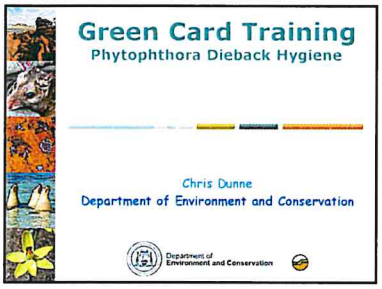


Green Card Training

Program

1. Welcome
2. 10 min DVD highlighting the threat of the introduced plant disease, Phytophthora Dieback, to the native plant communities of south-west WA
3. 90 min presentation on the impact, spread and management of Phytophthora Dieback in WA
4. Practical hygiene demonstration

Green Card Training

Two Levels of Green Card Accreditation

Level 1: Green Card "Inducted"
- Multi-choice Quiz
- Sign the "Green Card" Code of Conduct
- Complete Observation Checklist
- Provide Course Feedback

Level 2: Green Card "Accredited"
- Multi-choice Quiz
- Sign the "Green Card" Code of Conduct
- Complete Observation Checklist
- Provide Course Feedback
- Job Safety Analysis
- Follow Up Report (due 3 months after training)

Green Card Training

Green Card Program Goals

"to establish a nationally recognised training qualification for biosecurity and invasive species management programs within native plant ecosystems across Australia"

"to set a new standard for Phytophthora Dieback hygiene management within high priority native plant ecosystems within the south-west of WA"

Green Card Training

Green Card Participant Training Outcomes

Demonstrated knowledge of the introduction, impact & current strategies used in the management of Phytophthora Dieback across the south-west of WA

Proven skills to plan & implement basic hygiene protocols into any activity with the potential to spread Phytophthora Dieback

A qualification for a nationally recognised unit of competency "Inspect and clean machinery for plant, animal and soil material (AHCBIO201A)". Contributes to a Cert II or III in Biosecurity or Conservation & Land Management

Allows the qualified candidate to enter lands managed by the DEC or other land managers that require Green Card Accreditation as a condition of entry

Global Biodiversity Hotspots

Biodiversity in South West WA

The south west of WA Biodiversity Hotspot

One of the top 34 biodiversity hotspots in the world as recognised by Conservation International

High levels of natural diversity, particularly for plants, coupled with high levels of threat to that diversity

One of only five Mediterranean-type ecosystems to be listed as globally significant

A Centre of Plant Diversity as defined by WWF and the International Union for Conservation of Nature and Natural Resources (IUCN)

Containing five of the 15 national biodiversity hotspots nominated by the Australian Government

Biosecurity & Invasive Species

Biodiversity & Biosecurity in WA Native Ecosystems

Key threats to south-west biodiversity include introduced or invasive organisms such as:

pathogens
pests
weeds

Biosecurity & Invasive Species

Vectors for the Spread of Weeds, Pests or Diseases

Key threats to south-west biodiversity include introduced or invasive organisms such as:
- pathogens
- pests
- weeds

High risk vectors include:
- contaminated vehicles or machinery
- contaminated materials
- uncontrolled access or poor hygiene procedures

Phytophthora Dieback in WA

Phytophthora cinnamomi & other *Phytophthora* species

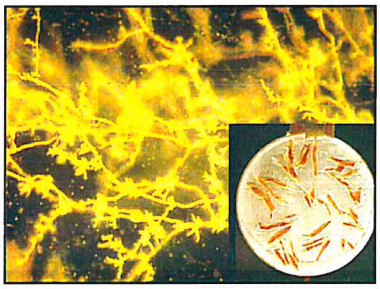
Over 20 different *Phytophthora* species recorded in WA

At least 16 have been associated with different plant diseases and tree declines within native plant ecosystems

Phytophthora cinnamomi was introduced in WA during European settlement

Phytophthora cinnamomi is the most common, widespread & most devastating *Phytophthora* species in native plant communities within the south-west of WA

DEC Policy Statement No 3 recognizes the emerging threat of other *Phytophthora* species & applies the precautionary principle to minimize their accidental spread



