only in the warmer months of the year. In the National Park, highest falls typically occur in December, with a characteristic peak in the green 'all veg' cover fraction several months later around March-April. This flush of growth then dries out, with the non-green (i.e. dry) vegetation cover peaking around August-October. Green vegetation cover is at its lowest proportion during this period, at approximately 20%. This vegetation that remains green throughout the year is likely to be woody vegetation and is modelled by the 'persistent green' dataset. This dataset is then used to separate the non-woody 'ground cover' component from the 'all veg' fractional cover dataset. Comparing the all veg green, ground cover green and persistent green median values during the dry-season shows all veg at around 20 % and persistent green remaining at around 15 %, while ground cover drops to below 5 % (Figure 8).

¹ Queensland Parks and Wildlife Service (2024) *Staaten River National Park Management Statement*
https://parks.qld.gov.au/_data/assets/pdf_file/0032/166982/staaten-river.pdf

² Threatened Species Scientific Committee (2017) *Conservation Advice Psephotus chrysopterygius golden-shouldered parrot*
<https://www.environment.gov.au/biodiversity/threatened/species/pubs/720-conservation-advice-13072017.pdf>

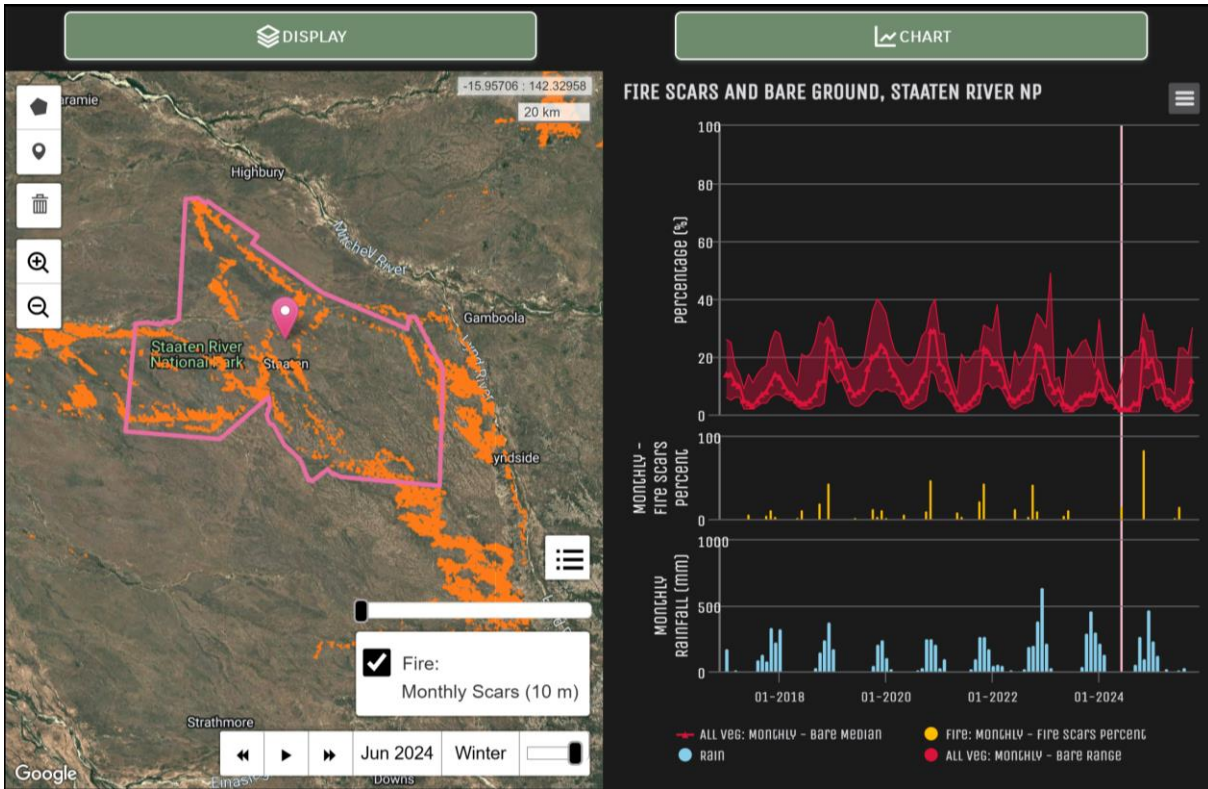


Figure 5 – Fire scars from small cool season fires, June 2024

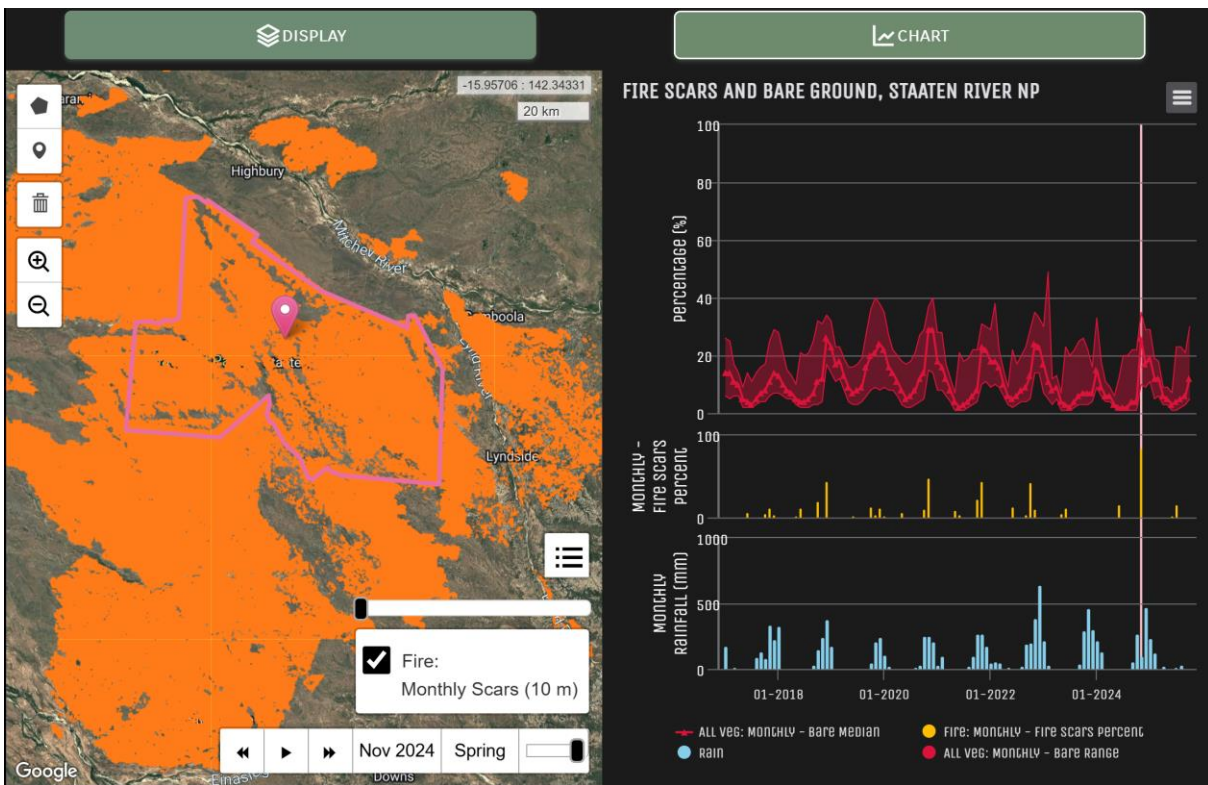


Figure 6 – Fire scars from extensive dry season fires, November 2024

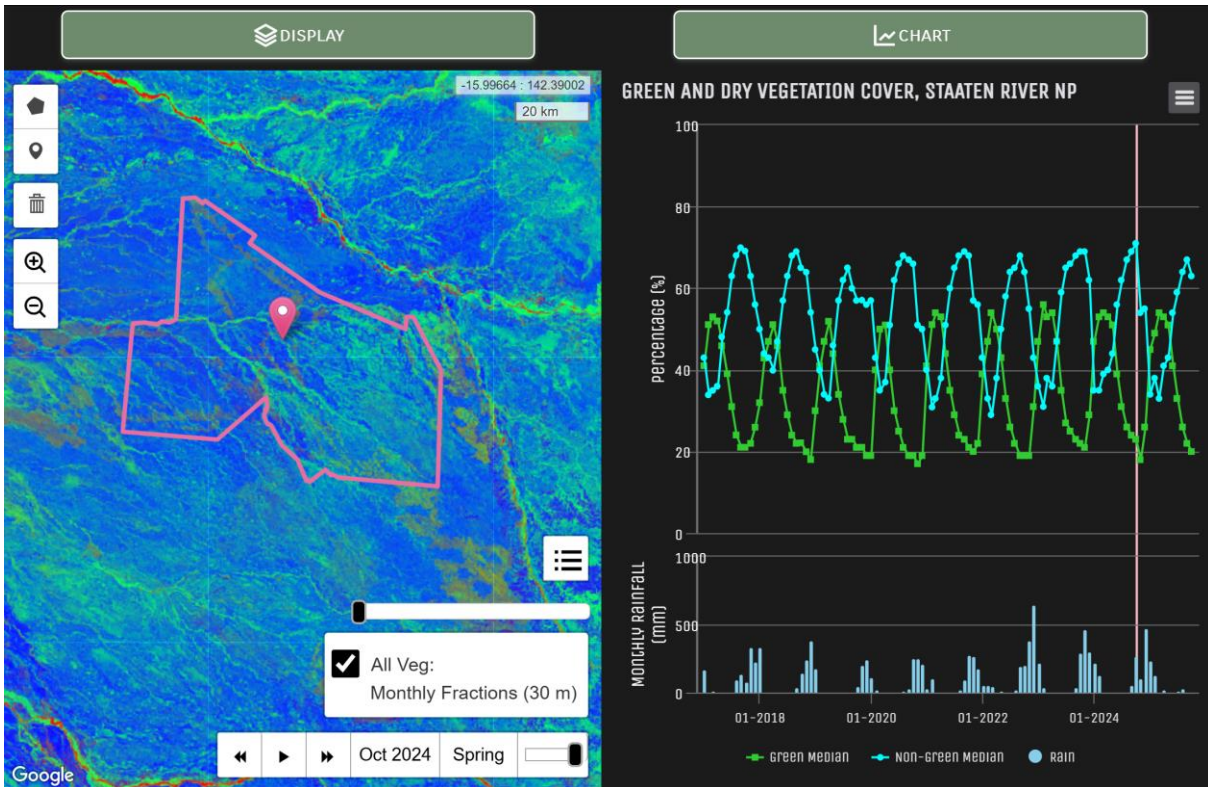


Figure 7 – Display window shows monthly fractional cover (i.e. ‘all veg’) during October 2024, showing a mix of green and dry vegetation cover. Small bare areas correspond with fire scars from June 2024 (Figure 5).

