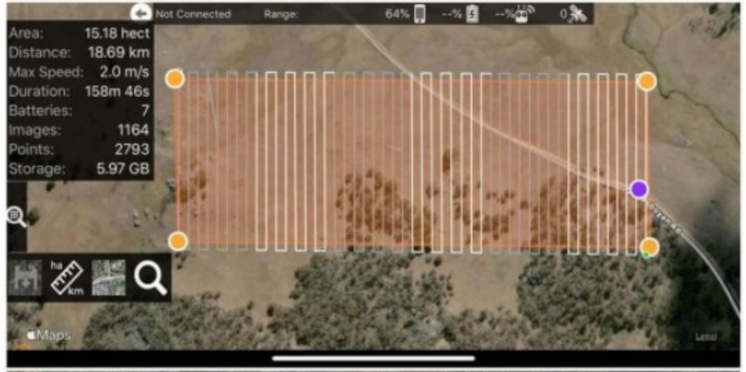
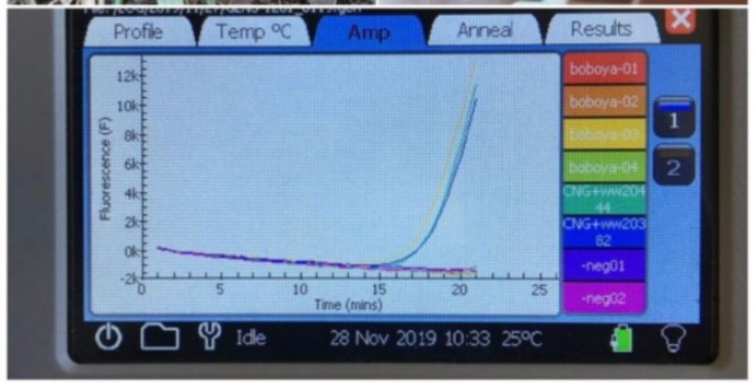
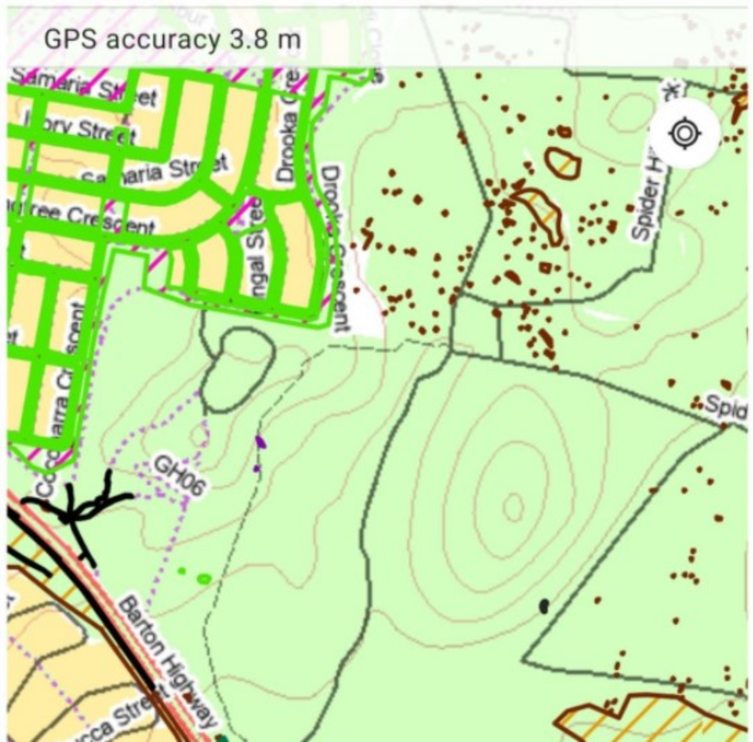
Invasive Plants Plan 2020-25 | ACT Parks







Scope of this plan

This operations plan is for invasive plant management on ACT public land. It contains measures to prevent and manage biological invasions (ie. environmental biosecurity).

Goals of the plan: mitigate the impact from invasive plants on biodiversity and socio-economic activity, and restore areas impacted by invasive plants. Objectives to attain these goals:

Threat abatement (efficiency & effectiveness indicators):

- Reduce new incursions (eradication & extirpation)

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Threat abatement (efficiency & effectiveness indicators):

- Reduce new incursions (eradication & extirpation).
- Reduce the spread of invasive plants (containment).
- Reduce the density of invasive plants below the critical threshold level (asset protection).

These objectives aim to stop a trend towards degradation.

Restoration (outcomes - condition of values indicators):

- Passive restoration of natural state ecosystems (1)
- Active restoration of disturbed state ecosystems (2,3)
- Rehabilitation of highly modified state ecosystems (4)

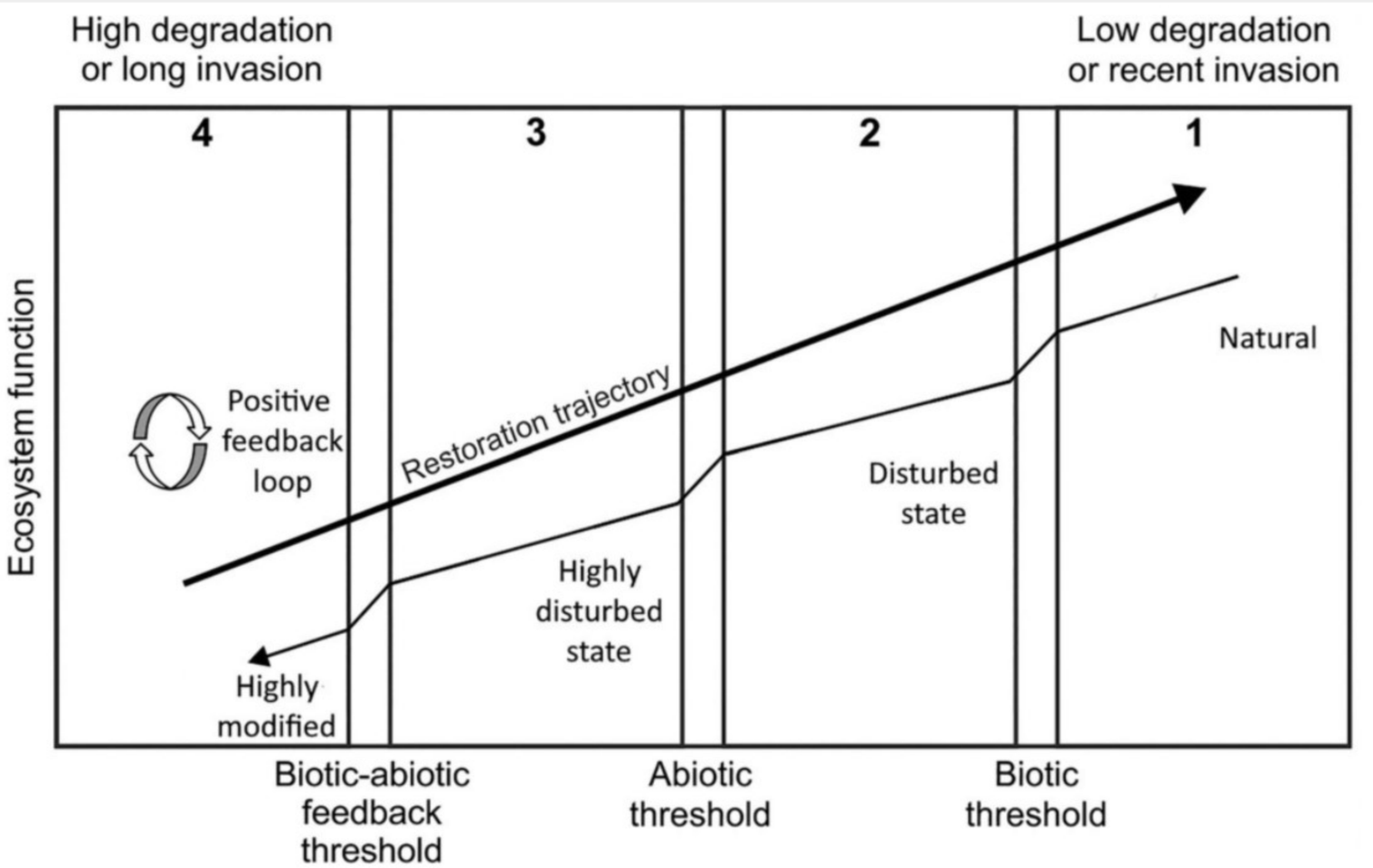
These objectives move ecosystems up the restoration trajectory.

