

# The Story of the Dunny Brush in the Bellybutton

## The EcoEvolution of a BioSecurity Revolution

How Community based EcoTourism is helping protect  
Australia's Nature, Culture and Future...







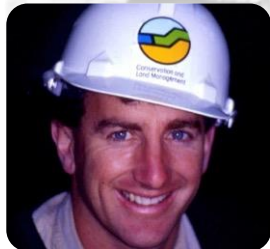




Dr Per Christensen









## by P. CHRISTENSEN

Its wide range of host plants makes jarrah dieback very important from an ecological viewpoint. Many plants are affected, notably members of the Proteaceace, Euphorbiaceae, Myrtaceae and Leguminosae families. Susceptible plants include species of *Banksia*, *Macrozamia*, *Xanthorrhoea*, *Casuarina*, *Dryandra*, *Adiantum*, *Lumniera*, *Banksia*, *Pultenea*, *Leucopogon*, *Podocarpus*, *Kingia*, *Personosium* (*Cercaria*).

Most of these species have no obvious direct economic value at present and so unlike jarrah the effects of their destruction are not immediately apparent. Nevertheless in the long term the loss of these components of the native flora may well prove to be of greater significance than the immediate dollar value assigned to the dead timber trees.

Banksias are very important in the ecology of the south-west. Many species flower during late summer and autumn or winter when little else is in bloom, and their pollen and nectar provides food for a whole host of small animals and birds.

provides a refuge for small animals, such as geckoes, birds and the tiny pigmy possum.

so many areas on both  
d in parks and reserves  
ble species exist that  
come infected. Such  
guarded with the  
once they have

► Middle: Red wattle-bird (*Anthochaera carunculata*) with young. This is a honey and insect eater associated with banksias and other wildflowers. (Bert Wells)

► Bottom: Honey possum (Tarsipes spencerae) on kangaroo paw (Anigozanthos flavida). This species feeds on the nectar and pollen of banksias and other wildflowers. (Bert Wells)

Scarlet banksia (*Banksia coccinea*)  
—one of our most spectacular wild-  
flowers—is also susceptible to dieback.

**Back Cover**  
Crowned snake (Denisonia coronata)  
found in a dead blackboy

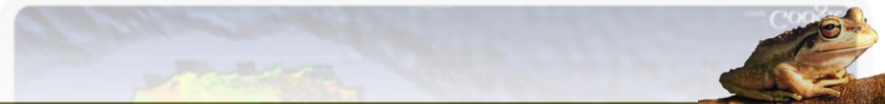
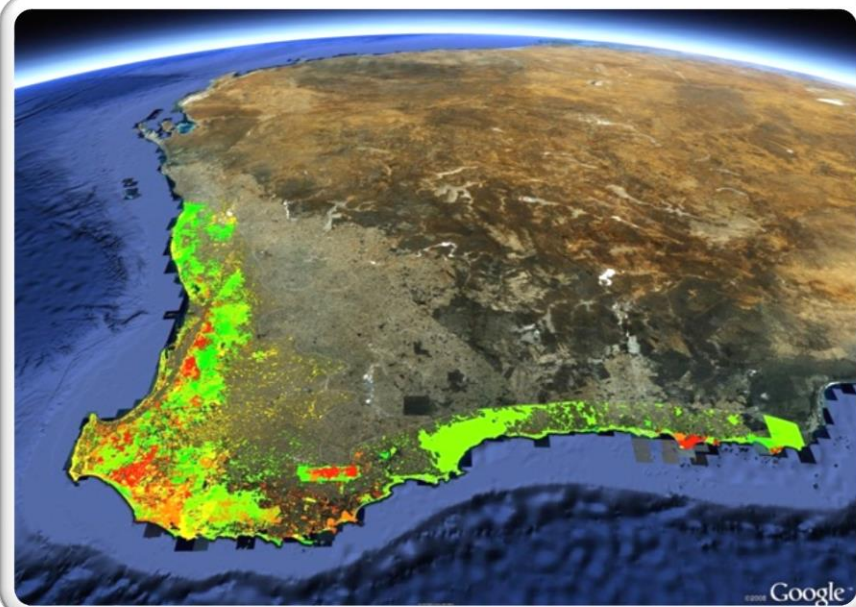
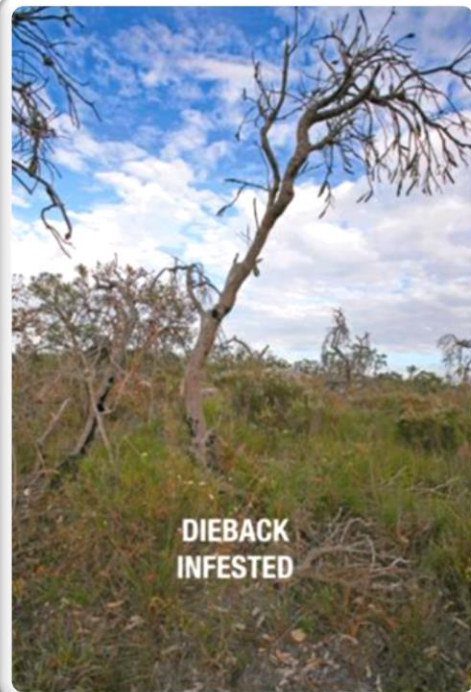
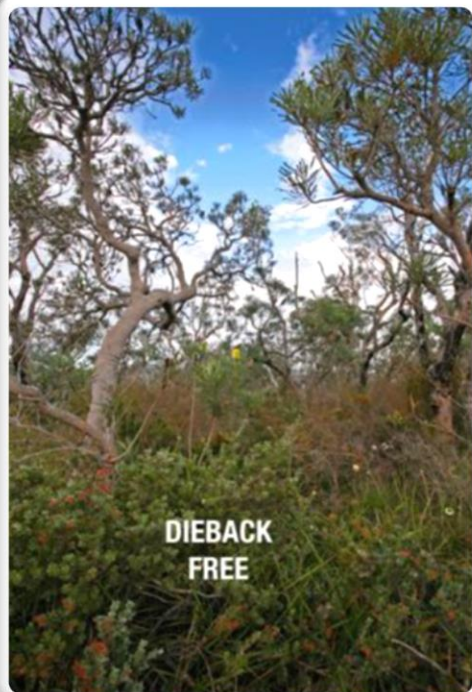
all animals, such as  
birds and the tiny pigmy

