The early years on Canberra Nature Map (2013-2019)

This is a personal viewpoint which I hope tells the story of the early history of Canberra Nature Map, how it evolved from a simple concept to a complex and sophisticated nature mapping website. It covers the years from 2013 to 2019.

From one orchid to all wild plants

The Canberra Spider Orchid, Caladenia actensis, was the inspiration for the creation of Canberra Nature Map (CNM) and its logo. This orchid is an endangered plant that is endemic to the ACT. When Aaron Clausen accidentally encountered these beautiful orchids he began a search to find out more about them and how to ensure their continued survival. Eventually he linked up with Michael Mulvaney who is a senior environmental planner in Conservation Planning and Research (CPR) in Environment ACT. Following discussion with Michael, Aaron decided to create a small website to map the location of these orchids using GPS technology.

After some months and continued discussions with Michael, the concept grew to cover rare plants in general. With Aaron's talent and professional IT experience, and Michael's long career in working as a botanist, biologist and ecologist they put together the basics for a website to map rare plants in the ACT.

In May 2014 I received an email from Michael, inviting me to join in helping with the running of the website, by being a Local Moderator for Tuggeranong Hill and Rob Roy Nature Reserves. This meant taking responsibility for the website content of these reserves. I cautiously accepted and began getting to know the website. I was very impressed with the concept and saw it had a great potential. It was also an opportunity to show off the great diversity of native flora that I had discovered in my area.

A short time later I explained my ideas for the project and its future and told them of my plans to use CNM to document the local flora in the above reserves as well as the nearby Murrumbidgee River Corridor using my stash of old photographs. Seeing my enthusiasm Aaron made me an administrator for the website so I could help with its development. Again I was cautious about this new role, but eventually found it to be very fruitful, and the three of us have done it ever since. During the 1970s and 1980s my public service career was in computer programming and systems analysis, and this background made me quite useful to the development of the website.

The amateur naturalist members often didn't know the difference between common plants and rare ones, so it was soon realised that, in order to optimise the recording of rare plants, we had to fully embrace reporting common ones. It was also very valuable to know about the complex flora communities that rare plants were part of. Then, by the end of 2014 we were receiving reports of exotic plants and noxious weeds. A few of our regular users were shocked and protested. At first we tried to separate them away from our normal records, but as they kept coming in we had to make an adjustment and embrace exotic plants and weeds as well. So we began to cover the whole range of wild plants. This has been extremely useful. Our knowledge of the whereabouts of rare plants has grown enormously since our humble beginnings. Also the Park Rangers have become involved and if a serious weed problem is reported then Michael can inform them immediately, and they can use the GPS location to go directly to the site and deal with it.

This is how our growth has happened, in a natural organic way, learning as we go, being responsive to the needs of our users and accepting their discoveries willingly.

It has been a huge job to create a plant species structure which is easy for amateurs to understand yet scientifically sound, as well as getting the spelling right for all those names, doing countless identifications, selecting the best photos for our species lists, etc. The efforts of Betty Woods and Michael Mulvaney need to be acknowledged here. Betty Woods kindly allowed us to bulk-import the photos of regional plants, with locations, from her and Don Woods' books. Also David Nicholls (ferns), Heino Lepp (fungi) and Tony Wood (orchids) were there for us from the start.

Our greatest success had been with plants, and after several years of receiving sightings and much support from local enthusiasts, our plant species lists and photographs became quite excellent and the major source of information and education on the flora of the ACT.

From a simple concept to a complex and sophisticated website

At the time I joined CNM there was a very limited agenda, namely the mapping of rare plants with photographic data solely from modern digital cameras with GPS tracking technology. All my photos were from a pre-digital camera, and most of them were of common native plants. It was not difficult to persuade Aaron and Michael to broaden their horizons and accept historical photos without GPS data. So Aaron amended the reporting process and linked into Google Maps so that all that was required to give the location of a plant was to click on the point on a map.

Atlas of Living Australia

There has always been a big emphasis on accuracy of data. From the beginning CNM developed a strong relationship with the Atlas of Living Australia (ALA). Our sightings are exported to them. In reality what happens is that on a regular basis they scan our website and take a copy of all new sightings that have come in since their last visit, as well as all those which have been edited in any way. They like our data because it is verified by experts, and they make great use of our photographs that become part of their galleries. We align our species names with theirs for this reason. Michael and Aaron have meetings with their staff at CSIRO when necessary to discuss any issues.

Adding mobile phone capability

Aaron is a mountain biker and loves the great outdoors, and enjoyed photographing orchids and putting them on the website when he got home. But he realised that the process would be much quicker if he could take the photos and load them onto the Internet on the spot. So he started the development of an App, so he could do it with his iPhone. This required paying another party to do the work. Later he had someone do the same App for Android. This was very expensive and cost tens of thousands of dollars. This broadening of the method for reporting has been a great boost to the reporting and also membership.

NatureMapr

As the months progressed it became clear to Aaron that this project was very useful and practical and that the platform could be transferable to cover areas other than Canberra. So he then began rewriting the software in such a way that other regions and projects could be taken on without too much effort, provided there were the willing local experts. The new platform was named NatureMapr and CNM is its primary project. The regions covered in in the early days were the South Coast and Southern Highlands.