[Return to Impacts] [Return to Adaptive management] [Return to Control methods & restoration principles] [Return to Measuring success] [Return to Prevention pays big dividends] [Return to Table of Contents]

Terminology - weeds or invasive plants?

The IUCN defines an invasive alien taxon as: *An alien taxon whose introduction and/or spread threatens biological diversity.* This requirement that invasive species must be harmful is common in policy usage (Convention on Biological Diversity).

The scientific definition of invasive plants focuses on the invasion process:
Invasive plants are naturalised plants that produce reproductive off-spring, often in very large numbers, at considerable distances from parent plants, and thus have the potential to spread over a considerable area. Richardson et al (2000)



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Invasive plants invade natural, seminatural, human-modified and alien plant dominated vegetation. Those that invade natural vegetation are a threat to biodiversity.

Most invasive plants are *environmental weeds*. The highest impact invasive plants are *transformers*, ie. those that can change ecosystems and cause regime shift. Transformers are the highest priority for control.

[Return to Weed risk assessment] [Return to Table of Contents]

Land management responsibility

The Environment, Planning and Sustainable Development Directorate (EPSDD) manages 73% of the ACT, through its operations branches: the Parks & Conservation Service (PCS) and the Resilient Landscapes Branch.

City Services which is part of ACT Transport Canberra and City Services directly manages 2% of the ACT and another 9% indirectly, in the urban residential & commercial areas.

ACT Parks (PCS, Resilient Landscapes Branch & City Services) staff work together on invasive plant control and restoration projects, often assisted by volunteers (Catchment Groups, Parkcare, Landcare, Friends of Grasslands, National Parks Association, Canberra Bushwalkers).

Naturalised, invasive & other alien plant related definitions

Terminology	Definition
Alien plants	Plant taxa in a given area whose presence there is due to intentional or accidental introduction as a result of human activity (synonyms: exotic plants, non-native plants, non-indigenous plants).
Casual alien plants	Alien plants that may flourish and even reproduce occasionally in an area, but which do not form self-replacing populations, and which rely on repeated introductions for their persistence (includes taxa labelled as 'waifs', 'transients', 'occasional escapes' and 'persisting after cultivation').
Naturalised plants	Alien plants that reproduce consistently and sustain populations over many life cycles without direct intervention by humans (or in spite of human intervention); they often recruit offspring freely, usually close to adult plants, and do not necessarily invade natural, seminatural or human-made ecosystems.
Invasive plants	Naturalised plants that produce reproductive offspring, often in very large numbers, at considerable distances from parent plants[1], and thus have the potential to spread over a considerable area.
Weeds	Plants (not necessarily alien) that grow in sites where they are not wanted and which usually have detectable economic or environmental effects (synonyms: plant pests, pest plants, harmful species, problem plants).
Environmental weeds	Alien plant taxa that invade natural vegetation, usually adversely affecting native biodiversity and/or ecosystem functioning.
Transformers	A subset of invasive plants which change the character, condition, form or nature of ecosystems over a substantial area relative to the extent of that ecosystem.

Richardson, D.M., Pyšek, P., Rejmánek, M., Barbour, .M.G., Panetta, F.D. and West, C.J. (2000) Naturalization and invasion of alien plants: concepts and definitions. Diversity and Distributions, 6: 93-107. doi:10.1046/j.1472-4642.2000.00083.x

[1] Reproductive offspring found >100m from the parent plant: "(approximate scales: >100m; <50 years for taxa spreading by seed and other propagules; >6m/3 years for taxa spreading by roots, rhizomes, stolons or creeping stems)." Finding a few seedlings >100m from their parent plant does not mean an invasion has started. They must be reproductive offspring.
Note: The IUCN definition for an invasive species includes impact. *Invasive alien taxon: An alien taxon whose introduction and/or spread threatens biological diversity*. Taxon refers to species and lower taxonomic levels and those not yet formally described. IUCN (2020) IUCN EICAT Categories and Criteria. The Environmental Impact Classification for Alien Taxa First edition. Gland, Switzerland and Cambridge, UK: IUCN. https://doi.org/10.2305/IUCN.CH.2020.05.en

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Other public land managers in the ACT include: National Capital Authority, Department of Defence, Suburban Land Agency, ICON Water, National Arboretum, Stromlo Forest Park, TransGrid, and Canberra Airport

All land managers are required to manage legislated pest plants.

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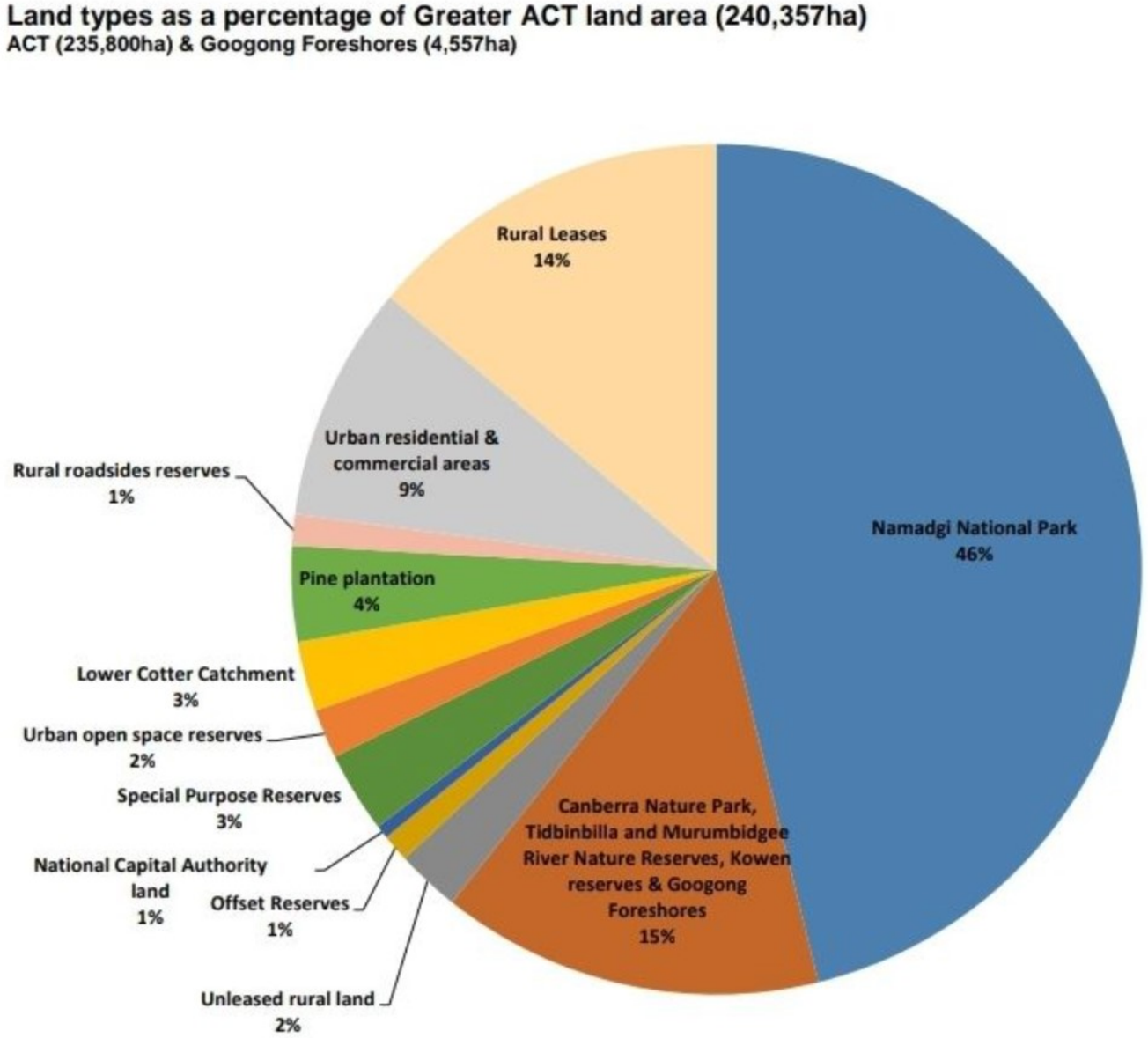
Protecting biodiversity

