

DuraVeg[®] ***Bulletin***

EDITION 4 - AUTUMN 2020

***Proven systems that reclaim
and restore environments.***

Experts from earth to turf.

Bulletin

Edition 4 - Autumn 2020

Welcome to the Autumn edition of our PGG Wrightson Turf – DuraVeg®
Revegetation and Erosion Control Bulletin.

Australia had a summer of record-breaking temperatures which fuelled a series of devastating bushfires across the country, which at the time of writing, destroyed more than 11 million hectares but are now under control following some heavy rains followed by eventual flooding in some areas. Now, from an erosion and sediment point of view, the environmental focus shifts to limiting erosion, protecting soils and reducing sediment loads impacting waterways.

New Zealand has also experienced extreme temperatures out of the norm, with places reaching up to 40 degrees. However, in December the South Island of New Zealand did experience a torrential rain event, causing flooding and Canterbury's Rangitata River to burst its banks; forcing the closure of two main highways and effectively shutting commuters off for days until the roads were reopened. This was followed by the same region just 6 weeks later being declared in a drought and water restrictions are now in place alongside plenty of other parts of New Zealand.

In this issue we have a recap of the 2019 International Erosion Control Association (IECA) Australia conference which was held in tropical Cairns, as well as a number of case studies from projects in Australia and New Zealand. We also provide insight into a grass establishment trial that is currently in progress at our Kimihia Research Centre, and cap things off with a feature profile of Robert Coulson from RST Environmental Solutions.

We hope you enjoy this issue, and thank you for the continued support.



Oliver Norton
Business Development Manager
Australia



Joe Johnson
Business Development Manager
New Zealand



Sustainable revegetation

INSIDE THIS EDITION

IECA Cairns Update	03
Black Diamond Mine Case Study	04
Dunedin Spillway Case Study	05
Melbourne Living Wall Case Study	07
Grass Establishment Trial	08
ProGanics® DUAL™	11
Feature Profile Robert Coulson	12



DELEGATES LISTENING TO A PRESENTATION

IECA Cairns Conference October 2019



ADAM DIBBLE WITH A KOALA

PGG Wrightson Turf sent a representative group of DuraVeg® Trusted Advisors to the Region 2, IECA Conference held last year in Cairns, Queensland Australia.

Adam Dibble, President of Region 1 IECA and Samantha Roe, Executive Director of the IECA made the trek from the USA to attend the Queensland conference

making the 2019 conference one to remember. DuraVeg - PGG Wrightson Turf were proud to host a customer appreciation dinner where many of our contractors and clients from all over Australasia were able to come together for the chance to network.

Timed with the conference was the release of Ecotain® environmental plantain, a highly suitable revegetation forage herb, into the Australian revegetation market. Agronomist Dr Glenn Judson joined the team travelling from New Zealand to present on Ecotain and explained in detail the potential benefits to nutrient control and soil stabilisation of including Ecotain into revegetation applications. An Ecotain living exhibit was also displayed on the DuraVeg counter so delegates could view Ecotain growing.

Presentations were well attended and with the nearby proximity of Australia's Great Barrier Reef to this year's conference, the Reef's protection was high on the agenda. Many presentations were focused on erosion and controlling sediment in local

waterways and the subsequent impact on the reef. With many of the presenters being local experts in their field, it made for some insightful and passionate presentations; with one Marine Biologist showcasing photos from his time spent personally diving on the Great Barrier Reef over the past 40 years.

Overall this was a well thought out and executed conference bringing together the experts from New Zealand, American and Australian sustainable erosion control and revegetation markets, making the 2019 Cairns Conference truly an International Erosion Control Association event.



THE DURAVEG STAND

Black Diamond Mine Case Study

PROJECT STAKEHOLDERS

Collie Shire

Western Australia Department of Mines,
Industry Regulation and Safety (DMIRS)

Soilwater Group

DuraVeg® from PGG Wrightson Turf

CHALLENGES

Highly erodible soils that were previously
unable to support vegetation

167 tonnes/ha/year (74 tonnes/ac/year)

Minimal topsoil

1V:2H slopes

Public interference

APPLICATION

ProFlex™ System

ProGanics® BSM™ : 5000 kg/ha (4,460 lb/ac)

Flexterra® HP-FGM® : 4000 kg/ha (3,570 lb/ac)