Impact of *P. cinnamomi* in WA

Biodiversity Impacts

- Disease process leads to a significant loss in diversity, structure and biomass within vulnerable native plant ecosystems
- Disease impact flows through the entire ecosystem affecting native fauna & other ecosystem processes
- Threatening process in many Declared Rare plants, Priority plant species or Threatened Ecological Communities

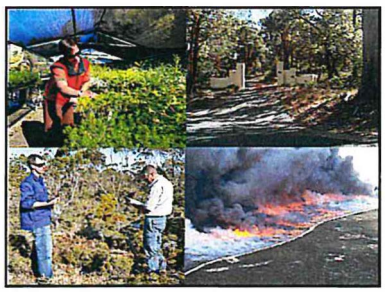
Impact of *P. cinnamomi* in WA

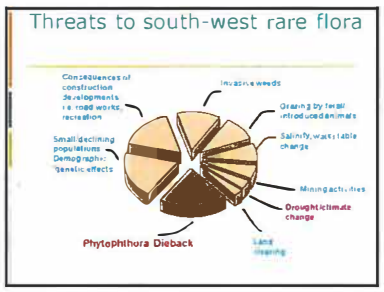
Social Impacts

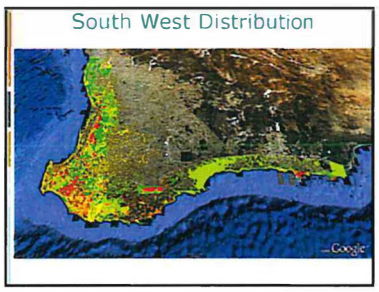
- Indigenous culture & values
- Restrictions affect recreational bushland users: 4WD, trail bikes, horse riders, mountain bike & bush walkers
- Disease common in residential home gardens & bushland on private property

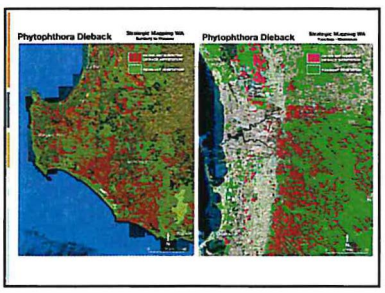
Economic Impacts

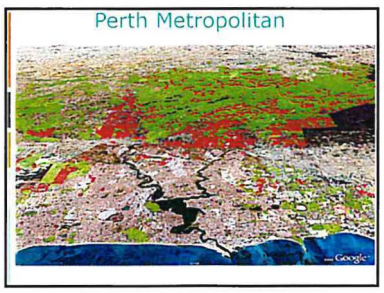
- Forestry, mining, extractive industries, horticulture apiary, plant nurseries, tourism
- Direct measurable cost exceeding $160 million per year to the National Economy
- Full impact estimated to exceed $500 million per year in WA

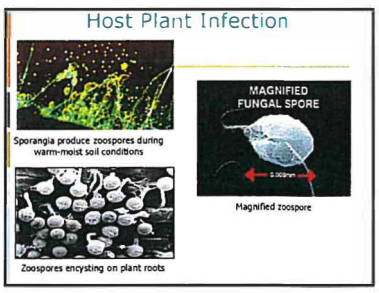


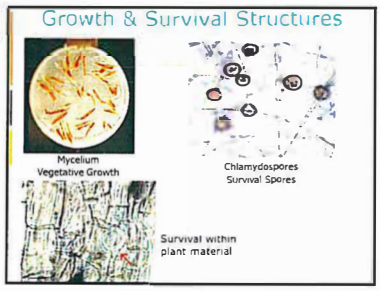

Threats to south-west rare flora
Consequences of construction Developments, railroad works, recreation
Invasive weeds
Grazing by feral/ introduced animals
Salinity, water table change
Small declining populations Demographic/ genetic effects
Mining activities
Drought/climate change
Land clearing
Phytophthora Dieback