The ACT has a diverse range of native vegetation - from Jounama Snow Gum Woodland at 1855m elevation, to lowland grassy woodland remnant vegetation at an elevation of 590m. Invasive plants degrade many of these native plant communities which impacts on the habitat of our unique wildlife.

Opposite clockwise from top left	Main invasive plant threats
Alpine Ash tall forest in Namadgi National Park	blackberry, pine wildings
Jounama Snow Gum woodland at Mount	blackberry, pine wildings, sweet vernal



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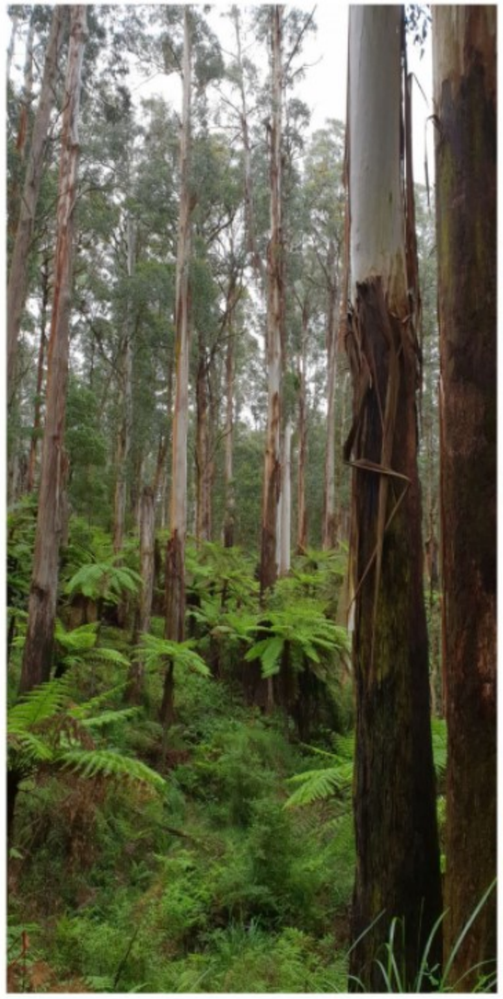
Opposite clockwise from top left	Main invasive plant threats
Alpine Ash tall forest in Namadgi National Park	blackberry, pine wildings
Jounama Snow Gum woodland at Mount Gingera	blackberry, pine wildings, sweet vernal grass, cherry plum
Broad-toothed Rat - found in sub-alpine bogs and surrounding heath	blackberry, African lovegrass, English broom
Glycine Pea found in lowland grasslands and woodlands	serrated tussock, African lovegrass, Chilean needle grass, St John's wort, woody weeds
Grassland Earless Dragon found at Jerrabomberra Grasslands Nature Reserve	serrated tussock, African lovegrass, woody weeds

[Return to Table of Contents]



Introduction-naturalisation-invasion

Fortunately, not every plant introduced to a new country or region establishes in the wild. And only a subset of those that do, spread to new locations. Impacts of those that become invasive also vary greatly. Understanding why some alien plants establish, naturalise and become invasive helps with risk assessment and targeted management.

Environmental filtering determines if an alien plant species can naturalise in its new region or country. If it has traits that are well matched to the new environment, and it is able to reproduce and disperse, then it is likely to naturalise.

Novel traits determine if the naturalised plant becomes invasive. A novel trait is one that the resident native plants do not have. If this trait gives a competitive advantage then the

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Factors that contribute to invasive plant spread

- Propagule pressure e.g. masses of wind-borne seed
- Resource availability e.g post-fire
- Disturbance
- Facilitation eg. mutualists such as mycorrhizal fungi
- Competitive ability e.g. fast growing
- Enemy release e.g. freed from co-evolved pathogens
- Novel weapons e.g. allelopathic chemical release

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Impacts

The Convention on Biological Diversity lists the spread of invasive species as a driver of biodiversity loss. A global meta-analysis of 1,041 field studies found that the abundance and diversity of resident native plants declined with invasive plant spread. This impact on biodiversity has been well documented in NSW.

The IUCN has adopted the Environmental Impact Classification of Alien Taxa (EICAT) (opposite) as a standard for measuring environmental impacts from invasive species. Each category has a detailed description. Species are classified on the basis of their most severe documented impacts across introduced regions. This highlights species with high potential impacts. For example, Weeds of National Significance (WoNS) and

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Invasive species also have socio-economic impacts. The Socio-economic Impact Classification of Alien Taxa (SEICAT) can be used to categorise such impacts.

EICAT and SEICAT are not a substitute for risk assessment. These methodologies highlight species that need to be risk assessed. Weed risk assessment is used to guide on-ground management in a region. It includes invasiveness, impacts and potential distribution. The Invasive Species Compendium, Global Invasive Species Database, NSW WeedWise , Environmental Weeds of Australia and the Victorian Advisory List of Environmental Weeds are a good starting point for gathering this information.