12





# Phytophthora Dieback...





## Project Dieback

The aim of **Project Dieback** is to protect the biodiversity of special areas at risk from *Phytophthora Dieback* for all five affected Natural Resource Management Regions of WA.

For fifteen years WOW Wilderness has helped worked with SCNRM, DEC, DPaW, DWG, CPSM and stakeholder groups to establish and support Project Dieback.





## EVERY STEP COUNTS

## KEEP YOURS CLEAN

### Phytophthora Dieback Plants & Animals at risk

Phytophthora Dieback is a plant disease caused by soil borne water moulds of the genus *Phytophthora*.

These pathogens attack the roots of susceptible plant species and presents one of the greatest threats to biodiversity in Western Australia.



Phytophthora Dieback affects 40 per cent of the native flora of the south west - about 2,300 species.

This project is supported by funding from the Western Australian Government's State NRM Program



Many species killed by Phytophthora Dieback grow along the Denmark-Nornalup Heritage Rail Trail. It destroys them by attacking and rotting their roots. Losing these plants also means losing homes and food for native animals.



### Things you can do to make a difference

- Stay on designated tracks and trails
- Avoid travelling and walking in wet soil conditions
- Do not pick plant material
- Ensure your footwear and camping equipment is free of soil before entering new areas



### Boosting Banksias' Defence

Some of the river banksias (*Banksia seminuda*) growing in this area have been injected with phosphite to help protect them from dieback infection. Phosphite is a biodegradable fungicide which when injected, boosts the plant's natural defence against Phytophthora Dieback.



### WA STANDARD DIEBACK SIGNAGE SYSTEM

**DIEBACK STATUS ENTRY SIGNS FOR ROADGUIDE POSTS**

**DIEBACK PROTECTION AREA (DPA) SIGNS FOR DPA BOUNDARY ACCESS POINTS**

**DIEBACK PROTECTION AREA**

**DIEBACK PROTECTION AREA**

**DIEBACK STATUS ENTRY SIGNS FOR WALK TRACK POSTS**

**DIEBACK PROTECTION AREA**

**DIEBACK PROTECTION AREA**

**DIEBACK SYMBOLS WITHIN DIEBACK STATUS AREAS**

**Boot Cleaning Station**

**Access By Permit Only**

### DIEBACK

**YOUR GUIDE TO PRIORITY PROTECTION AREAS IN THE SOUTH-WEST OF WESTERN AUSTRALIA**

**UNDERSTANDING DIEBACK AND HYGIENE**

**PURPLE SPREAD DIEBACK**

### DIEBACK PROTECTION AREA

## STOP

### Clean on Entry

This area has special values threatened by Phytophthora Dieback. Vehicles and footwear should be clean and free of dirt before entering this property. Your help preserves the native bushland and animals.

[www.dieback.net.au](http://www.dieback.net.au)

[www.qisback.net.au](http://www.qisback.net.au)