Liquid Lime: 10 L/1000 m² (10.7 gal/ac)

RESULTS

Despite interference from the public
during establishment, the site successfully
established vegetation

The government was pleased with the
results

During the 1940s and 50s, the Black Diamond Coal Deposit was heavily mined, creating a large pit over time. Eventually, the pit filled with water and despite fencing, signage and warnings from local government, it became an unsafe, yet popular lake for cliff diving. Tragically, four people suffered spinal injuries and one person died in the former mine. The Collie Shire needed to redesign the pit to eliminate the cliffs and establish vegetation that would eventually grow to match the surrounding woodlands. This meant reshaping the slopes to 26-degrees and establishing vegetation to prevent the risk of a landslide. Once the slopes had been successfully reshaped, the contractor took a soil test to determine what amendments, if any, were needed to ensure a more favourable growing environment for vegetation. The soil test showed depleted soils with an acidic pH of 4.4 and minimal organic matter. Profile® recommended using the ProFlex™ System, a combination of ProGanics® Biotic Soil Media™ (BSM™) and Flexterra® High Performance-Flexible Growth Medium® (HP-FGM®). ProGanics is an Engineered Soil Media™ (ESM™) designed to provide an abundant source of organic matter and soil-building components to modify soil chemistry and initiate plant growth. Flexterra is the industry's highest performing hydraulically applied erosion control product

proven to minimise soil loss and provide superior erosion control. The contractor also applied Liquid Lime, a pH modifier used to neutralise acidic soils to a more optimal range for vegetation establishment. One year later, the site had vegetation, despite the fact that the public had trampled the vulnerable vegetation to access the lake during early establishment. The government saw the site as a success and is pleased with the progress it has made over the years as the shrubs and trees continue to grow in.



TOP : The slope prior to reshaping

BOTTOM: ProGanics applied in the foreground; Flexterra in the background

HEADER: Follow-up inspections three years after application showed sustained growth



THE SPILLWAY BEFORE WORK WAS STARTED

Southern Reservoir Spillway - Dunedin

Southern Reservoir Dam was originally constructed in the 1880's and is owned and operated by Dunedin City Council for the purposes of water supply. It has a total reservoir storage volume of approximately 260,000 m³ at full supply level. Due to the condition of the existing spillway arrangement, it was recommended that a new spill be constructed, and in a new location adjacent to where it currently exists.



EXISTING SPILLWAY

In a report produced by Stantec, there were two confirmed dam safety deficiencies:

- The existing service spillway, an appurtenant structure to the dam, has insufficient capacity to safely pass the required Inflow Design Flood. There is also a high risk of blockage, due to the culvert at the upstream end of the spillway.
- Erosion of embankment materials around the existing service spillway location.

The new service spillway has been designed to safely pass the 1:10,000 Annual Exceedance Probability Flood, and the new spillway must have a significant increase in capacity from 1 m³/s to 8 m³/s.

Following an options assessment, a reinforced grass lined spillway was selected as the preferred option. The key basis for this was capital cost. A key dam safety consideration for a grassed line spillway is potential soil erodibility. Specifically, backward erosion (headcutting) leading to an undermining of the spillway control

structure and an uncontrolled release of the reservoir. This meant the grassed spillway was to be reinforced.

DuraVeg® from PGG Wrightson Turf were engaged when the idea of a grassed spillway system was the preferred solution.

A 5 Fundamentals approach was adopted:

Step 1: Understand your substrate.

A soil test was conducted with the soil that was to be used for the spillway. The results showed low levels of phosphorus and potassium. However, all other levels were in the ideal range to sustain vegetation. A fertiliser was selected to increase the levels that was deficient, to be applied with the Flexterra® FGM as well as the seed.

Step 2: Species selection.

Due to the region (Otago), only cool Season grasses were selected. The seed mix recommended and used was:

- 50% *Colosseum perennial ryegrass*
- 23% *Governors creeping red fescue*
- 22% *Silhouette chewings fescue*
- 5% *Arrowtown browntop*



FINISHED SPILLWAY



THE GREEN ARMOR™ SYSTEM



CROSS SECTION OF GREEN ARMOR™

**Step 3: Erosion Control Material:
Solution: The Green Armor™ System**

The Green Armor™ system offers a more aesthetically pleasing and environmentally superior means of protecting high-discharge waterways. The system begins with Enkamat®

TRM (Turf Reinforcement Mat) which provides a permanent, lofty and open matrix. It is then hydraulically infilled with Flexterra® FGM (Flexible Growth Medium®) to intimately bond soil and seeds while accelerating growth.