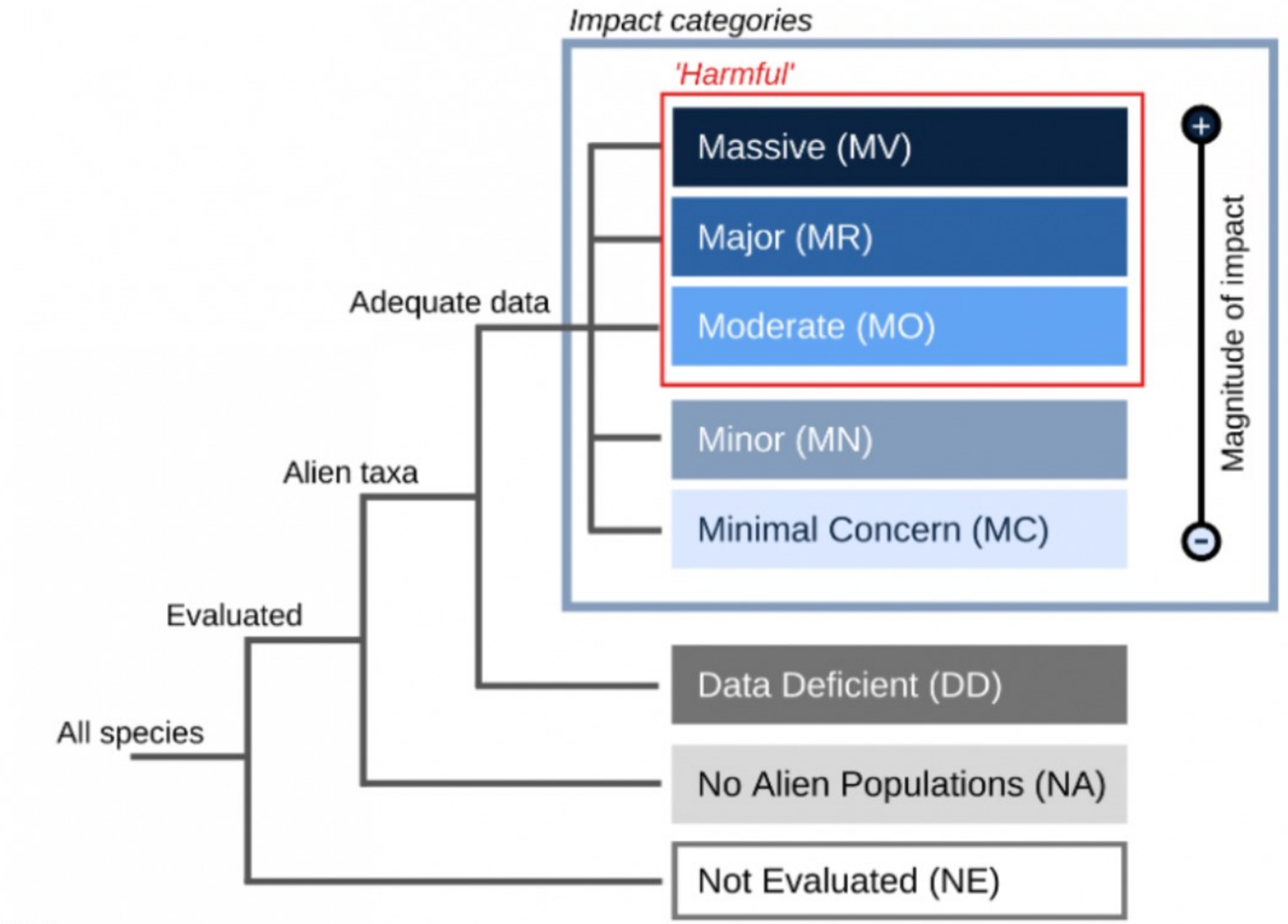
[Return to Terminology - weeds or invasive plants?] [Return Weed Risk Assessment] [Return to Protecting biodiversity] [Return to Table of Contents]

The invasion curve

The invasion curve lists landscape scale management objectives, which change as the area invaded increases.

Examples for two high risk invasive plants:

a) Sale of Mexican feather grass was prohibited before it could spread. Eradication is feasible because it is a weed at the early stages of invasion. The early invader manual is



IUCN
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Examples for two high risk invasive plants:

a) Sale of Mexican feather grass was prohibited before it could spread. Eradication is feasible because it is a weed at the early stages of invasion. The early invader manual is used to guide eradication projects.

b) African lovegrass is widespread due to inaction in the early stages of invasion. The landscape management objective is asset protection. Threat reduction involves control of African lovegrass around the perimeter of conservation reserves. Impact amelioration involves reducing the density of African lovegrass within the reserves (see multifaceted management).

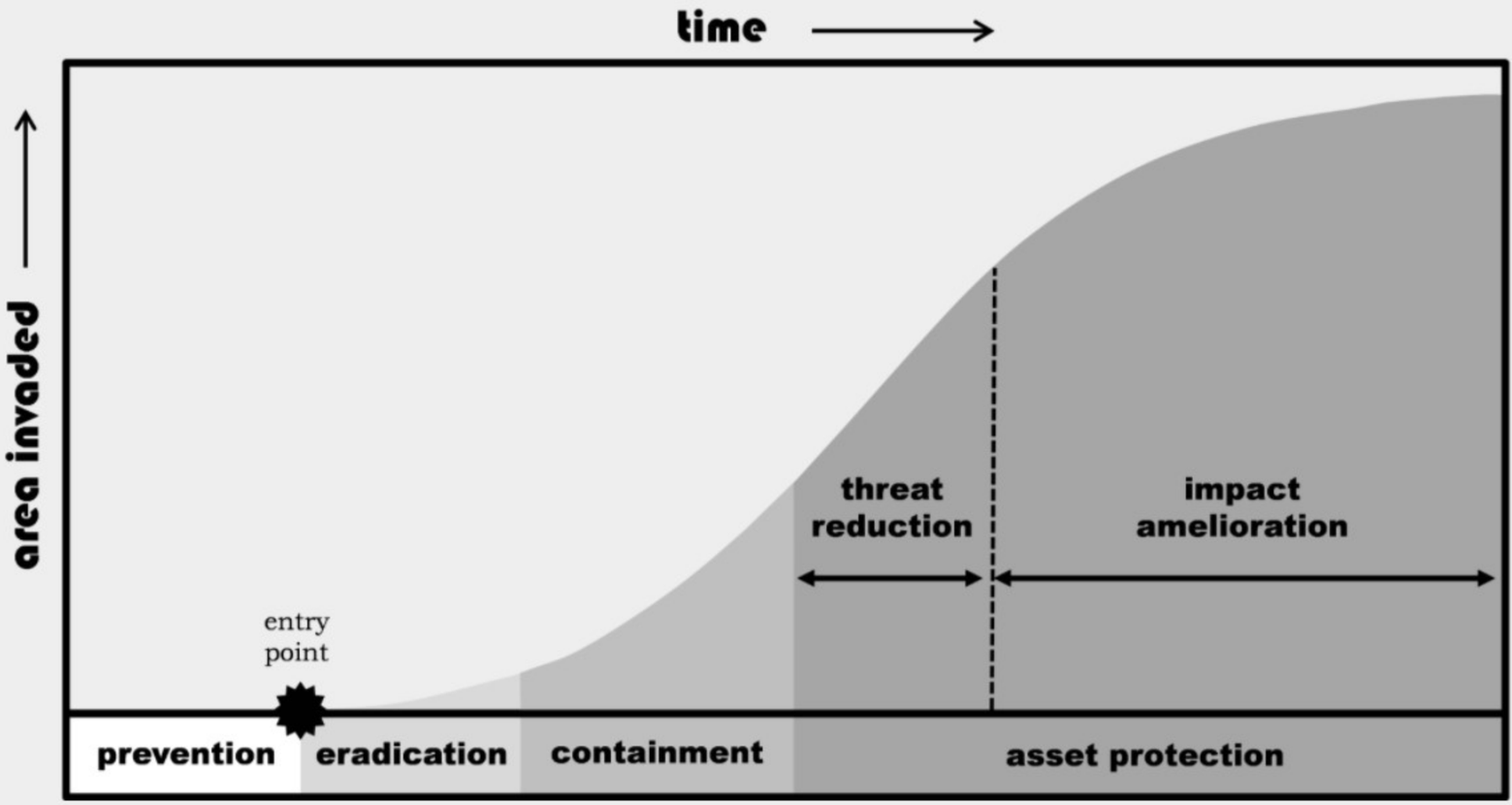
[Return to Scope of this plan] [Return to Prevention pays big dividends] [Return to Multifaceted management] [Return to Weed risk assessment] [Return to Measuring success] [Return to If you don't map it - you can't manage it] [Return to Table of Contents]

Weed risk assessment

Weed risk assessment looks at invasiveness, impacts, and potential distribution. A review is underway using NSW Department of Primary Industry Weed Risk Management System to allocate risk ratings to the main species managed.

In the interim, lookup the species in the ACT preliminary advisory list of invasive plants. Use the Environmental Weeds of Australia database, NSW WeedWise and the Victorian Advisory List of Environmental Weeds for additional information about invasiveness, impacts and risk.

Species that are invasive in natural ecosystems and have significant impacts are in the high (and vey high) risk category of the flowchart opposite. Select a management objective from the invasion curve and multifaceted management.



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Those species that are weak invaders of natural habitats and/or rarely have significant impacts are a low or medium risk. If inspection shows that a threat has emerged then multifacetated management can be undertaken.