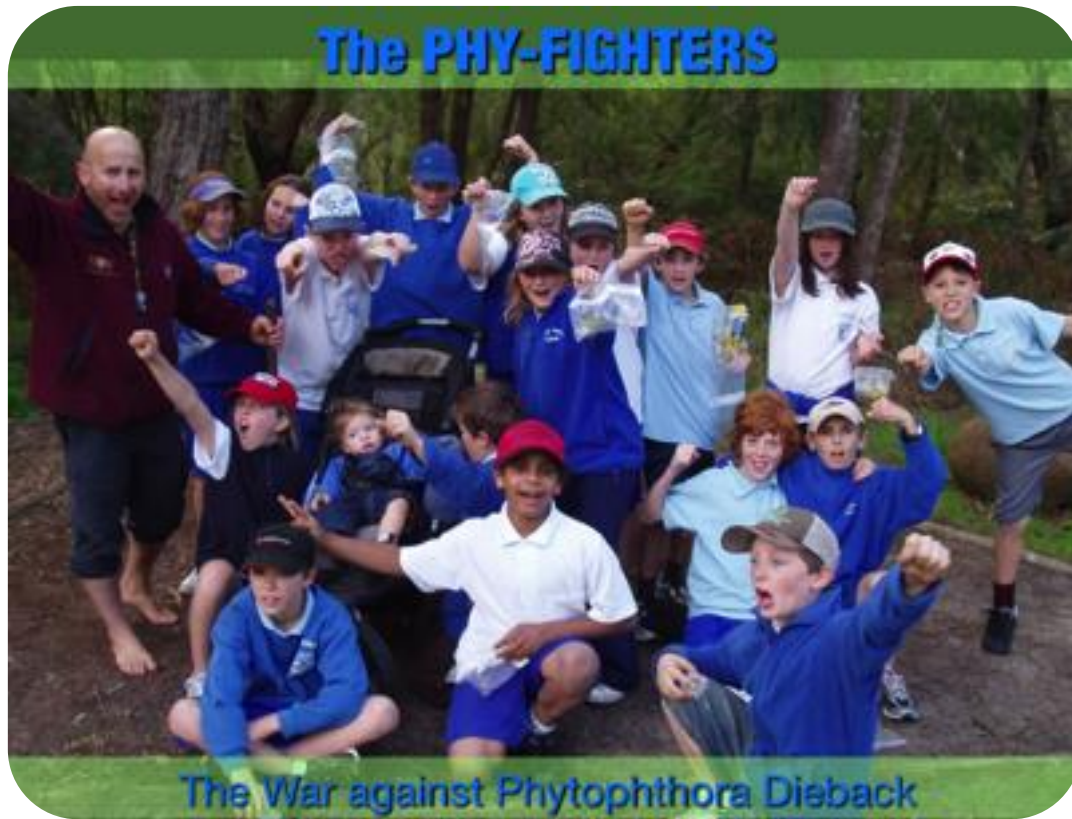
## EcoEducation Programme

**A curriculum-based education programme unifying community, teachers and students in education, understanding and stewardship of the environment and society.**

The programme integrates the core learning areas of Science, Humanities and Social Sciences, The Arts, Technologies.  
UR Walpole comes from the focus on Nature, Culture and Future – linking the students with the natural environment, cultural heritage and their role in the future of the community.

Each year a new theme is adopted, planned and implemented within the guidelines of the school's curriculum. Each unit comprises of a series of sequential activities with the community, which provide students with the opportunity to explore the core learning areas through real life experiences.







## Evolution of the PhytoFighters

UR Walpole EcoEducation Invaders Camp



First Brush PF

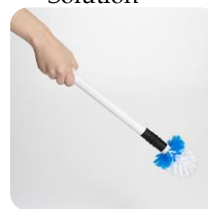
First Shoe Sprayer



First Bulb Pump

First PF 100

The Dunny Brush Solution



PF1000

Detergent Brush



Joe's foot Brush



PF 2000





GSDC MEDAL NRM 2015





## Dieback Hygiene Footwear Station

### Research and Development

#### PhytoFighter 1000

- Current Usage Research
- Footwear Cleaning Station Upgrade

#### Hygiene Stations Designs for other vectors

- Wheelchairs, Mountain bikes, Motorbikes, Horses

#### Spray Solution Research

Design and Build an innovative prototype for the future

## Biosecurity Hygiene Station





Lamington NP, QLD



Kauri Reserve, NZ



The Temple, TAS



Mt Lindesay, WA



Manea Pk , Bunbury WA



Denmark , WA



Mt Kosciuszko , NSW





## Hygiene Station Observational Survey - Managers



Dieback PF 1000 Survey

Footwear Hygiene Station Management Discussion Survey  
DIE Dieback Conference 2014 Mundoch, Dieback Conference 2015 Kalamunda  
Phone interviews, emails, face to face discussions