- 30-50% less cost than hard armor such as concrete or riprap
- Higher-density turf
- Twice the erosion resistance of natural vegetation

Step 4: Ensuring proper installation

It was critical to ensure that the product was installed to manufacturers guidelines as well as a contractor with experience applying Flexterra® was utilised.

Step 5: Follow-up inspections and maintenance practices

The site was regularly inspected to ensure the success of establishment. There was a fertiliser recommendation 8 weeks after installation to encourage the speed of establishment due to the time frame that the spillway was required to be operational.



INSTALLATION OF GREEN ARMOR™



VEGETATION NOW ESTABLISHED



SPILLWAY OPEN & OPERATIONAL

Melbourne Living Wall Case Study

PROJECT STAKEHOLDERS

DuraVeg® from PGG Wrightson Turf

BWD Hydroseeding

Sunland Group

CHALLENGES

Near-vertical retaining wall

Extreme weather

Limited rainfall and sunlight as the area where growth is needed is nearly vertical

Minimal soil volume

Poor soil quality: acidic soil with pH < 5 and low organic matter content < 2%

APPLICATION

ProGanics® BSM™ : 4480 kg/ha (4,000 lb/ac)

Flexterra® HP-FGM® : 4370 kg/ha (3,900 lb/ac)

Liquid Lime: 90 L/ha (9.7 gal/ac)

12-5-14 fertiliser: 180 kg/ha (160 lb/ac)

RESULTS

Grasses successfully established in two weeks

A high-end housing development in Melbourne, Australia had an unsightly retaining wall. Designers with Sunland Group wanted to construct a vertical "Living Wall" with gabion baskets. Previous attempts to vegetate the wall using topsoil and non-woven geotextiles failed. Sunland Group contacted DuraVeg from PGG Wrightson Turf and Profile Products to develop a new solution.

Following Profile's lead, the contractor conducted a soil test to review the physical and chemical composition of the soil. The test showed poor soil conditions, which led DuraVeg to prescribe Profile's ProGanics® Biotic Soil Media™ (BSM™), a hydraulically applied Engineered Soil Media™ (ESM™) that provides organic matter and soil-building components to modify the soil chemistry and initiate growth and vegetation establishment. DuraVeg recommended Liquid Lime to raise the pH to more ideal levels and improve the nutrient uptake, along with a 12-5-14 fertiliser. The seed mix consisted of varieties of couch, clover and fescue because of their low maintenance properties.

After removing the failed matting, BWD Hydroseeding then hydraulically applied ProGanics BSM, seed and fertilizer onto the site in one hydraulic slurry, followed by Flexterra® High Performance-Flexible Growth Medium®

(HP-FGM®) to effectively hold the seed and soil in place. Flexterra HP-FGM is the erosion control industry's highest-performing hydraulic mulch, providing near-perfect erosion control and faster vegetative establishment.

Within two weeks of application, the vegetation had successfully established and within a few months the Living Wall was lush. Thanks to the performance of ProGanics and Flexterra, the grasses thrived under demanding conditions.



TOP : Previous attempts to vegetate the Living Wall using matting failed

BOTTOM: Established vegetation, April 2017

HEADER: Sustained vegetation, September 2011



Grass establishment under revegetation conditions trial

Every revegetation project is in some form or sense unique. In some cases, each region and/or government organisations create their own guidelines for erosion and sediment control. Throughout Australasia it is easy to find a wide range of products being specified with the common final purpose of establishing sustainable vegetation. There are a lot of factors at play on a real-world revegetation scenario, such as topography, water regime, soil type and fertility, species selection, etc. The goal of every product should be to create the best conditions for vegetation to establish without compromising any of the geotechnical requirements.

With various hydromulches, straw and rolled erosion control products in the market, PGG Wrightson Turf are running an internal trial to compare how well some of these products establish vegetation under controlled trial conditions. This trial has been installed at the Kimihia Research Centre (Lincoln, New Zealand), with a completely randomised design and three replicates of each treatment.