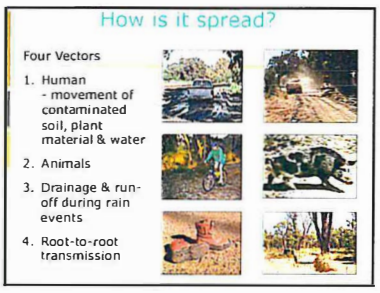

South West Distribution
Google

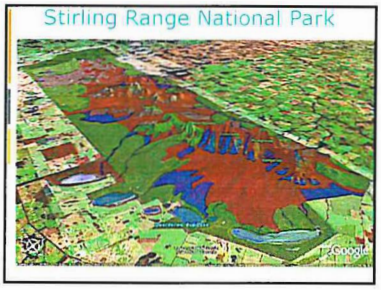

Phytophthora Dieback
Phytophthora Dieback


Perth Metropolitan
Google

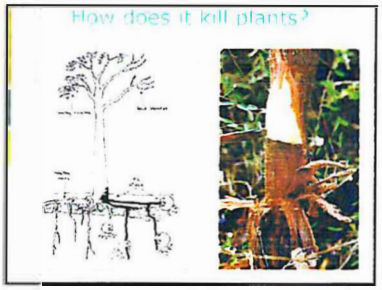

Host Plant Infection
Sporangia produce zoospores during warm-moist soil conditions
Zoospores encysting on plant roots
MAGNIFIED FUNGAL SPORE
Magnified zoospore

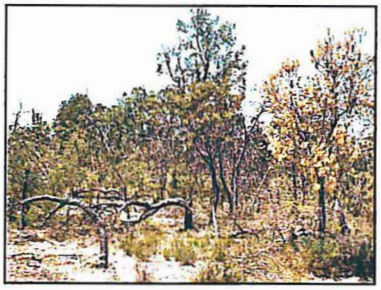


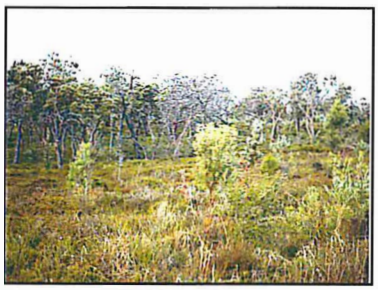


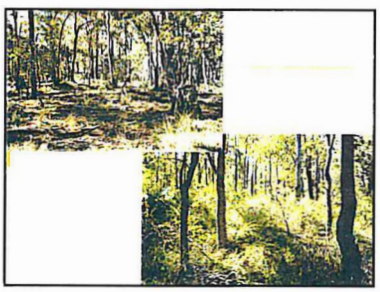


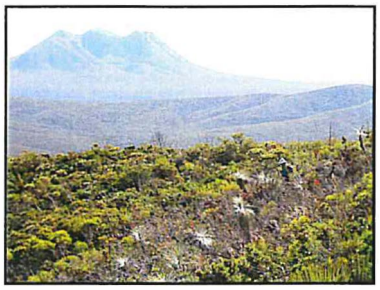
1980's - phytophthora started being looked at already gone.
15% phosphite
10 sp. critically endangered.



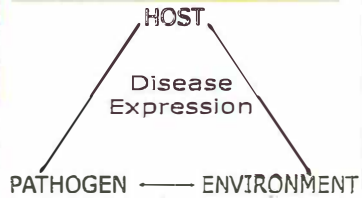








The Disease Triangle



Environmental Factors

Rainfall

Under 400 mm	Limited or no occurence
400 - 600 mm	Restricted to drainage, water gaining sites or water courses
Over 600 mm	Widespread distribution across the landscape

Soil

Soil temperature: 12 – 35 °C, 25 °C optimum

Physical, chemical & biological properties

Site Factors

Geology, shallow soils & impeded drainage

Topography: ridge, slope & valley floor

Catchment hydrological characteristics

Climate & local weather patterns

Host Factors

Susceptible | Highly Susceptible

Jarrah forest (Nth of Preston River) — 33%

Banksia woodland (Swan Coastal Plain) — 44%

Stirling Range N.P. — 36%

Priority & Declared Rare flora — 49%

Legislation & Regulation

WA Government Legislation

Wildlife Conservation Act, 1950

Conservation and Land Management Act, 1984

- Declaration and classification of Land (Disease Risk Areas – DRA)

