
ARTIFICIAL WETLAND THE REAL DEAL IN CONTROLLING RUN-OFF

Bruno Bertolo, Figtree Macadamia Farm, Whian Whian

An important orchard floor management issue for macadamia growers is soil erosion. This is a major cost to farmers and local communities in terms of the permanent loss of soil and the impact that soil has on waterways.

Causes of erosion, especially in older orchards on sloping land, include run-off after rainfall and bare soil under trees. In recent times, a lot of effort has been put into improving orchard floor management by installing drainage, encouraging more light by managing canopy size and cultivating groundcovers. But even with best practice orchard floor management, areas vulnerable to soil erosion can still exist.

A project developed through Whian Whian Landcare Inc. in the Northern Rivers west of Lismore has taken a different approach to decreasing the erosive capacity of water flow on a macadamia farm. The objectives of the project are as follows:

- improve water quality leaving the property
- trap sediment for collection
- provide habitat for beneficial insects, micro bats and birds.

Wetland features in erosion control

The focus of the project is an artificial wetland, which was built where several drainage points met before run-off water left the property. The benefits of wetlands in managing run-off are that they:

- remove energy from running water
- filter water
- accommodate surges of water and slowly release it
- provide habitat for insects, micro bats and birds.

Remove energy for running water. The wetland is designed to route water through a series of small ponds and weirs. This slows the water and reduces its erosive power (water hitting water is not erosive). As the water flow decreases, suspended soil is dropped into the ponds, which have been designed to allow surplus sediment to be retrieved from time to time.

Filtering the water. The ponds have been constructed so they have varying depths. Shallow areas are designed to enable specific plant species to thrive. Deeper areas are designed to remain free of plants, so water can flow freely. This stops the ponds from becoming overgrown.

Aquatic plants can capture and use fine particles and nutrients in the water as well as stabilise the ponds. In extreme rain events, the plants lay down, which allows water to flow over them without damaging the ponds or the plants.

Surge capacity and slow water release. The small weirs are designed to be porous, which results in water captured during rain events being slowly released. Using bell-mouth inlets and outlets allows water levels to be maintained for plant health, while still providing capacity for additional water storage during high rainfall events.

Habitat for insects, micro bats and birds.

The wetland incorporates IPM (integrated pest management) principles in that it provides habitat for



The photo on the left shows the area, where several drainage points met on the farm, selected to build the wetland. The centre photo shows the ponds being constructed using an excavator. The final photo shows the finished project.

beneficial organisms including insects, micro bats and birds, all of which predate on pest insects. While the use of broad-spectrum pesticides has been reduced, not eliminated, it is important to provide safe harbours for beneficial insects. These areas allow them to breed and thrive, so populations can recover quickly after pesticide use.

The wetland has been planted with a selection of native trees, bushes and grasses to host beneficial organisms.

Practical considerations for building an artificial wetland

Building a wetland is not just a matter of digging a few holes around the farm, rather it involves careful planning and a knowledge of hydrogeology and environmental engineering.

While wetlands, which are really a series of small, shallow ponds, can be placed in a large variety of locations, consideration must still be given to slope, soil conditions and water flow. A large excavator will prove invaluable. It's worth noting that small adjustments to the design may be required as experience is gained with each specific site.



Vegetation around and in the ponds has now established providing habitat for beneficial species.

Bare soil and weirs should be planted out as soon as possible to protect the structure from erosion in the event of rain events.

Plant selection and placement needs to be considered as part of the overall design.

Weed management and the arrival of undesirable species need to be monitored during the establishment phase. Ducks will arrive immediately and with them plants from far and wide.

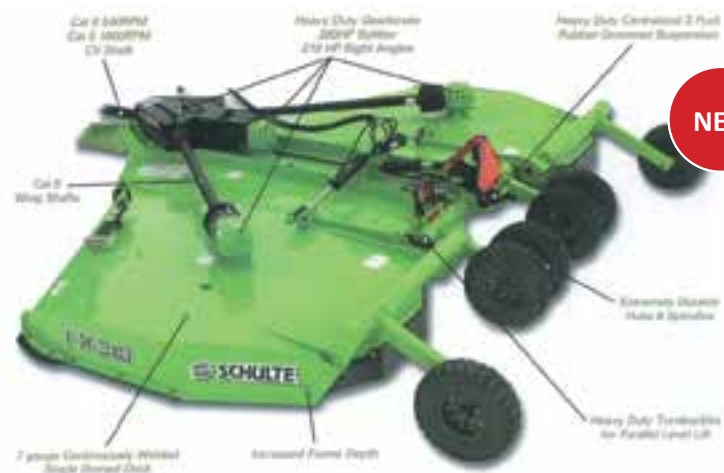
SCHULTE SALES AUSTRALIA FX318 18' Rotary Cutter