[Return to Table of Contents] [Return to Terminology - weeds or invasive plants?] [Return to Impacts] [Return to Integrated prioritisation] [Return to Resilience to drought, fire and climate change]

Prevention pays big dividends

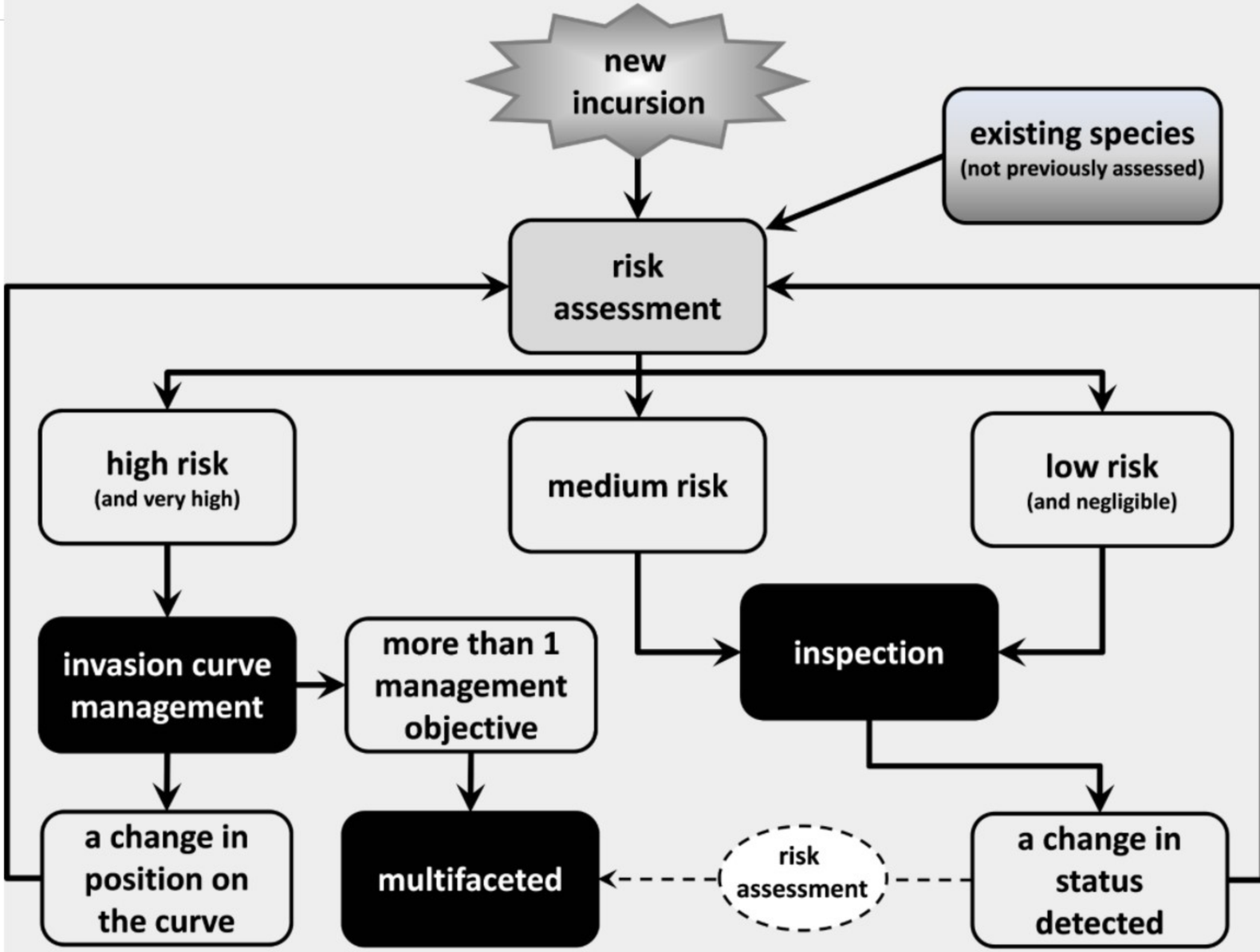
There is a large cost savings in preventing invasive plants from establishing. Cleaning boots, vehicles and other equipment before travelling through national parks and nature reserves reduces the spread of invasive plant seed.

Prevention includes reducing the chance of a new incursion into the ACT, and it is also part of multifaceted management of established invasive plants.

The Arrive Clean - Leave Clean guidelines explain how to prevent the spread of invasive plant diseases and weeds that threaten local ecosystems and species.

Prevention is one of the main objectives of this program. Examples of prevention measures:

- Bushwalking boot hygiene stations



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- Citizen Science web sites like Canberra Nature Map 'Nasty Weeds' reporting that send auto-alerts of new incursions
- The Weed Swap - Early Invader BioBlitz

[Return to Measuring success] [Return to Table of Contents]

Multifaceted management

Some invasive plants need to be managed in more than one way in different locations, and this requires multifaceted management.

Multifaceted management mainly applies to high risk invasive plants that have become widespread. In multifaceted management, eradication is replaced with extirpation (local eradication for a catchment, district or protected area) because eradication from the ACT is not feasible.

An example of how this applies to blackberry control in Northern Namadgi National Park:

- Prevention measures include avoiding physical disturbance to vegetation cover
- Extirpation of outlier infestations in remote catchments
- Containment of spread of infestations in the neighbouring Lower Cotter and Tidbinbilla
- Threat reduction by targeting infestations likely to spread into large bird-orchid habitat

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- Threat reduction by targeting infestations likely to spread into large bird-orchid habitat
- Impact amelioration by controlling infestations in tree fern gullies

[Return to Scope of this plan] [Return to Weed risk assessment] [Return to Measuring success] [Return to Table of Contents]

Integrated prioritisation

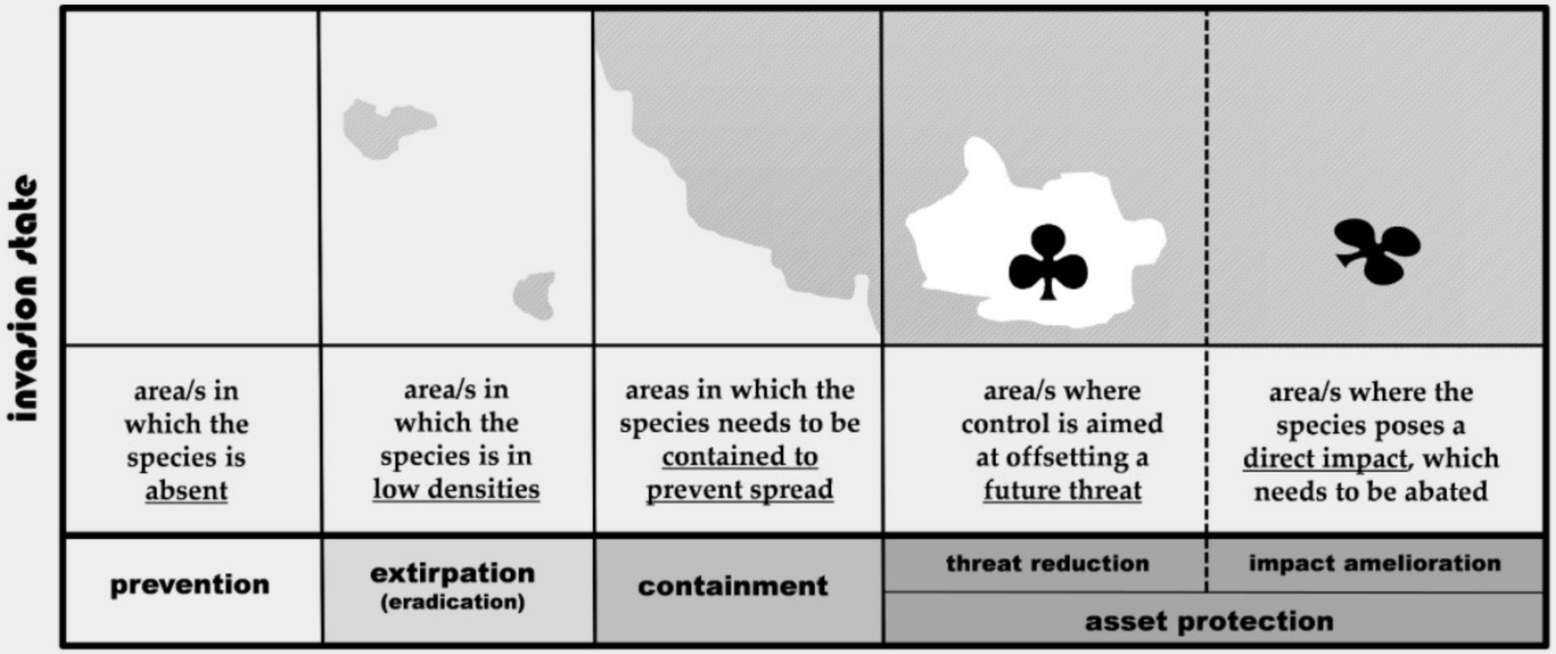
Due to the large number of invasive plants in the landscape, there needs to be a methodology that ensures the highest priority control projects are resourced first.