Conservation and Land Management Regulations 2002

Forest Management Regulations 2002

- Application of conditions to enter DRA

Environmental Protection Act 1986

- Applies regarding the general provisions for causing 'pollution' or 'environmental harm'

Commonwealth Legislation

Environment Protection & Biodiversity Conservation Act, 1999

International Agreements

IUCN International Convention on Biological Diversity, 1992

Disease Risk Areas

CALM Act 1984 - Disease Risk Areas (DRA)

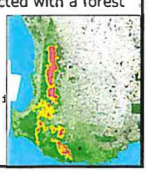
Any area of public land where the Executive Director considers that the earth, soil or trees ***may be***, or ***may become*** infected with a forest disease"

Require a written authority to take a potential carrier into a DRA

Must carry your written authority

Require that specific conditions be applied e.g. dry soil conditions

Penalties up to $2,000



Phytophthora Dieback Management

Policies & Procedures

DEC Policy Statement No. 3

DEC Best Practice Guidelines

DEC Management Procedures

Other Management Tools

National Parks & Nature Reserves plans

Forest Management Plan

Natural Resource Management Strategies

Threatened flora & Threatened Ecological Community Recovery Plans

Threat Abatement Plan

Commonwealth Government's "Disease in natural ecosystems caused by *Phytophthora cinnamomi*"

Managing Phytophthora Dieback

Management Aims

1. Prevent introduction in priority protection areas
2. Eradicate or contain spot infestations
3. Minimise spread within sites
4. Reduce impact in priority plant species & communities

Strategies developed for specific areas or operations

- Human associated spread
- Animal vectoring
- Water associated spread
- Root-to-root transmission

DEC Planning Tools

Phytophthora Dieback Planning Tools

Phytophthora cinnamomi occurrence map
Phytophthora cinnamomi management plans
Hygiene management plans: HMP
Environmental standards checklist

As a [illegible] for 'at risk' operations:
know the dieback status of the site
implement appropriate access & hygiene procedures
plan & schedule the operation to reduce risk factors

Dieback Mapping

Dieback Interpretation & Mapping

Interpreters observe & map:
- Symptomatic or dead indicator plants
- Community structure & biomass change
- Chronology of deaths; not just one event
- Multiple indicator species deaths
- Consider other plant health issues (pests, diseases, frost, fire, drought, herbicide)
- Link to vectors for introduction & spread

Interpretation results confirmed by soil/tissue sampling

Maps for specific operations include buffers to account for cryptic expression

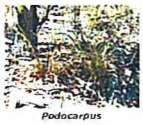
Disease expression can vary from subtle to highly destructive

Indicator Species


Banksia

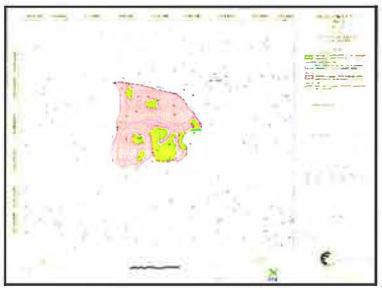

Zamia palm

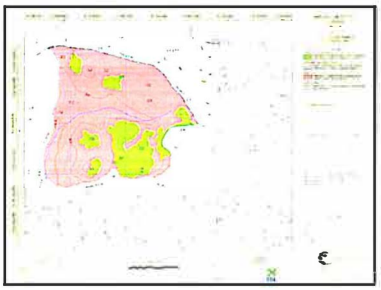

Grass trees

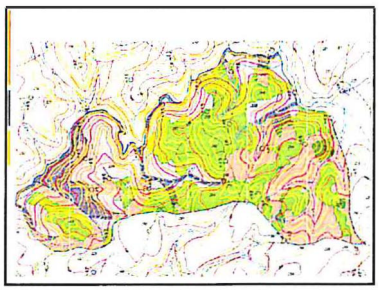

Podocarpus

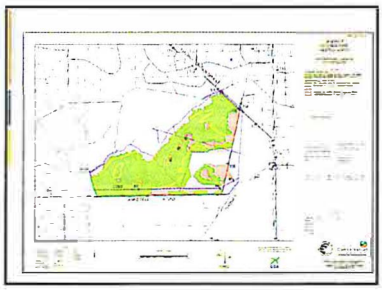

Persoonia

When to sample?