Growth of coverage of fauna

After our successful beginning with plants we gradually broadened our coverage to include various types of fauna. We began with reptiles and frogs in 2015, linking up with ACT Herpetological Association through Geoff Robertson and with Frogwatch via Anke Maria Hoefer. Gradually our members took on this expanded coverage. When these two faunal groups were running well we added butterflies with the help of Suzi Bond. Then we became emboldened enough to try birds. This was a much more difficult task because we wanted to incorporate the Canberra Ornithologists Group (COG) database into CNM. They have been surveying birds around Canberra and nearby for many years, and their data is invaluable. We tried at first adding a part of the database, with about 1 million records. This being done the whole system collapsed and our software failed.

Despite Aaron's best efforts to fix it there was no recovery. The problem was the jump from several thousand records to over a million, and everything was going too slow and we kept having system crashes. So Aaron reluctantly cut the COG data out, and began a period of rewriting some of the more inefficient software.

Eventually we were ready and added back the COG data. This time things went more smoothly. By the beginning of 2016 the bird section was in full flight with Chris Davey as our leading expert. The contribution from bird enthusiasts grew well and we now have excellent photos of many of our birds and a happy relationship with the COG people who can use our website to explore their data in a new way.

In the winter of 2016 we quietly added mammals. Then in August 2016 we took on the enormous task of receiving sightings of all insects and other arthropods (mainly spiders but also centipedes, scorpions, etc.). Our founding experts here were Kim Pullen and Roger Farrow. The huge number of species and the number of different sorts of insects and spiders made this a very complex addition. Since I know very little about insects and spiders, my organising their addition was 'a steep learning curve' to say the least.

Our members were very keen to participate. In the second half of January 2017 the number of sightings of insects and spiders was roughly double those for plants. This was a significant moment for CNM and a gigantic leap forward from the original plan for the website. Gradually we were getting the support of specialist entomologists for more of the insect groups. In the winter of 2017 we increased our coverage to include fish. In 2019 we began to cover other invertebrates, that is molluscs and various kinds of worms.

Becoming popular required big improvements

The website become very busy, so that it needed to be upgraded to cope with the the increased demand. So a major rewrite was done of some of the underlying software to make it more efficient. A part of this was the addition of the **Maintenance Service** utility which performs a lot of routine functions in the background and enables sighting reports to be completed faster. The effect of this is

that there is a time delay between when action is done on one page and the result appears on a different page. For example when a sighting identification is confirmed it may take a minute or two before the sighting appears on the relevant species page.

In parallel to this, a lot of his energy is directed toward maintaining a good performance from the smartphone Apps. They are regularly updated and new versions released. This makes contributing to CNM easier and smoother.

Another important change was the addition of **Audio reporting** to the NatureMapr platform. This is particularly valuable for frogs and birds, since all frogs and some birds are difficult to photograph. The audio file format used is MPEG4 (.m4a), which is comparable with iPhones.

In association with this, FrogWatch was also included in the NatureMapr coverage. FrogWatch is a different concept in that it is strictly for accumulating data on frogs and accepts surveys with a number of species in each report. The focus of the surveys by FrogWatch members is at particular “Points of Interest”. The Points of Interest concept has been broadened for general use throughout our website network and allows us to monitor species present within a certain radius of a single point on the map. The FrogWatch website is will only accept sightings and surveys at the established Points of Interest. Its project boundaries are the same as for CNM.

To add to our value as a data resource, improvements were made in our ability to bulk import data from historical surveys and to import or transfer taxonomy. Historical surveys provide valuable information about species abundance and distribution for a great variety of species over time. Being able to import taxonomy enables us to develop new projects more easily. Jennifer Smits is our expert in dealing with these features.

We also provide the ACT Government with readily accessible and up to date locational information. This is used in decisions regarding the protection and enhancement of Canberra’s natural treasures and is a significant benefit of the project. In return the Government provides funding for the website hosting expenses.

Conclusion

The development of CNM was an enormous task, with thousands of hours of volunteer work. At the time I joined there were only about 50 members and just a few experts covering plants, fungi, mosses and related species. We now map the location and abundance of all types of wildlife. By 2023 our membership had grown to over 6000 and we had over 100 experts covering over 8000 species in the various fauna and flora groups.

Much has happened since those early years. From humble beginnings as Canberra Nature Map it evolved into NatureMapr, and that has grown to cover the whole of Australia. It is designed in a way that is useful to science and researchers as well as easy and enjoyable for amateur new members. We aim to present the flora and fauna that are recorded in a way that is educational and informative, with species lists and photographic libraries. The website is a venue to communicate and share knowledge in a friendly setting which is run mostly by volunteers.

CNM and the NatureMapr platform has become a highly sophisticated and valuable wildlife mapping website and is a leader in this field. There will be further growth and change in the future. The inclusion of machine learning or artificial intelligence via the “robot” CarbonAI is a part of this.

With technology always changing we will have to continue to evolve. We look forward to the challenges ahead.

By Michael Bedingfield, 2023