Integrated prioritisation is used to allocate budgets to threat abatement projects:

- Identify alien plant **species** most likely to be invasive and with the greatest impact: Weed risk assessment
- Identify high risk pathways for invasive plant spread, eg. roadsides, disturbed areas
- Identify **sites** at most risk from invasive plant spread (invasion pressure). Biodiversity triage focuses attention on the greatest immediate threats that can be abated.

Integrated prioritisation addresses the Invasion Syndrome.

The Operations Dashboards are used to guide integrated prioritisation.



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Managing for biodiversity rather than an umbrella species is more likely to create resilient ecosystems.

[Return to Terminology - weeds or invasive plants?] [Return to Table of Contents] [Return to If you don't map it - you can't manage it] [Return to Planned budgets and projects]

Control methods and restoration principles

The NSW Weed Control Handbook encourages integrated control using a number of different methods: herbicide application (eg. spot spraying, cut-stump, basal bark, boom spraying, aerial spraying (drone, helicopter, fixed wing), stem-scrape, granular, splatter-gun, wick-wiper), biocontrol (ALA bio-control hub), manual removal, revegetation, flaming, grazing management, slashing, mulching and steaming. Additional restoration methods include: prescribed burning, soil carbon augmentation, and soil fertility management.

The Principles for Optimising Spontaneous Succession are:

- Act early in the invasion process before biotic and abiotic thresholds are crossed. Detection techniques such as drones, LAMP DNA and detection dogs greatly help in this regard.
- Follow-up control is essential to maintain the gains of initial management, both in areas under passive restoration and active restoration. This principle is well

Level of threat to biodiversity	Probability of protecting biodiversity at specific sites: High	Medium	Low
High	Invasive plant management is critical, immediate, targeted and long term.	Targeted management needs to occur promptly and long term.	Broad management
Medium	Targeted management action needs to occur promptly and long term.	General management to reduce the impact of invasive plant populations.	General low level management to reduce the threat.
Low	Actions to minimise the threat and prevent further elevation of the problem.	Low level of management only.	No immediate action. Management action required only after completion of higher priorities.

Downey, P., Williams, M., Whiffen, L., Auld, B., Hamilton, M., Burley, A., & Turner, P. (2010). Managing Alien Plants for Biodiversity Outcomes—the Need for Triage. Invasive Plant Science and Management, 3(1), 1-11. doi:10.1614/IPSM-09-042.1

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- Follow-up control is essential to maintain the gains of initial management, both in areas under passive restoration and active restoration. This principle is well documented for a long term restoration project at the Organ Pipes National Park.
- Selecting the appropriate initial control methods.
- Integrated control is a crucial element in long term management.
- In fire-adapted ecosystems prescribed fire and wildfire should be included in planning control work and other restoration.
- Recognise the need for flexibility and adaptive management.

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Adaptive management

Biological systems respond to management in many different ways. The adaptive management approach ensures treatments and responses are recorded (eg. mapping and photo points), so lessons can be learnt. Future management can then be adjusted to reflect outcomes and experiences. This leads to optimal management.

The passenger-driver decision tree shows how to apply adaptive management principles to restoration work. Changes to management are made based on the response to a restoration action.

Invasive plants are drivers of change to natural state ecosystems , and are often abundant in disturbed state and highly modified state ecosystems.

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Invasive plants are drivers of change to natural state ecosystems , and are often abundant in disturbed state and highly modified state ecosystems.

Alien plants that are naturalised but not invasive are often passengers of change. They are not the primary cause of the ecosystem degradation, but once established can make restoration difficult.

The decision tree guides the selection of the management objective: passive restoration (B), active restoration (C,D) or rehabilitation (E).

Highly disturbed and highly modified ecosystems are difficult to restore, even after implementing passive restoration. Biotic and abiotic thresholds have been breached. The reasons: viable native plant seed are no longer present in the soil (C), beneficial soil fungi that supported native vegetation are absent (D) and physical process have changed (E).

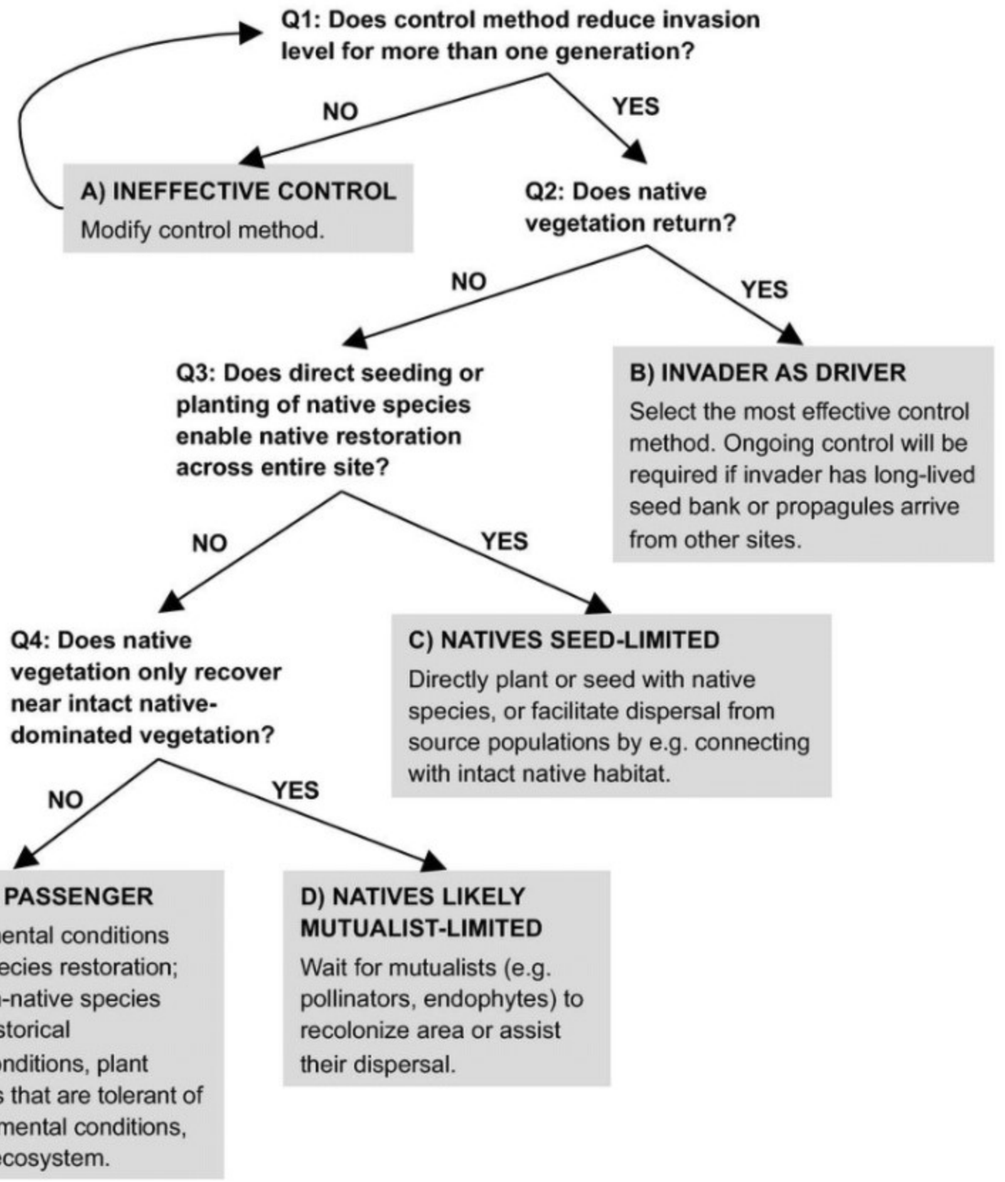
[Return to Resilience to drought, fire and climate change] [Return to Control methods & restoration principles] [Return to If you don't map it - you can't manage it] [Return to Table of Contents]