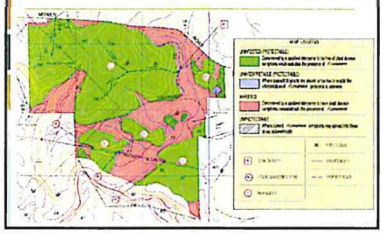
Hygiene Management Plans

Clean on entry for [illegible]
Clean on exit for **Dieback infested**
Mixed categories: Split Phase Operation
Apply minimum hygiene for sites with an unknown disease staus or uninterpretable area

Hygiene Management Plans (HMP)
Plans 'at risk' activitiesfor operations
Identifies:
- access routes & closures to protectable areas
- clean on entry points
- clean down points
- no soil movement areas
- drainage controls
- signage required

Management Maps

Management Maps



Management Tactics

Phytophthora Dieback Management

Risk Assessment

- Risk reduction planning
- Quantitative risk assessment
- Decision trees & management frameworks
- Schedule timing & weather conditions for high risk activites

Prevention & Containment

- Detection & mapping
- Manage & upgrade access
- Split phase operations
- Implement hygiene plans & procedures
- Install operational signage
- Use dieback-free materials
- Green bridges
- Engage with other stakeholders

different m'mnt zones saves money & cleaning down.

Management Tactics

Phytophthora Dieback Management

Eradication

- Sterilise basic raw materials e.g.
- Eradicate new spot infestations in high priority areas

Impact Reduction

Strategic management of the biodiversity values under threat from *Phytophthora cinnamomi*:

- Threatened plant species, communities & high conservation value areas
- Targeted Phosphite (fungicide) treatment
- *Ex situ* & *in situ* conservation practices including seed collection & translocation of endangered plant populations
- Restoration

Assess & Reduce the Risk

Assess the Risks of the Operation

- Plan activities around catchment & hydrological features
- Manage any altered drainage
- Position roads or tracks low in the landscape profile
- Schedule high risk activities for dry soil conditions
- Quarantine sensitive areas following large rainfall events or flooding
- Use dieback free materials in protectable areas including imported soil, gravel or plant stock
- Stockpile top soil on site
- Schedule time & resources for undertaking hygiene procedures during the operation
- Ensure staff & contractor awareness or provide training
- Monitor compliance

Access Control

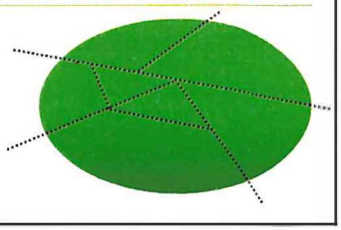
Control & Restrict Access

Access Control

Remove Access

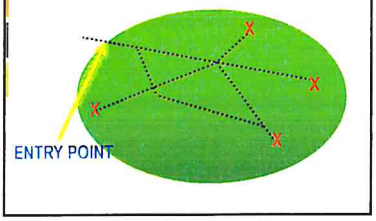
Access Control

Reduce or Eliminate High Risk Access



Access Control

Reduce or Eliminate High Risk Access



Access Control

Manage Operational Access

Access Control

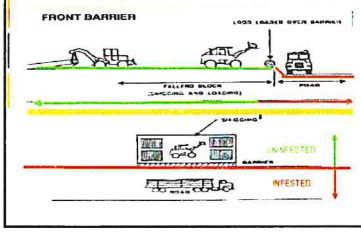
Managed Entry Points

- Gates
- Inspection areas
- Clean on Entry points
- Turn around points
- Clean down points & hygiene infrastructure
- Operational signage
- Recording & monitoring

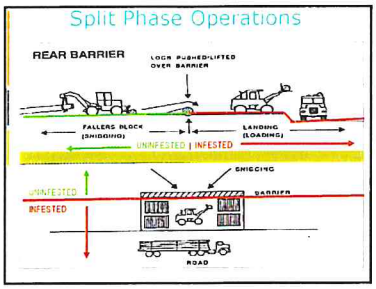
Access Control

Split Phase Operations

Work with barriers on boundaries



Split Phase Operations



Split Phase Operations

Work with barriers on boundaries

Hygiene Procedures

Clean on entry

Inspect & clean vehicles, machinery, equipment & footwear

No clods of soil or plant material

No slurry of soil, plant tissue & water

Contain wash down effluent

Some dust & grime adhering to the sides of the vehicles need not be removed!

