



Biodiversity Conservation at Mater Dei

Holly Reinke, Jack Dunlop, Larissa MacDonald and Luke Krvavac from Macarthur Anglican School, Cobbitty.

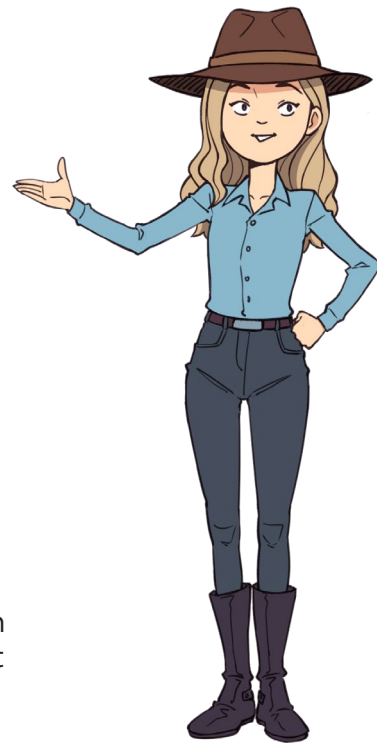
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Mater Dei
Western Sydney
NSW

Mater Dei is a conservation area in Sydney, NSW. It's canopy is dominated by grey box and forest red gum. the shrub layer and understory is abundnt with blackthorn and kangaroo grass. This type of ecosystem is called the Cumberland Plain Woodland and is habitat for threatened species such as the Cumberland land snail.





Brown and crunchy and full of hidden gems, we are fortunate to have the Critically Endangered Cumberland Plain Woodland in Cobbitty. This unique bush is home to some fantastic wildlife. Swift parrots and sugar gliders love the blossoms on the red gums, and the Endangered Cumberland Plain land snail rummages through the leaf litter. We are proud of this site and the efforts being made to conserve the Cumberland Plain Woodland on the outskirts of Greater Sydney.



What were once widespread plains, this landscape has been heavily altered and reduced to a few small fragments. Wanting to find out what can be done to protect this Critically Endangered and under-appreciated ecosystem, we visited the Mater Dei property in Cobbitty.



Mater Dei, originally the land of the Dharawal people, is on the edge of Western Sydney. Known as Wivenhoe in 1837, the property was established for cattle and vineyards. In 1910, the property was purchased by the Sisters of the Good Samaritan, to run an orphanage and then a school for students with disabilities. Fortunately, the Sisters of the Good Samaritans also made sure to conserve the native values of the Cumberland Plain Woodland and the local biodiversity.

In 2012, the Sisters of the Good Samaritan partnered with the Biodiversity Conservation Trust (BCT) to allocate part of the Mater Dei property into conservation agreements. There are three areas where the land is protected for conservation into the future, and all three areas join each other, reaching the Nepean River. This means that the landscape can never be cleared and is conserved to help the Cumberland Plain Woodland and all the biodiversity present.



After European settlement, the first major ecosystem cleared for agriculture was the Cumberland Plain Woodland. The fertile clays and shales of the Cumberland Plain extend to Pennant Hills in the north, Penrith in the west and all the way to Camden in the south. These landscapes were the more viable option to crop and graze than the surrounding Blue Mountains. Now with the sprawl of suburban Sydney, this ecosystem and the unique species are under extreme threat.

On the 23rd of September, we travelled to the Mater Dei property with Kathryn from the BCT, Tom from Hooked on Nature and Caitlin from Petaurus Education Group. Huge cabbage gums towered over us providing shade as we entered through the gate, filled with a vast range of hollows; basically a set of high-rise flats for wildlife. There were a pair of musk lorikeets arguing about the nest and with any luck they'll raise babies up there. We met Geoff Green, the manager of the property, and Kathryn to learn about how this unique landscape is being managed for biodiversity.

Geoff began, “so, there are around 164 hectares of bushland restoration occurring on the property. This is under three separate agreements. Where we are now, is the original 80 hectares preserved under a Conservation Agreement in 2010. A further 84 hectares has been preserved under two Biodiversity Stewardship Agreements between the Office of Environment and Heritage. Now known as the Biodiversity Conservation Trust.”

Restoration on the property began by the removal of cattle. “It is amazing how many species can return once no grazing occurs,” said Kathryn. Geoff added “the management of invasive species and the replanting of native vegetation has been a tool in bringing biodiversity back to a higher level...Conserved for perpetuity, meaning forever.”

“One of the things that attracted us to the Mater Dei property was the existing Wivenhoe Conservation Area. It allowed us to incorporate more areas through two Biodiversity Stewardship Agreements.” Kathryn said.







We learnt about the local biodiversity of the Cumberland Plain Woodland. Biodiversity includes all living things; plants, animals, fungi and bacteria. Biodiversity can mean the differences between two separate species but also two animals of the same species. The differences between us are what makes our species stronger as some of us are stronger against different pest species, diseases or predators. It is essential that each individual in a species can travel from place to place through corridors to share their genetic strengths. This is also why it is so important that we have pockets of bush connected through corridors to prevent species from going extinct locally. Therefore, protecting a larger area like what is happening at Mater Dei is better than isolated patches in a sea of bare paddocks or houses.