If you don't map it - you can't manage it

Why we map:

- Integrated prioritisation
  - measure spread and scale of infestations

Passenger Driver Decision Tree



Catford, J.A (2016) Using Management to Determine the Drivers of Alien Plant Invasion and Limits to Native Restoration, Applied Vegetation Science, Vol. 19. 2016, 5-6

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If you don't map it - you can't manage it

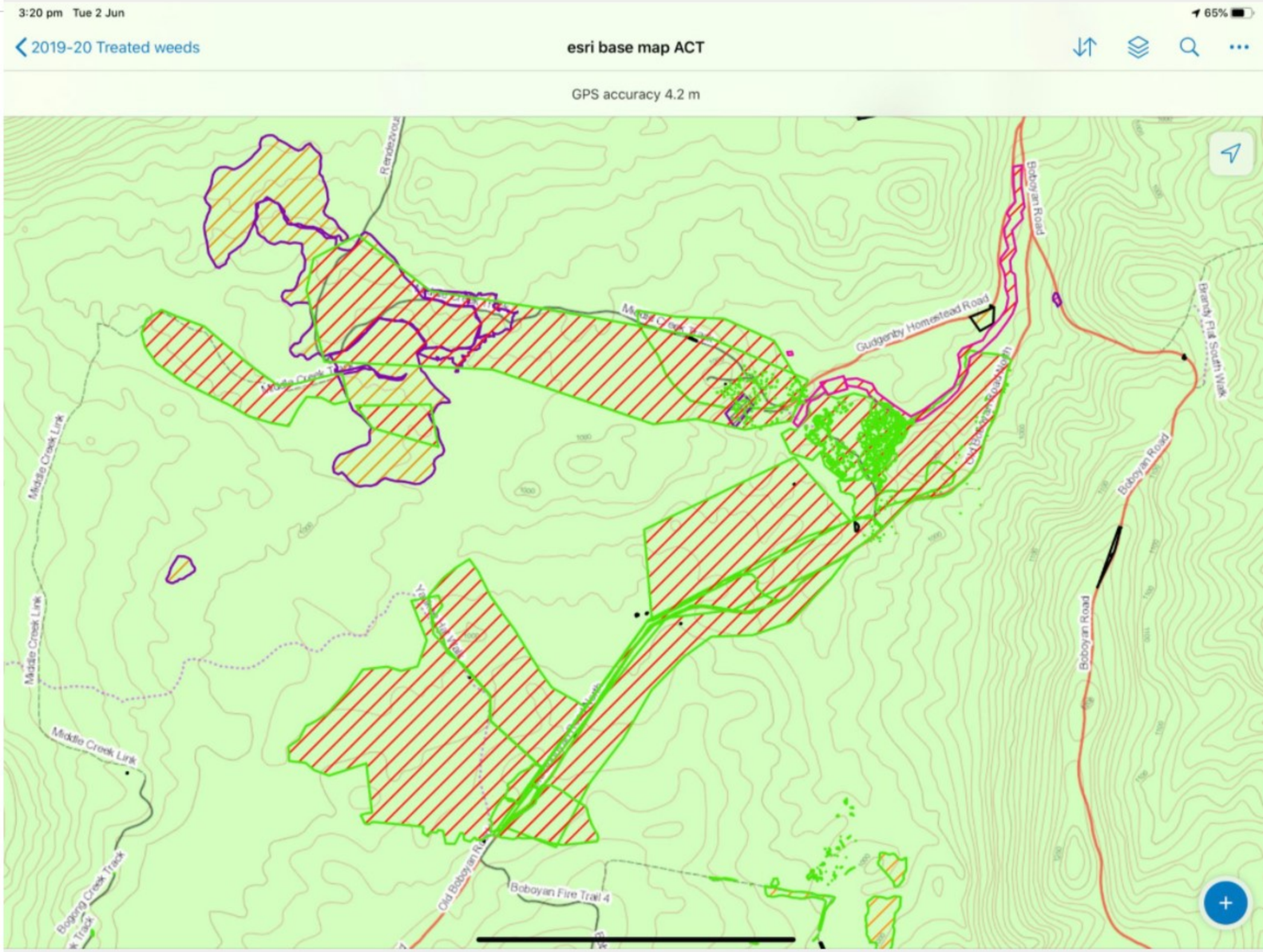
Why we map:

- Integrated prioritisation
  - measure spread and scale of infestations
  - detect proximity of infestations to assets
  - record pathways of spread
- Report and trace the spread of early invaders
- Ensure follow-up control is undertaken and inform adaptive management
- Assess progress meeting the management objectives
- Report to stakeholders - coordination and accountability

Invasive plant control on ACT public land is mapped on the ArcGIS Collector app and ArcGIS On-line.

- The current Operations Dashboard
- Previous operations dashboards:
  - 2019-20 Operations Dashboard
  - 2018-19 Operations Dashboard

[Return to Integrated prioritisation] [Return to Measuring success] [Return to Table of Contents]



Resilience to drought, fire and climate change

Climate change causes an increased frequency of droughts and wild fires (disturbances with an abiotic origin), which create opportunity niches for invasive plants. Invasive plant spread, itself, is also a disturbance (biotic in origin). It disrupts the local ecosystem and species. Invasive plants can be drivers of change (spread without an abiotic disturbance) and passengers of change (spread due to an abiotic disturbance), or a combination of both.

When invasive plant seedlings dominate post-disturbance, ecosystem resilience is lost. Ecosystem restorations costs escalate because active restoration is needed instead of less expensive passive restoration. Avoiding regime shift (ie. degradation of native plant communities) is a priority for protected area managers.

Fortunately there is evidence that resilience is greater if native plant community diversity is maintained, and this should help limit plant invasion, even under warming associated

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Resilience to drought, fire and climate change

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WeedFutures is used to see how climate change will affect the distribution of invasive plant species. The predicted changes can be compared with current distribution maps from the Atlas of Living Australia. This data informs weed risk assessment , which identifies invasive plants that are significant threats to native plant community diversity.

