

# Using citizen science to monitor the recovery of Warrumbungle National Park

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## Introduction

Warrumbungle National Park (WNP) is located near Coonabarabran in central NSW. In January 2013, a bushfire burnt 80-90% of WNP. The intensity of the bushfire left large areas of the park with minimal mid-storey and ground cover, leaving it vulnerable to erosion and runoff. The thunderstorm that soon followed the bushfire washed large quantities of sediment and organic matter into the streams that drain the park.

The resulting fire recovery management actions provided a constructive opportunity to involve the local community and embed citizen science projects to monitor and collect valuable information on how the park is recovering.

## Types of citizen science used:

Three citizen science projects have been running with the first starting in November 2014.

- 1. Back to bungles bird week:** a seasonal bird monitoring project that aims to detect changes in bird diversity in burnt versus unburnt areas over time.
- 2. Water quality:** a collaborative project that enables students to 1) collect biannual water quality data 2) sample macroinvertebrate diversity 3) test the accuracy of expensive versus cheap water quality tools and 4) test how their macroinvertebrate sorting skills compared to aquatic ecologists.
- 3. Warrumbungle Snap:** photopoint project set up to monitor vegetation regrowth over time.

The design of each project allowed different audiences to participate and contribute to the monitoring work (table 1).



Figure 1 images taken by citizen scientists from the Whitgum lookout Warrumbungle Snap Photo credit: Steve Tucker and Bron Hicks.

## Methods

### 1. Back to bungles bird week

Two times each year (autumn and spring) volunteers led by an OEH staff member would survey 10 WNP trails across four days. Surveys occurred between 8am-1pm, with birds observed or heard during the walk recorded. Each survey was timed and birds were only observed on the way in to avoid duplicate counts.

### 2. Water quality

Led by OEH aquatic ecologists, students recorded water quality (temperature, pH, conductivity, dissolved oxygen) with expensive and cheap tools to assess accuracy. Following which, they sampled and later sorted macroinvertebrates to determine diversity change overtime. Wambelong Creek is surveyed twice each year with collected data compared to determine change over time.

### 3. Warrumbungle Snap

Three photopoints have been installed at easily accessed and frequently visited point in the park. Park visitors contribute to the project by taking a photo using their camera, phone or tablet at the installed photopoint. Photos can then be submitted via the Warrumbungle Snap app or via the website. Images can then be downloaded and compared.

## Results

The three-pronged citizen science program has been an effective monitoring tool and has attracted/involved a diverse audience (table 1). The results provided are just a sample of what has been collected in each of the projects

Table 1 participation numbers for each of the citizen science projects.

Project	Participation numbers
Back to bungles	72 individuals (campers, park visitors, bird watching enthusiasts)
Water quality testing	101 students from local Central Schools and High Schools
Warrumbungle Snap	147 images contributors (park visitors)

### 1. Back to bungles bird week

Over the 3 years, the bird community in the burnt areas has become more like the bird community in the unburnt areas, although there are still differences in species mix and abundance. The unburnt areas host a slightly less diverse (74 species vs 89 in the burnt areas) but more abundant bird community (80 birds per hour of counting vs 58 birds per hour of counting in the burnt areas).



### 2. Water quality

Students generally compared very well with experts at collecting macroinvertebrate samples from the stream and picking out the range of taxa present. Besides the pH strips, pairwise comparisons noted the cheaper water quality testing tools provided similar results to the more expensive Horiba.



### 3. Warrumbungle Snap

186 have been submitted. Figure 1 illustrates change that has occurred at one of the photopoint sites.

## Conclusions

Each of the projects have recorded valuable information that can be used by the WNP managers. The program highlights that multiple citizen science projects can effectively run in the same space and at the same time, while still being integrated to support the same goals – in this case fire recovery management.