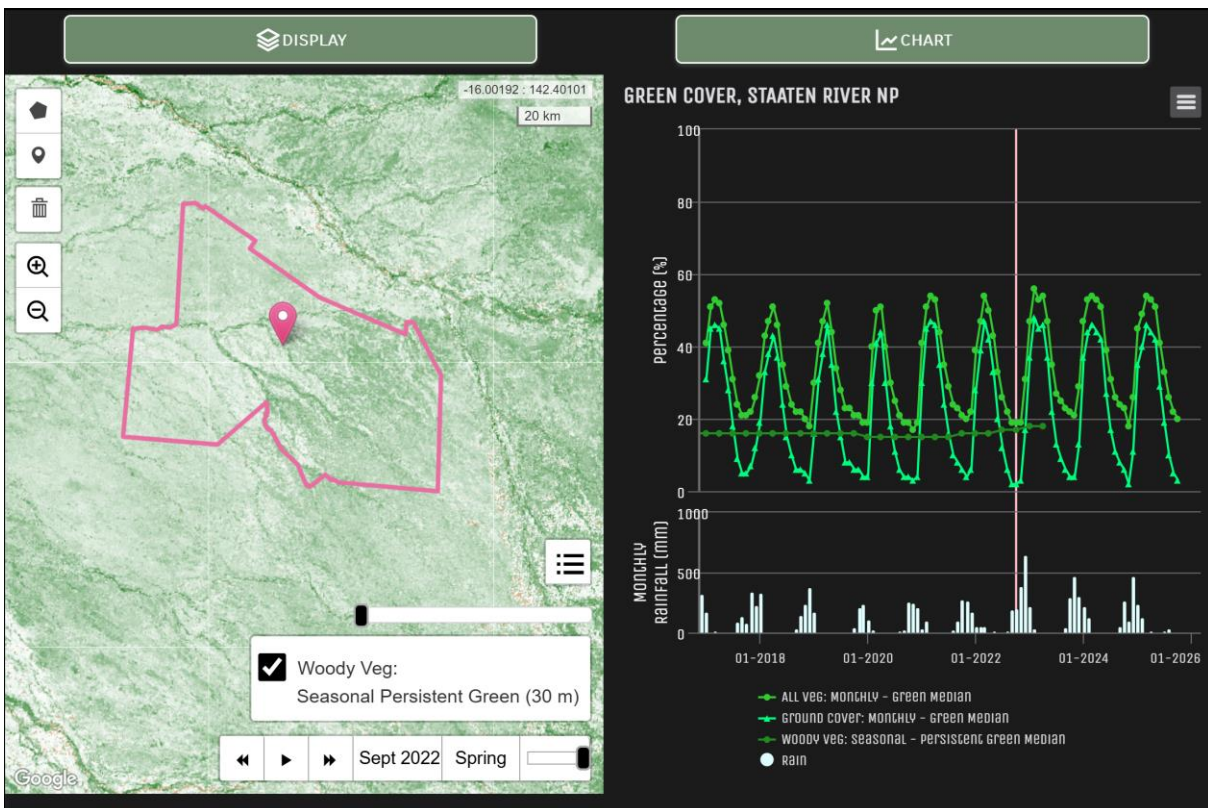


Figure 8 – Chart shows different ways of measuring green vegetation. Display window shows persistent green for Spring 2022, with darker green indicating areas of higher persistent green, likely to be woody vegetation.

This kind of data extraction could be used to analyse differences in fire frequency, timing and extent across the National Park and neighbouring grazing properties, as well as compare vegetation cover amounts at different parts of the property. Combining this remote sensing data with other information, such as nesting and feeding locations of the golden-shouldered parrot, could assist management in this very remote location.

Other examples

Researchers and practitioners have used VegMachine to assist with a range of applications. For example, they have:

- compared ground cover and run off from different grazing regimes;
C.M. Thornton, A.E. Elledge (2021) 'Heavy grazing of buffel grass pasture in the Brigalow Belt bioregion of Queensland, Australia, more than tripled runoff and exports of total suspended solids compared to conservative grazing', *Marine Pollution Bulletin*, Volume 171, <https://doi.org/10.1016/j.marpolbul.2021.112704>
- analysed ground cover trends in relation to encroachment by Indian Couch;
Spiegel, N. B. (2023) *Indian couch invasion: scope, production impacts, and management options*. Project Report. Meat and Livestock Australia, North Sydney, Australia. <http://era.dpi.qld.gov.au/id/eprint/14414/>
- monitored revegetation and stability of land condition following mining;
Clay M, Nicolson L, Dunlop J and Purtill J (2025) A review of research and tools for grazing as a post-mining land use in Queensland: Technical Paper, Office of the Queensland Mine Rehabilitation Commissioner, Queensland Government, Brisbane https://www.qmrc.qld.gov.au/_data/assets/pdf_file/0023/335615/review-research-tools-for-grazing-pmlu-in-queensland.pdf
- analysed long term average woody vegetation in relation to fire frequency and soil carbon stocks;
Haig J, Sanderman J, Zwart C, Smith C, Bird MI. (2024) 'Impact of fire return interval on pyrogenic carbon stocks in a tropical savanna, North Queensland, Australia'. *International Journal of Wildland Fire* 33, WF24006. <https://doi.org/10.1071/WF24006>
- analysed long term average woody vegetation in relation to land condition and beef production.
Gobius, N. R., English, B. H. and Baker, K. M. (2025) Arresting grazing land condition decline in Queensland's northern gulf should be framed around improving business performance. In: 12th International Rangeland Congress IRC 2025, 2-6 June 2025, Adelaide, South Australia. <https://era.dpi.qld.gov.au/id/eprint/15111/>

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