CONTEXT: Conference, Phone, Email, Clinic, Face to Face	SETTING: DWP, Shire, Mining, Private, Nursery, Biosecurity, Tracks & Trails	EFFECTIVENESS	COMMENTS & CRITICISM
Conference 2014 Mundoch	DWG (DIEBACK WORKING GROUP)	Effectiveness Costs Installation Maintenance Safety Other Comments/Ideas	Some people may not be able to use squeeze bulbs. Relatively vandal proof. Initial costs high, chemical costs high. Hard to get to some vehicle access sites, need a team of carriers, but can be done. Only 40L, high use site need to be filled regularly, people may be upset if empty. Potential trip hazard with spray cover. Use a foot pressure pump.
Conference 2014 Mundoch	Nursery	Effectiveness Costs Installation Maintenance Safety Other Comments/Ideas	Perfect for nursery biosecurity. \$200 may be hard for a private nursery. Looks easy, would not worry about securing to concrete. Onsite daily so OK. Chemical spray getting on body.
Conference 2014 Mundoch	DWP/W	Effectiveness Costs Installation Maintenance Safety Other Comments/Ideas	Good for trails and also against a range of organisms. Brushes effective, one test not everyone used the pump to activate the spray. Can you do a unit with just brushes? Spray system need a maintenance budget. Some areas may require bumping, pending on which chemicals are used. Integration into recreation maintenance programme. Use ramps to get onto unit. Walking sticks may get caught in grate. Brushes need to do sides of boots.
Conference 2014 Mundoch	BioSecurity (NZ)	Effectiveness Costs Installation Maintenance Safety Other Comments/Ideas	Quick to use. Signage need to be effective for walkers to use unit. Better instructions needed for sprayer. Better than existing unit. Expensive to ship to NZ. Should be done in the track not on the side unless a gate system is used, people walk past unit. Units some times left unfilled. May need unit access for all.
Conference 2014 Mundoch	City (Melville)	Effectiveness Costs Installation Maintenance Safety Other Comments/Ideas	Using it for Kaori Dieback, maybe use for dydimos. Assistance with grants. Overseas groups high, need a installer in Perth region to ensure hygiene is understood and enforced during installation. Community group volunteer assistance. Can a tank be used? Signage in regard to chemical safety/biodegradability. Have you thought about one for wheelchairs and bikes. (Discussing for Wireless Hill)



# PROJECT DIEBACK - Hygiene Stations

EcoTourism Australia  
Asia-Pacific Tourism Conference 2020

WOW  
WILDERNESS  
ECOPROJECTS

## Hygiene Station Observational Survey - Users

WOW  
WILDERNESS

Dieback PF 1000 Survey

Dieback Footwear Hygiene Station User Observation Survey

Station Location: WOW Wilderness EcoCruises Jervis Wildlife

Date	Male	Age Bracket	Station	Verbal	Brush	Checked	Spray Use	Scrub spray	Effectiveness	Observer Comments - Initials e.g. effectiveness, difficulties, ideas	Safety	Comments from User - at unit
00/00/00	/Female	E15 15-20 20-40 40-60 60-70 >70	Pump Handle Sequence built	Instruction (Y/N)	Timing (seconds)	Footwear (Y/N)	Used pump (Y/N)	per foot (Y/N)	(Not/OK/Good)			
21/05/15	M	15-20	PH1	Y	7	N	Y	1	OK	TE: Had on left foot not sprayed		-
21/05/15	F	40-60	SB	Y	10	N	Y	1	Not	TE: ineffective Squeeze		"Bit hard to squeeze..."
21/05/15	M	40-60	SB	N	15	Y	Y	2	Good	GM: Used really well		"What is in it?"
22/05/15	M	15-20	PH1	N	10	N	Y	2	Good	TE: At first did not use handle		"where did dieback come from?"
22/05/15	M	15-20	PH1	N	10	N	Y	1	OK	TE: Learnt from previous person		No comment
22/05/15	F	40-60	PH1	Y	6	N	Y	2	Good	GM: Verbal instructions helped		"what is the spray?"
25/05/15	F	60-70	PH1	N	7	Y	N	2	Not	GM: Did not move foot over sprayer		-
25/05/15	F	40-60	PH1	Y	10	N	Y	2	OK	GM: Used pump well, missed a bit of heel		"What is dieback?"
25/05/15	F	40-60	PH1	Y	6	N	Y	3	OK	LE: Read all of signs		"good to see"
26/05/15	F	40-60	SB	Y	0	N	Y	1	OK	GM: Did not use brush!		"mmm so what do I do?"
26/05/15	M	>70	PH1	N	10	N	Y	1	Good	GM: Foot high off roller		-
26-May	F	>70	PH1	Y	0	N	Y	1	OK	GM: Instructed by husband, I did pump		"is it just water?"
3-Jun	F	40-60	SB	N	5	Y	Y	2	Good	TE: Sprayed back of leg, foot too far forward		will I get wet?
3-Jun	M	40-60	PH1	N	10	N	Y	2	OK	TE: Saw 14 shoes, fitted OK nearly tripped		-
3-Jun	M	60-70	PH1	Y	0	N	Y	1	OK	TE: Gave demonstration		How do I do it?
3-Jun	F	60-70	PH1	Y	0	N	Y	1	OK	TE: did not hold handle, due to carrying bag		-
5-Jun	M	20-40	PH1	Y	10	Y	Y	2	Good	GM: did it well and helped his child		"now pull back your foot...next one..."
5-Jun	F	U15	PH1	Y (dad)	15	N	Y (dad)	2	Good	Did not move shoes over sprayer until instructed		-
5-Jun	F	20-40	PH1	N	6	N	Y	2	Good	Helped child		"watch your father"
5-Jun	M	40-60	SB	N	0	N	Y	1	OK	Went through quite quick		-
7-Jun	F	40-60	SB	Y	0	N	Y	1	OK	Used two hand on squeezer		"thank you"
7-Jun	F	60-70	PH1	N	10	Y	Y	2	Good	Interested in plants it affected		Asked about chemical
7-Jun	M	>70	PH1	Y	10	Y	Y	1	OK	Walking stick got caught in grate		"No worries..."
7-Jun	M	40-60	PH1	N	5	Y	Y	1	OK	Wanted to know if dieback was in NSW		"Do we have it as well?"
8-Jun	F	40-60	PH1	Y	10	Y	Y	2	Good	Excited to use, only had sandals got wet feet		This is the first time I've seen one of these
8-Jun	F	40-60	SB	Y	20	Y	Y	3	Good	Been really muddy! Need ink brush...		You need these on the bb track!
8-Jun	M	>70	PH1	Y	0	Y	Y	2	OK	Maybe need mirror to see bottom of shoes		-
8-Jun	F	>70	PH1	Y	10	Y	Y	2	OK	foot not put on roller therefore too high for spray		-
12-Jun	M	40-60	PH1	Y	10	N	Y	2	Good	"Heel to Toe" works well		"mmm, how long have you had it"
12-Jun	F	40-60	PH1	Y	0	N	Y	1	OK	-		-



