A rock to a hard place: gardening in a difficult environment.

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Wilson Botanic Park Berwick, Victoria , Australia

Abstract

Wilson Botanic Park Berwick is a unique site hiding two seams of fossil plants, researched and documented as very significant finds, that identify the transition from Rainforest to Eucalypt forest. An exciting aspect is reintroducing plants growing here over 22 million years ago which will form the basis of collections of the future. The story reads like a good saga: extraordinary plant fossils, a quarried landscape, "interesting" soils, selecting suitable plants, water use, drying environment, weed control, as well as demands of residents in the south east growth corridor. This coming-of-age story is a relevant tale of a young botanic garden with an ancient history.

The site

Wilson Botanic Park Berwick, Victoria, Australia is located 40 km south east of Melbourne city centre. The entrance is on the Princes Highway, Australia's Highway One. As a local government facility, it is owned and managed by the City of Casey and is approximately 12km North West of the Royal Botanic Gardens, Cranbourne, a State Government facility., Wilson Botanic Park, covering 40 hectares, is located at the entrance to Berwick Village, Princes Hwy and surrounded by suburban development. The official opening to the public was on 26th July 1992 by Australia's Governor General, Bill Hayden.

The site is a former basalt (bluestone) quarry that was quarried for 117 Years. The first rock quarried was used for the Gippsland Railway to eastern Victoria and then used in the construction of local roads. The whole site was owned by the Wilson family and its descendants from the 1850s until 1976.

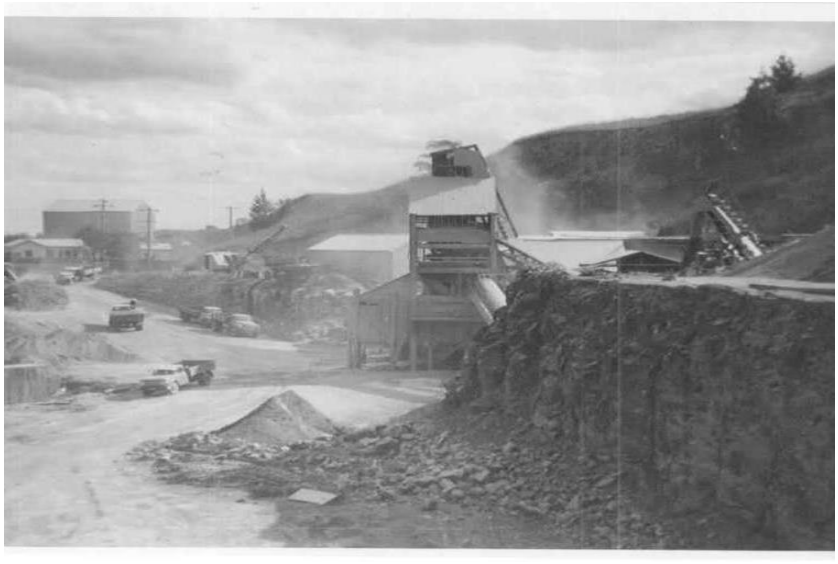

Figure 1 Berwick Quarry in the 1960s

The highest point in the Park is 143m above sea level, giving distant views: 3% of the state of Victoria, from the You-Yang Ranges in the west to the Strzelecki Ranges in the east. Quarrying left sheer rock faces, areas of steep slopes and some unstable ground with occasional rock falls and lands slips.

Figure 2 Anniversary Lake, Wilson Botanic Park, in 2012

There are three lakes on the site, the largest being Anniversary Lake which has an average depth of 5.5m., is spring fed and suitable for irrigation. The lakes support a variety of wildlife, including birds, fish, tortoises, frogs, and insects. Basalt Lake, 2m deep was quarried, but Waterlily Lake was developed during Stage 1 of the development of the site as a Park.

The site was mainly quarry overburdened with some uncompacted stockpiles, which presented difficulties such as landslips, erosion and drainage problems. There are many areas with underlying rock.