Vehicle Cleaning

How clean does it need to be?

DEC Checklist for vehicle and machinery inspection

Remove soil from tyres, mud flaps, guards, spare wheel & undercarriage

Provide & maintain adequate wash down facilities

Record & monitor wash down usage

Where no washdown exists or is faulty use brushes & brooms to clean the vehicle

Report immediately any faults or hazards

Clean Down Points

Vehicles & machines can enter uninfested areas without spreading Phytophthora Dieback

Ensure:

- Separate the vehicle or machine from the effluent
- Manage or contain drainage from wash down facility
- Correctly dispose of any soil or organic material collected during cleaning
- Record & monitor vehicle & machinery washdown

Clean Down Points

Cleaning Options

- Wash down: high pressure water system, fire unit or pressurized wash down spray unit
- Compressed air
- Vacuuming
- Physical removal with brush, scaper & dustpan

Establishing a wash down area

Selection location
Control effluent, slash and drainage
Appropriately dispose of waste & contaminants resulting from cleaning
Keep records
Ensure hygiene equipment & facilities are maintained

Clean Down Points

Safety First

Machinery or Equipment	Safety procedures for inspecting and cleaning
Light Vehicle	Park vehicle in safe and authorised area, ensure vehicle has hand brake engaged and vehicle turned off, follow JSA, check vehicle for contamination, clean down if necessary, complete inspection checklist.
Truck	As above
Covers and Guards	Check all covers and guards by lifting or removing as per the manufacturer's instructions. Clean off all plant, animal and soil from covers and guards and also the areas they are protecting, replace covers and guards as per the manufacturer's instructions.
Buckets or blades	As per JSA ensure machines are parked in appropriate area with all implements secured, check buckets and blades for contamination, clean down if necessary using pressurized washdown spray unit, complete inspection checklist

Clean Down Points

Dispose of Waste Appropriately

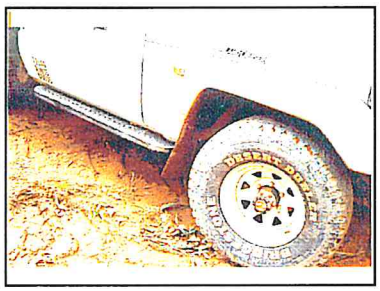
Bag all organic & plant material

Destroy collected material on site or send to contained refuse site

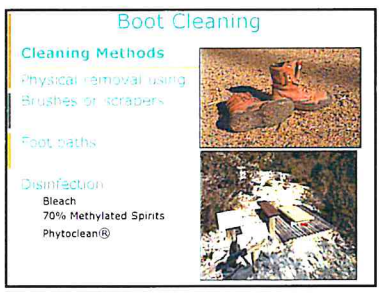
Contain effluent & run-off from wash down area

Wash down pad or ramps are cleaning

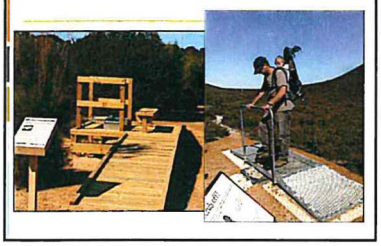
Clean Down Points




Don't carry Dieback


Boot Cleaning
Cleaning Methods
Physical removal using Brushes or scrapers
Foot baths
Disinfection
Bleach
70% Methylated Spirits
Phytoclean®

Boot Cleaning



Assessment & Hygiene Practical

Further Information

Department of Environment & Conservation

Dieback Working Group

Dieback Web Portal

Project Dieback

Centre for Phytophthora Science & Management @ Murdoch University

Atlas.