WOW  
WILDERNESS  
ECOCRUISES

Project  
**DIEBACK**  
WILDERNESS  
WESTERN AUSTRALIA  
www.dieback.net.au



**SOUTHCOST**  
NATURAL RESOURCE MANAGEMENT



Department of  
Parks and Wildlife



Shire of Nannup  
WATER • CONTRACTS • GROW



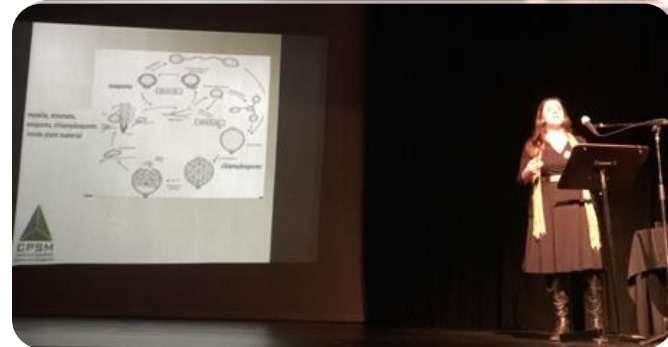
**GREAT SOUTHERN**  
Development Commission





## DIG State Dieback Conferences

Displayed the PF1000 Pathogen Hygiene Station  
With Project Dieback banners and posters.



## Hygiene Station Survey and Critical Analysis

### UR Walpole 2015 "Invaders" EcoEducation Programme - Walpole Primary School



Testing different soils and brushes



Comparison of Brush Vs Spray



Cameras

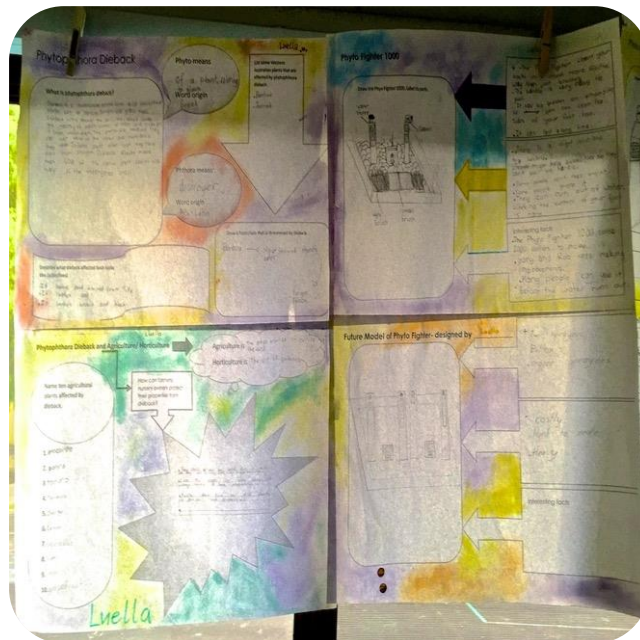
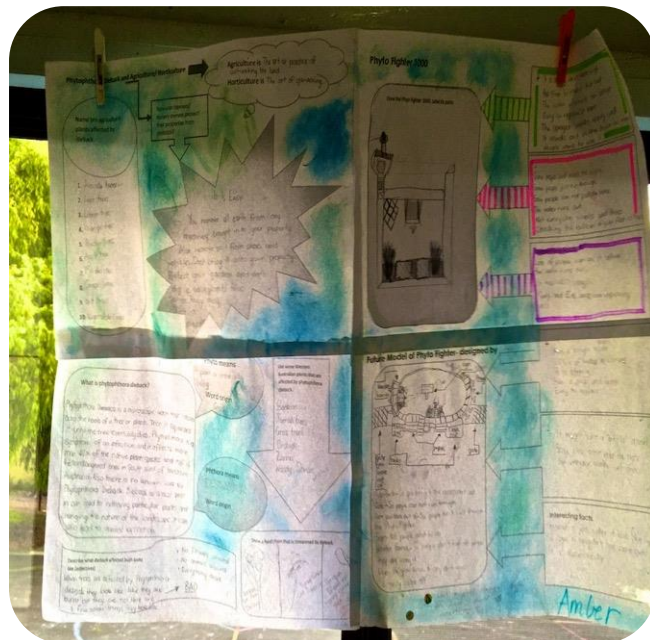