A total of 20 treatments have been installed. It is important to note that certain blanket products highlighted on their installation manual they could have hydromulch applied on top of them; therefore we created a new treatment to show the comparison of hydromulch by itself vs blanket vs blanket + hydromulch.

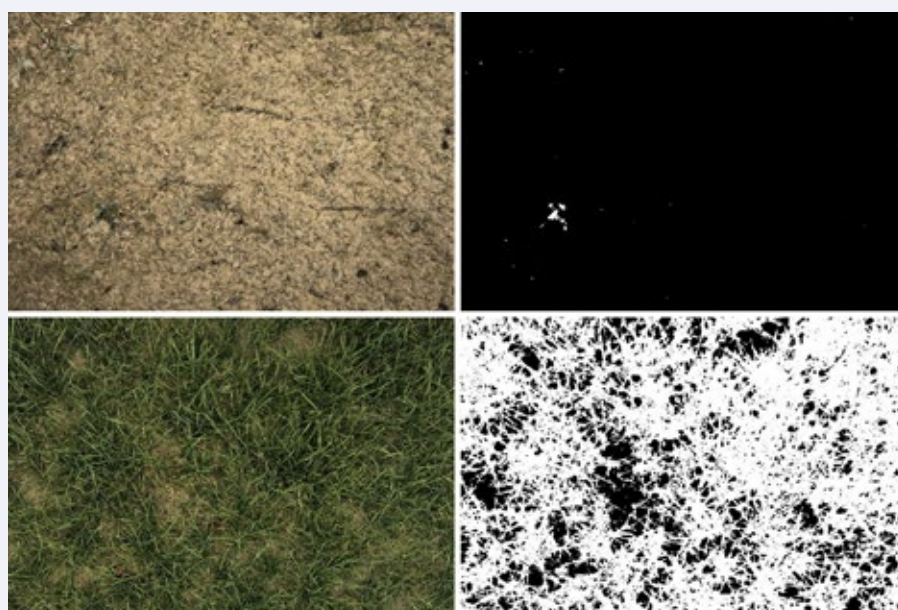


WEIGHING : The exact amount of mulch for each plot according to the product manual.

All plots are 1m² and received the recommended application rates of each product. Perennial ryegrass was installed on all plots as the revegetation cover.



CAPTURING IMAGES WITH THE LIGHTBOX



TOP LEFT: A plot on Nov 2019

TOP RIGHT: Processed image showing 0.08% coverage

BOTTOM LEFT: Same plot Dec 2019

BOTTOM RIGHT: Processed image showing 73% coverage

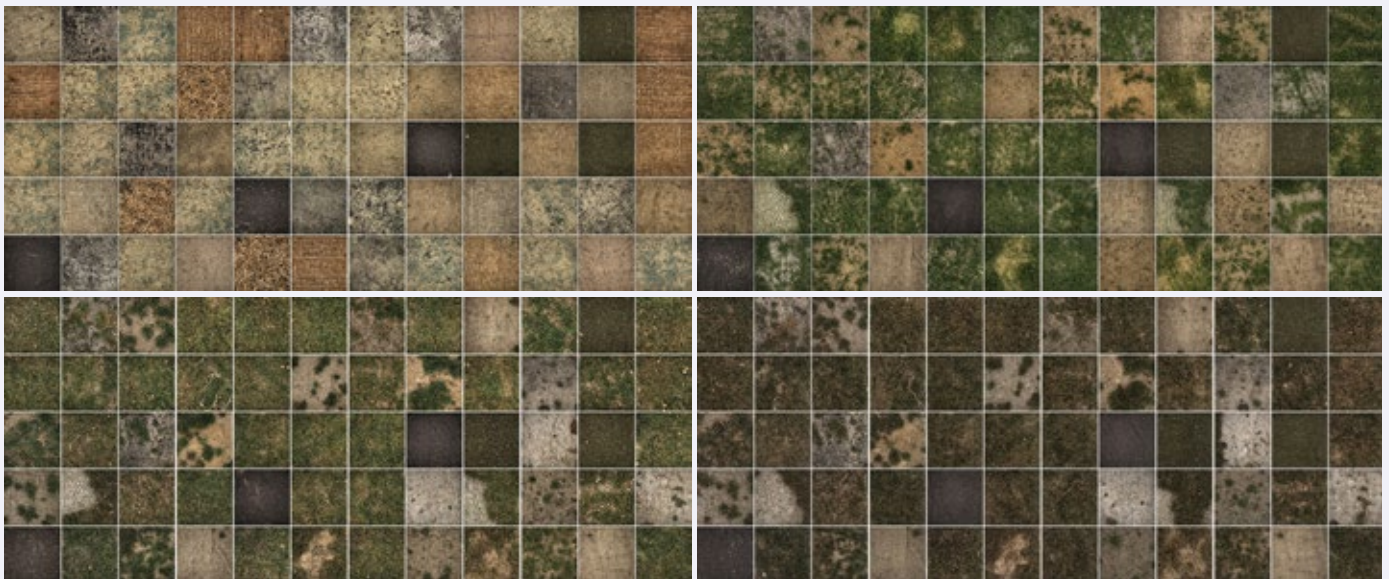
Alongside soil moisture, temperature, visual evaluations and weed counts, a lightbox is used to take photos of each plot monthly on a controlled light condition; the lightbox photography eliminates human factor and ensures each plot is scientifically treated the same. Computer software is used to calculate the percentage of green cover on each plot.