The site generally has very heavy yellow clay soil with many hidden rocks, making it hard to dig holes for planting. These soils dry out in summer and are wet and sticky in winter. Jackhammers, air-knives, picks, mattocks, crowbars and shovels are needed for digging holes. Water crystals, gypsum, fertilisers and mulch are necessary when planting.

Water is pumped from Anniversary Lake for irrigation. The lakes are spring-fed and supplemented by surface drainage into the lakes, yet at the height of the drought in recent times the water levels of the lakes have been down by approximately 1.5m. This year (2013) they are full, although in recent times aquifers have not been recharging the lakes as quickly as in the past. Presumably this is because storm water from the surrounding housing developments is piped to the sea rather than penetrating the farmland which previously surrounded the site.

Garden planning and management

Berwick township is historically known for its mix of exotic and native plants, and this theme continues into Wilson Botanic Park Berwick. In the same municipality, the Royal Botanic Gardens Cranbourne has its Australian Plant Garden, so we do not duplicate what is developing with native plants showcased there.

The first master plan in 1986 was drawn up by Scott & Furphy Landscape Consultants, followed in 1999 by one produced by Taylor and Cullity. In 2003 plans by the City of Casey Landscape Architect have been succeeded by the 2013 Plan from the City of Casey Landscape Design and Parks Departments.

In 2003 suggestions were made for over 50 different plant collections, yet in 2013 the number was reduced to a more manageable seven collections. These will include: a fossil plant collection, an arboretum with *Eucalyptus, Quercus and Cedrusa* and a “Casey Collection” of plants most suitable for the local or home gardener.

The original master plan included a selection of many plants which were considered suitable. Time has shown that many plants proved to be unsuitable in the conditions: *Camellia, Rhododendron, Magnolia* and *Picea*. But many plants have proven to be more successful than expected: *Quercus, Cedrus, Pinus, Betula. and Carpinus.* The site is large enough for experimental planting and plant trials.

The significant fossil plant discoveries on this site are a major focus of the future collection planning for Wilson Botanic Park. The original investigation of plant fossils at the site was carried out by Henry Deane in 1902. 1993 saw the study and subsequent publication of further evaluation of the Berwick fossil flora (Pole *et al*, 1993).

Wollemia, Agathis, Araucaria, Eucalyptus, Nothofagus and Gymnostoma are some of the genera

Figure 3 Rock specimen showing fossilised leaves of *Eucalyptus* and *Nothofagus*. Dated c. 22 million years BCE. Uncovered on-site in 1902.

found in the fossil remains on site. Macrofossils, leaves and fruit, and pollens have all been found.

The macrofossil specimens of *Nothofagus* and *Eucalyptus* indicate a climate change from a rainforest to a drier climate. The *Nothofagus* specimens found are more reminiscent of the tropical species from New Caledonia than the existing species found in Victoria.

Growth has been aided by the use of water crystals at planting to retain moisture in the soil. Mulching is widely used around the trees. Rocks dug out of the ground are used to create stability and wells around the base of trees, especially on slopes.

Vandalism was a huge problem in the initial stages of development. Some of the vandalised trees, such as *Quercus*, were transplanted to other sites and have grown into impressive specimens. A vandalised *Doryanthes* doubled in size and even flowered before the adjacent, non-vandalised specimen.

Sources of plants include other botanic gardens, commercial and specialist nurseries donations from private gardens and nurseries such as the Australian Plant Society, garden clubs and the Victorian Rose Society.

Summary

The site has witnessed the change from disused quarry to a beautiful garden/ park, with over 100,000 visitors a year, that provides fresh air and relaxation, and appreciation from its visitors –

local, metropolitan, regional, interstate and from overseas. Most exciting is the reintroduction of trees on-site which have been missing for millions of years: a real success story!

Figure 4 *Wollemia nobilis* growing beautifully where fossil specimens of it had been discovered

References

Pole, M. Hill, R. Green, N. Macphail, M. The Oligicene Berwick Flora – Rainforest in a Drying Environment. *Australian Systematic Botany,* **6** p.399-427.