Magnifiers

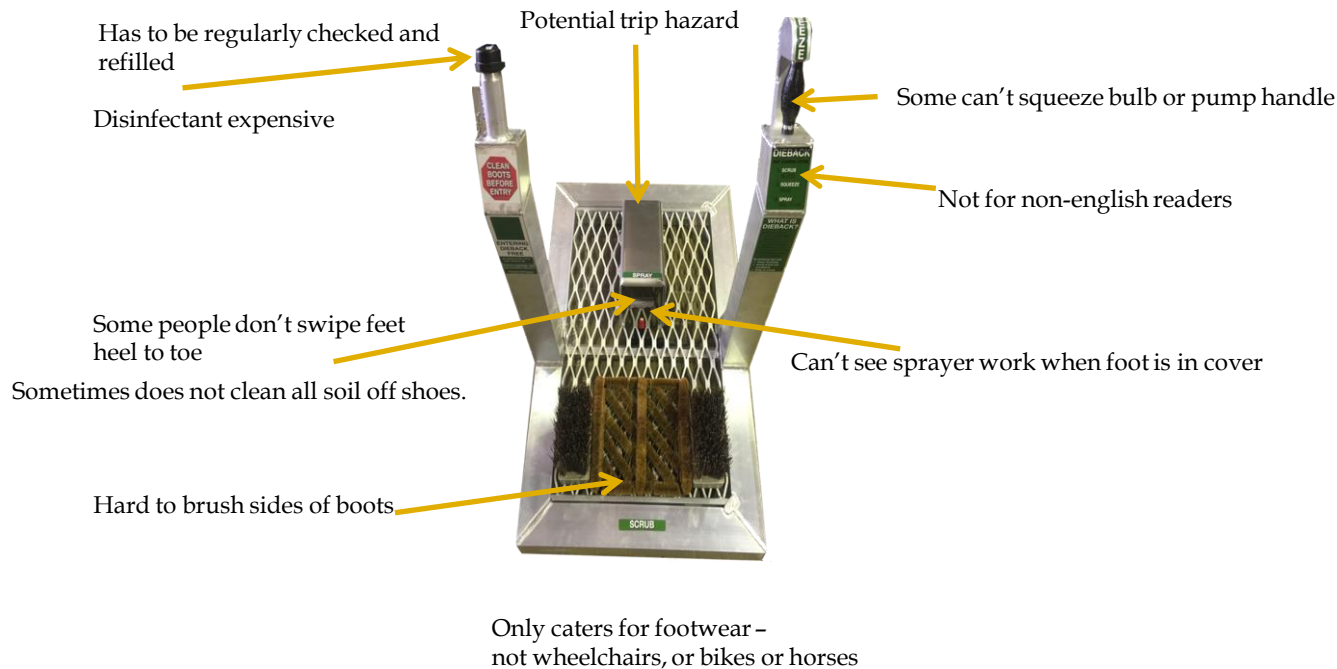




## Hygiene Station Survey, Critical Analysis and Future Model Walpole Primary School



## Critical Analysis Survey Summary





## Disinfectant Effectiveness Research – *PhytoClean* vs *Palmolive Anti-Bacterial* vs *Domestos* Partnership Murdoch University, Denmark Senior High School, SCNRM, WOW



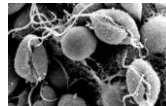
**Murdoch**  
UNIVERSITY



Denmark Senior High School ATAR Biological Sciences

Laboratory Research Experiment and Report

The effectiveness of three detergent solutions in the inactivation *Phytophthora cinnamomi* zoospores.



Three *Phytophthora cinnamomi* zoospores and a number of cysts on the surface of a root. Each zoospore has two tail-like flagella that allow the spores to 'swim' in water to reach a new host plant. (Image from: <http://www.environment.gov.au/system/files/resources/24666949-8c17-446d-8761-62aa61f9437e/files/p-root-rot.pdf>)

### 1.0 Introduction

As part of an education/industry/management partnership in liaison with Murdoch University, EcoProjects (Walpole) and South Coast NRM, the Year 11 Biology students at Denmark Senior High School investigated the effectiveness of three detergent solutions in inactivating *Phytophthora cinnamomi* (Pc) zoospores. The aim of the experiment was to determine which detergent solution was the most effective so that it can be used in foot-cleaning stations on established bushwalking tracks in forests of the Great Southern Region (and elsewhere). The most effective concentration of each detergent treatment for inactivating Pc zoospores was also investigated.