This is not a short-term project, part of the goal is to see how well each treatment will perform through the different seasons since product breakdown and longevity play a key role in a successful revegetation project.

We are very excited with the partial results so far with very interesting observations constantly arising. The positive feedback from suppliers, designers and specifiers that have visited our research centre in recent months has been great and gives us first hand insights on the revegetation challenges that our customers face.



GRASS ESTABLISHMENT SEEN IN THE TRIAL PLOTS FROM A DRONE OVERHEAD



MONTAGES: Lightbox imaging showing month by month progression of the trial so far.

The trial is continuing at the Kimihia Research Centre, and when completed a comprehensive report and case study will be presented; we will be sure to report conclusions from this trial in this publication in the future.

NOW YOU CAN GET BIOTIC SOIL MEDIA WITH EROSION CONTROL THAT WORKS!

INTRODUCING PROGANICS® DUAL™

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- Soil-building benefits of ProGanics® Biotic Soil Media™ plus erosion control equal to Bonded Fiber Matrix (BFM) performance in one time-saving, consolidated application
- High loading rates with highest water-holding capacity and erosion control effectiveness of any other “all-in-one” product
- Ideal for time-sensitive, large projects with depleted soils and slopes \leq 2H:1V

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PROGANICS DUAL — GET IN, GET IT DONE AND MOVE ON.

FEATURED PROFILE

Robert Coulson

Managing Director
RST Environmental Solutions



The DuraVeg team from PGG Wrightson Turf would also like to congratulate Robert Coulson on his recent appointment to President of the IECA Region 2.

How long have you been in the industry?

I have been in this industry for 22 years and before that I was involved in the seed industry; so soil and the environment have been my work areas for most of my life. I worked in several different areas of the industry from tropical and temperate environments involving seed production and establishment through to the present dealing with erosion and environmental fixes.

Where have you worked?

For the last 22 years I have worked and owned RST Environmental Solutions, a company based in Palmerston North and Christchurch. I have been fortunate to have been involved in a number of large scale projects which whilst challenging have been rewarding. When I started in the

industry environmental issues were never in the forefront of construction. It has been interesting seeing the change in status of the industry over the years.

What led you to work in the revegetation industry?

I entered this industry quite by accident as my brother in law had an issue that needed solving quickly. He suggested I take a look at the industry as there were very few people involved. From there I bought a Hydroseeder out of the USA and put in on an old Power Board 4wd truck and the rest is history. I realised early in the business that there was a need to upskill and so I spent some time travelling to international conferences establishing a network with people and going on training courses which were extremely useful.

What is your biggest motivator?

My motivator is getting a project that at first glance looks impossible to solve and then, using some very basic principles, working through the issues and solving the problem and then seeing the finished result. This has helped me solve problems such as stabilising the upper slopes of the Kaikoura earthquake zone, stabilising the Tasman fire area down to formulating the right seed mix to over-sow a forest or fixing up a subdivision or construction site that has been served an abatement notice.

Something interesting about you...

My son started keeping bees at the age of 11 and initially I was the driver to take him around his hives but now I am a part time employee catching bee swarms and tending hives whilst he is at school. It has been great to work together and not be the boss!

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