Additionally, by protecting a larger area of bushland, there are fewer impacts from outside threats. Threats can include increased chemicals from storm-water runoff, introduced plants and animals as well as diseases.



This is because there is a reduced edge to area ratio, known as the edge effect. By linking more areas of bush together through these conservation agreements, we can create better corridors for native plants and animals to move through the landscape, and reduce the edge effects.

From where we were standing, we could see hundreds of native plants which were guarded with individual covers. Geoff explained that these trees and shrubs were planted to join the large grandparent eucalypts like the cabbage gum we saw at the start of the day. This includes a diverse range of different plants to fill the different layers of the ecosystem; the canopy, understorey and ground-level. This would make it safer for wildlife to move between and that way more species were likely to utilise those trees as habitat. Diverse animal species rely on different plant species to eat, nest in and use to hide from predators or pounce on prey.





Kathryn explained to us that the Cumberland Plain Woodland was approximately only at 7% of its original extent. This aligned with what we learnt about the soil fertility and agricultural pressure that has occurred. So this type of planting that Geoff had shown us, known as infill planting, was really important to enhancing and increasing the environment.

Kathryn explained the composition of the Cumberland Plains Woodland ecosystem as we walked through the area. "In typical Cumberland Plain Woodland patches, you might have only two or three canopy tree species. Maybe another four or five species in the mid-storey, but up to thirty or so species in the ground layer". As she walked us through the woodland, showing us the layers of vegetation, her eyes caught the strange edges of cubed poo. "This is wombat poo; do you know why it is cube-shaped?" Luke's reply of "a square bottom" got a chuckle. Kathryn explained, "for wombats to get all the nutrients and water out of the dry low nutrient food like the native grasses, the muscles in the bowel compact it."



We asked Kathryn what would happen if we didn't protect the biodiversity at Mater Dei. She responded, "without protection, the landscape could degrade, and more species could be lost. With species loss, the ecosystem will deteriorate as it adapts to change." Kathryn explained how we need all the different parts of the ecosystem for it to function. "The leaf litter provides habitat and food for insects which build soil. These soils can support more plants, which offer a wide range of food for pollinators. This can mean more pollinators for our crops." Tom explained that events that happen in the landscape impact the water in the Nepean River.

"If we don't have good cover of the soil by native plants it could erode. This would decrease the water quality, and this will eventually impact fish downstream. Which we consume, so this landscape is connected to everything" Tom added.

As we went over to the two Biodiversity Stewardship sites, Kathryn explained to us how biodiversity offsets work. "When land has been determined to be of good biodiversity value or has rare species on it, it can be permanently protected under a Biodiversity Stewardship Agreement or BSA. The BSA generates biodiversity credits based on the type of biodiversity present and the extent to which the site is expected to improve in condition under the BSA. These credits are then sold on a market to developers to offset the impacts from development." We learnt that the funds generated by the sale are then used by the landowner to manage and restore the Biodiversity Stewardship site forever. It also encourages developers to avoid impacts on bushland as it costs them money to clear areas of native bush for development. That way many developers will actually turn bushland on properties into BSAs.



Geoff and Kathryn then took us over to see Brendan from Toolijooa. Brendan and Geoff explained how they remove African olive. This major weed prevents native plants from germinating and can out-compete existing plants. Using mechanical removal followed by hand removal and the careful use of pesticides, they said they could really encourage native plants to germinate. Once native plants had germinated or were planted, the next hurdles were introduced deer, goats, rabbits and other pest species grazing on young plants. Geoff explained that the deer and goats were managed through culling and that foxes were included so that they weren't predating on native wildlife.

Part of our day involved setting up for a field day with younger students in October. We would help mentor these students as "Conservation Champions", so we set up an activity by placing some slate roofing tiles out to survey for the endangered Cumberland Plain land snail. We were trying to create habitat for the snails to seek refuge here, and when we came back later, we could see if any snails moved under.

When the field day arrived in October, we went back out to the site with 40 year five students from our school and Kingswood Park Public School. We did a range of different activities at Mater Dei to learn about biodiversity in our landscape at a deeper level. We met Junior from Petaurus, a MalakMalak man from Northern Territory, who did an Acknowledgement of Country. Geoff introduced the students to the Mater Dei property and then we gathered our groups and began our activities.

At Junior's station, we got to learn about Aboriginal culture and how there are other, more sustainable ways to manage the land. With thousands of years of understanding behind him, Junior really showed us how strong the Aboriginal relationship with Country is. Traditional plant and animal-use and management prevented over-harvesting of animals and saw the landscape in balance. Junior spoke about where he is from, things he has learnt from past and present Elders and showed us how plants were used as tools and told us stories. We thank Junior for coming and having a yarn with us.