The students sub-cultured agar colonies of Pc that were provided by Murdoch University to induce the production of zoospores from sporangia. These zoospores were then tested with three different detergent solutions at four concentrations to see which were the most effective at preventing growth of PC colonies on Pc selective agar. The investigation provided a great opportunity for students to learn new laboratory based skills, and there is also a field work component planned for later this term.



Disinfectant Effectiveness Research – *PhytoClean* vs *Palmolive Anti-Bacterial* vs *Domestos*  
Partnership Murdoch University, Denmark Senior High School, SCNRM, WOW



Preparing sub-cultures of *P. cinnamomi* mycelium in carrot agar to stimulate zoospore production.



Preparing sporangia experiment plates .



Experimental Results

Detergent Treatment	Detergent concentration				Control
	50%	20%	10%	5%	No detergent
PhytoClean	0	0	0	0	20
Domestos	0	0	0	>5	20
Palmolive Antibacterial detergent	0	5	10	15	20

Table 1: The % coverage of *Pc* colony growth recorded growing on *Pc* selective media agar plates one week after inoculation with *Pc* zoospores exposed to no detergent (Control) then three different detergents at four different concentrations.





# EcoTourism Australia PROJECT DIEBACK – Hygiene Stations



Building the PF 3000 Team  
 Rob Pernich  
 Innovator, Developer,  
 Engineer, Manufacturer



**SOUTHCOAST**  
 NATURAL RESOURCE MANAGEMENT



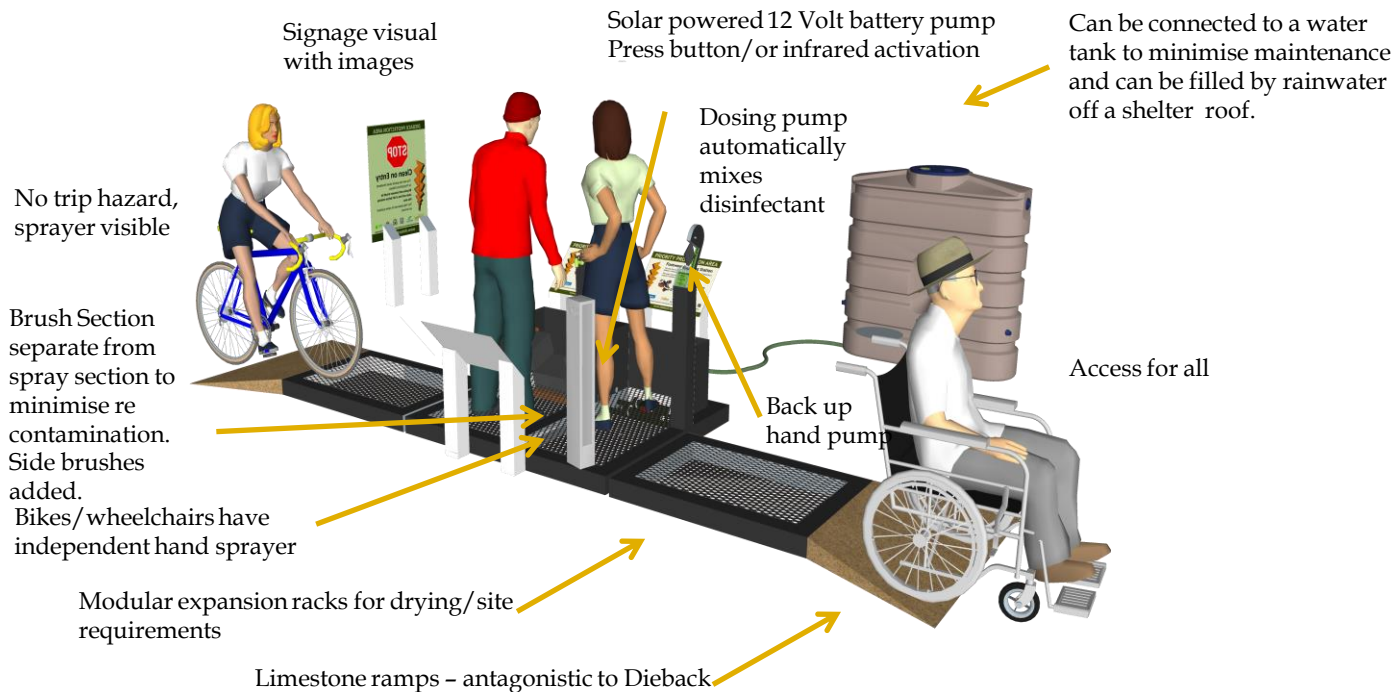
Department of  
 Parks and Wildlife



**GREAT SOUTHERN**  
 Development Commission



## The PF 3000 - New Innovative Ideas...





## PhytoFighter 3000

A New Design to address all issues!









Walpole environmental innovator and educator Gary Muir demonstrates the Phytofighter 3000. Picture: GSDC

# More help in dieback fight

■ Lisa Morrison

A new line of defence against dieback pathogen is slated to be installed in Walpole in the next month.