"MACADAMIA SPECIAL"

- Flex wing mower
- Standard with 6 fork tyres, single blades and single safety chains front and rear with half rubber flaps
- Option: shredder blade kit \$1,000 inc GST
- Option: 540 RPM or 1000RPM (same price)
- Legendary strength and quality and economically priced
- North America's first 18' flex wing mower
- An ultra narrow transport width makes moving this unit extremely safe and simple.
- Run with the same HP tractor as most 15' flex wings, but gain the extra 3' cutting width
- Excellent choice for mowing crop residue, pastures, weeds, orchards and roadsides
- Single 7 gauge domed deck sheds water and debris and increases life of the deck with this easy clean feature
- Available 540rpm or 1000rpm 80° CV drive or 540 equal angle non CV drive
- Heavy duty gearboxes and drive system with spun formed 7 gauge stump jumpers ensures durability and perfect balance

\$52,000 inc GST

UNSURPASSED CUTTING PERFORMANCE



XH1500 15FT FOLDING WING INDUSTRIAL SLASHER
Tandem walking axles in centre and single wheels on wings. Dome deck.

\$52,700 inc GST

FX1800 15FT FOLDING WING AG SLASHER
Dual wheels in centre and single wheels on wings.

\$46,500 inc GST

Ph: (02) 6845 2992 Fax: (02) 6845 3199
Mob: 0418 636 321

Email: schultesales@bigpond.com
www.schulte.com.au

Rocks and boulders can be strategically placed to provide additional water flow control. This is particularly relevant if there is a big drop from one pond to the next.

Project delivers

Although still in the early stages, the project has delivered on its main objectives. The wetland has been successful in helping to control and slow water flow through the property and to capture sediment after a major storm event. The increase in the number and variety of insect species is also obvious.

The overall project cost was \$15,000, which included outlays for machinery, plants and labour, as well as an estimate of in-kind contribution from the landholder. Local landholders donated a lot of their own time as did subject matter experts in hydrology, soil and plant selection.

Information

For information about the project contact Emma Stone, Whian Whian Landcare Inc., email whianwhianlandcare@gmail.com

About Whian Whian Landcare Inc.

Whian Whian Landcare Inc is a community-based, not-for-profit organisation with over 20 years of experience in landcare projects and practices. The group advocates for ecological and agricultural sustainability in a proactive and collaborative manner and has successfully delivered innovative landscape projects supporting the diversity of land uses in the area. Recently, in partnership with Richmond Landcare Inc, it completed a major project focused on healthy catchments and improved water quality through riparian and catchment restoration and soil conservation. The construction of the artificial wetland was part of this project.

The project was funded by the North Coast Local Land Services through their Targeted Engagement Program 2017-18, using funding from the National Landcare Program.

NUT SOLUTIONS AUSTRALIA

QUALITY MACHINERY AND EQUIPMENT FOR NUT PRODUCERS

COMMERCIAL V-TWIN HUSKER FOR MACADAMIAS



- Electric motor or PTO tractor drive
- Up to 600kg nuts/hour
- Adjustable inlet gate for all size nuts
- No pre-sorting, easy cleaning
- Manufactured in NZ, 2-year warranty
- Commercial V-Twin Nut Cracker also available

MOTORISED HUSKER AND CRACKER



- All-in-one motorized solution – de-husk and crack with the same machine
- Easy to swap between husking and cracking
- Suitable for domestic or commercial applications (including quality control)
- Close to 100% crack rate!
- Perfect for macadamias
- Manufactured in NZ, 2-year warranty

KK OIL PRINCE F UNIVERSAL



- Cold press oil from nuts and seeds – including macadamias
- Capacity: up to 10-15kg/hour
- Food-grade standard steel – manufactured in Germany
- Perfect for a small, value-add operation
- Range of sizes available

AUSTRALIAN NUT HARVESTERS



- Picks up all varieties of nuts quickly and easily
- High-quality tool made of zinc coated steel
- Ideal for a single tree, a small grove or even tidying the factory floor
- Save your back and knees!

Contact: John Pethybridge
0407 847 170

www.nutsolutions.com.au

Nut Solutions Australia is the Australian agent for Crackademia (NZ), Bag-A-Nut (USA), Kern Kraft (Germany) and Feucht-Obsttechnik (Germany).