Toby Eastoe, from the BCT, set out trays of water bugs from two dams. Mud and water bugs, what a fun experience! The bugs up close were really cool, and we learnt that they were an important food for so many other animals like fish and birds. Some of them are decomposers and clean and filter the water to make sure it is healthy. Armed with tweezers, spoons, pipettes, magnifiers and identification sheets; we set out to see how many water bugs there were and if there was diversity between species. It was such a treat seeing these sticks with legs move in the trays, also known as Caddis Flies and WOW! Have you ever seen the mouth of a dragonfly nymph? They shoot out like an alien to catch prey! Never did we expect to see such diversity of life under the water. It was fascinating to learn that water bugs could tell us if the water was clean. The more sensitive bugs, the cleaner it was, and we found very sensitive water bugs.

Next, we worked with Caitlin from Petaurus Environmental Education Group, who led us on an exciting expedition into the insects and spiders of the Cumberland Plain Woodland. She showed us how these mini beasts were the base of the food chain and provided many ecosystem services to us all. Such as the spiders living in the bushes filtering mosquitos into their webs and how native decomposers like Cumberland Plain land snails and cockroaches help to break down leaves and make soils. The one that really sticks with us was the ferocious bull ants. Caitlin explained how these characters were all females and that they control other insects with their venomous sting. As they drink nectar from flowers, just like bees, they are also essential pollinators. And then, sure enough, Caitlin ended up getting stung by four of them. They really are mini-beasts!



Next, we searched under the slate tiles to see if we could find the Endangered Cumberland Plain land snails. Unfortunately, it wasn't wet enough, and so none had the opportunity to move under the placed habitat. But we saw many other insect species, and it was pretty amazing to see so much life in such a small patch of bush that we sampled.

Tom got us close and personal with native local wildlife and their claws, shells and tails. We heard how Joanna the Goanna liked to eat the oldest, smelliest most rotten dead things possible, and while we all thought that was a bit gross, she thought that was delicious! Without that, we'd have a smellier world, and this linked back to the other animals that are decomposers and keep the landscape healthy and balanced.

Frankie, the Tawny Frogmouth, was an assassin of moths and pretended to be a branch. The last animal was Precious, a brightly coloured Diamond Python, who was ever so gentle, and deserving of the name. Thankfully we weren't a rat; otherwise, the outcome may have been different.

Tom showed a valuable hollow log, just like the ones in the canopy above; and said that without this key habitat, most of these animals would be without a home. We had no idea that hollows took well over a hundred years to form, way too valuable to be used as firewood.

There is nothing better than getting stuck into it, and that's what Brendan from Toolijoa had us out doing. The gloves went on, and he gave us an area to plant some important native species. With dirt being moved and plants going in, we planted 60 native plants in around twenty minutes. It felt really nice to know that our plants might be at Mater Dei as habitat for so many animals for centuries to come.

STUDENT REFLECTIONS

HOLLY

"I am a conservation champion because I have learnt what biodiversity is, and have shared that knowledge to younger students who will go and apply their knowledge about the environment and biodiversity to their everyday lives and raise awareness for how biodiversity affects many plants and animals."

JACK

"My knowledge has changed by going on these excursions, experiencing and seeing the amount of wildlife there is in a very small amount of area, and how all of these flora and fauna help the biodiversity of an area."

"I am a conservation champion because I am now aware of the impact we are making on the biological footprint of not only the Cumberland Plain Woodland forest, but the whole world and all the biodiversity that there is everywhere."

LARISSA

"I am a conservation champion because I now know how to consider the impact of what everything has on different ecosystems, the difference between native and invasive species and I want to be able to improve the way that people treat and use the environment."

"The program was better than I expected, from seeing and holding different animals that I never thought I would ever come in contact with, to learning about the Indigenous importance of the land, discovering new bugs and testing water quality. I know understand the importance of learning about these new things and how to improve the way that the environment is treated and respected."

Luke

"I learnt ways to stop and control erosion by having trees, grasses and bushes around waterways to filter and stop runoff"

"Biodiversity is a variety of different species of plants and animals living and working together in an ecosystem"

"When I started this program I thought that biodiversity and agriculture were opposites. But now I know that by increasing biodiversity you can increase agricultural yield, improve soils and water quality"

"I am a Conservation Champion because I understand how biodiversity can create a positive ecosystem where animals and plants can be protected"







The experiences and lessons we have gained at Mater Dei in Cobbitty are going to be with us always. Nature is something we rely upon, every species and the role that it plays impacts another. Without biodiversity, we would not be able to survive, that is why we need to be Conservation Champions. We understand and protect all living things, and we do it with pride.



Thank you to Geoff Green and Brendan for showing us around. With properties like Mater Dei, we can see that conservation can occur on private land. This is an opportunity to look after the unique biodiversity of the Cumberland Plain Woodland and other important landscapes. Not just in Cobbitty, but all of Sydney, New South Wales and even Australia.

A big thanks to Kathryn Collins and Toby from the BCT; and Tom, Martin 'Junior' White and Caitlin for teaching us about biodiversity and careers we can have in Agriculture or Science.

Lastly, thank you to our teacher Helen Glover for the amazing opportunity.

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We would like to acknowledge
the Traditional Owners of this
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Elders — past, present and
future.

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Biodiversity Conservation Program

In 2019, students from
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participated in creating a book
as part of the Biodiversity
Conservation Trust's
Conservation Champions
Program on the edge of
Western Sydney.