Walpole environmental innovator and educator Gary Muir unveiled the Phytofighter 3000 prototype at the Great Southern Development Commission's Field Day in Albany last month.

The improved version of earlier Phytophthora dieback cleaning stations could help limit the spread of the devastating disease by cyclists, horse riders and is also wheelchair-friendly.

The new prototype was integrated with a design by Walpole Primary School students who analysed issues with the previous 1000

and 2000 models as part of their long-running innovative UR Walpole EcoEducation Program.

The Phytofighter 3000 features a coarse mesh platform above a debris collection area, and separate bays for removing soil and plant material and applying disinfectant with a retractable hose in a bid to limit recontamination.

It is solar-powered and has a backup hand pump system.

Mr Muir said the prototype would be installed at the entrance into the Walpole Nornalup Inlets Marine Park by the end of November for an observation period through his WOW Wilderness cruises into the Walpole Wilderness Area.

"That high-value, special protection area is dieback-free," he said.



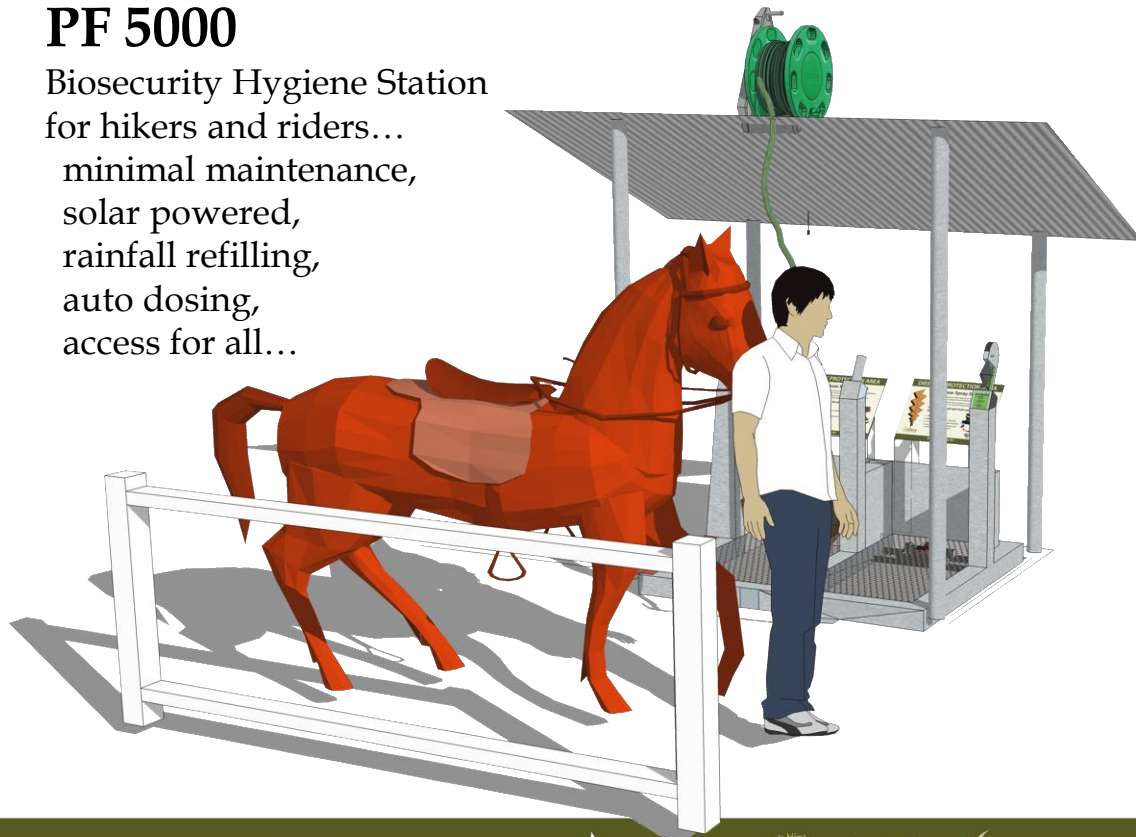




## PF 5000

Biosecurity Hygiene Station  
for hikers and riders...

minimal maintenance,  
solar powered,  
rainfall refilling,  
auto dosing,  
access for all...











## FORESHORE PARK



Shire of  
**Nannup**  
rest • connect • grow



GOVERNMENT OF  
WESTERN AUSTRALIA

Department of  
Primary Industries and  
Regional Development



**SOUTH WEST**  
DEVELOPMENT COMMISSION



**SOUTHCOAST**  
NATURAL RESOURCE MANAGEMENT



Department of  
Parks and Wildlife



Dieback  
eradication group



CPSM



Donmark High School  
Strive to Achieve



Wannan



Shire of  
**Nannup**  
rest • connect • grow



Shire of  
**Nannup**  
rest • connect • grow



GOVERNMENT OF  
WESTERN AUSTRALIA



**GREAT SOUTHERN**  
Development Commission



**GSDC**  
MEDAL