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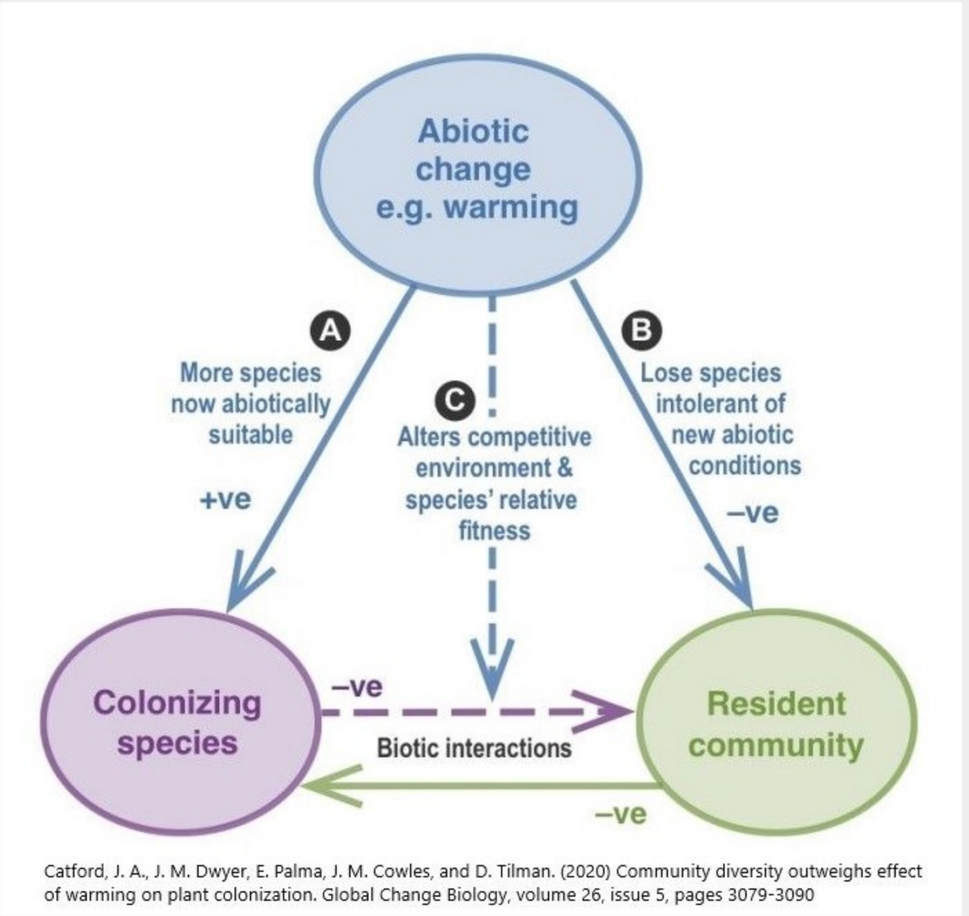

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Post-fire restoration

Extensive areas of Australia's forests burnt with high fire severity in late 2019 and early 2020. This included a fire that affected most of Namadgi National Park (46% of the ACT).

Resilient ecosystems are characterised by spontaneous succession. Fire adapted vegetation communities usually self-repair after disturbance from wildfire but this requires keeping invasive plants at low densities (reducing invasion pressure).

Post-fire spread of ox-eye daisy in northern Kosciuszko National Park demonstrates how

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Post-fire spread of ox-eye daisy in northern Koscisuzko National Park demonstrates how an invasive plant can disrupt native plant succession over a considerable area.

A post-fire decision key shows which species are the highest risk. The Post-fire Operations Dashboard shows the areas in Namadgi National Park under greatest invasion pressure. These areas are a priority for inspection and management.

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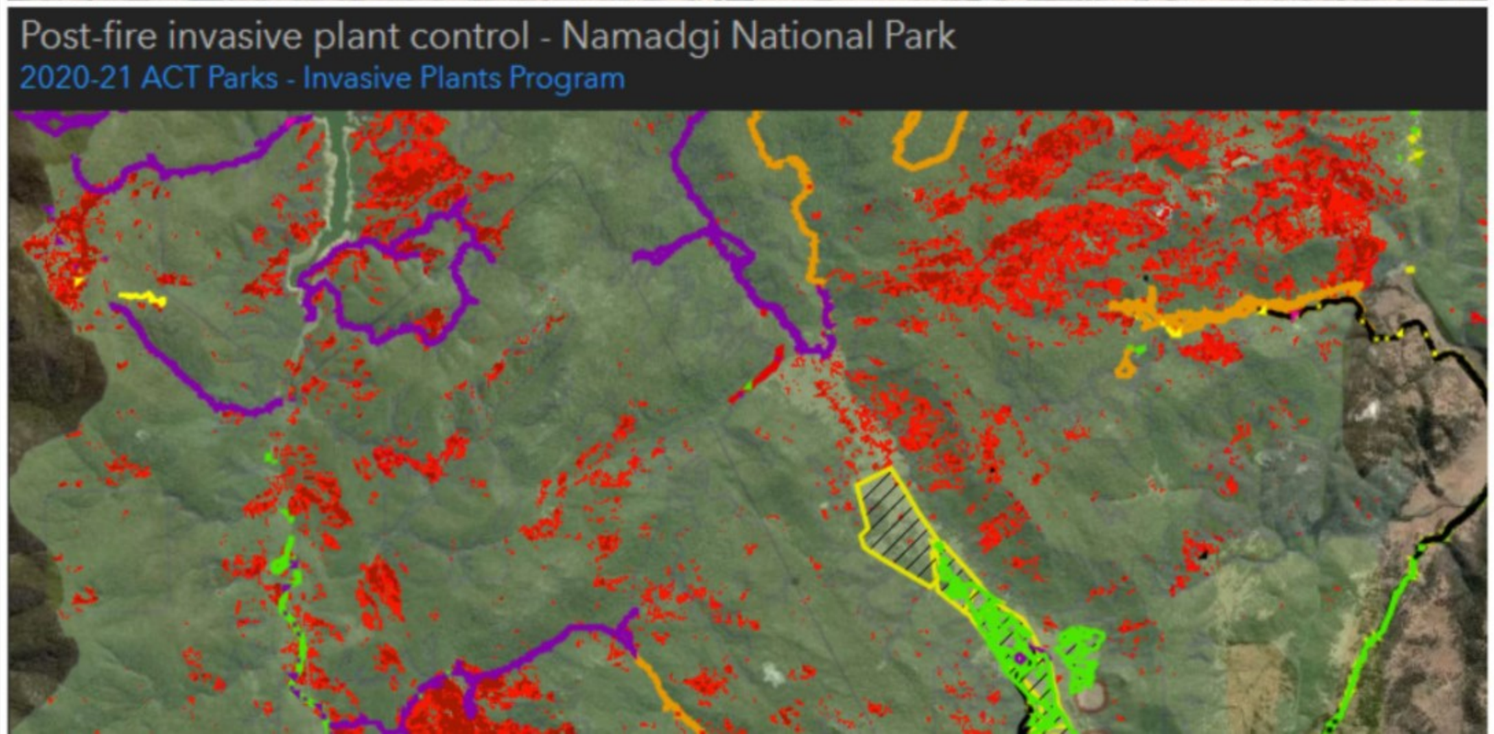
Measuring success

Adequate resourcing over the period of the plan (2020-25) will build on progress achieving the program objectives (threat abatement & restoration).

Threat abatement progress:

- Extirpation is possible for:
  - Mexican feather grass (ACT) Lowland Grassland CEMP, Operations Dashboard extirpation gauge
  - fireweed (Molonglo catchment) ArcGIS On-line data from 2015-20, Operations Dashboard extirpation gauge
  - ox-eye daisy, Shasta daisy, Spanish heath & Coolatai grass (ACT reserves) Operations Dashboard extirpation gauge
- Containment of English broom and blackberry spread in Namadgi National Park 2019-20 Operations Dashboard
- Asset protection
  - Reduced density of invasive grasses Offsets data
  - The operations dashboard critical threshold gauge shows where invasive plant density is being kept below the level that causes a decline in native plant species richness



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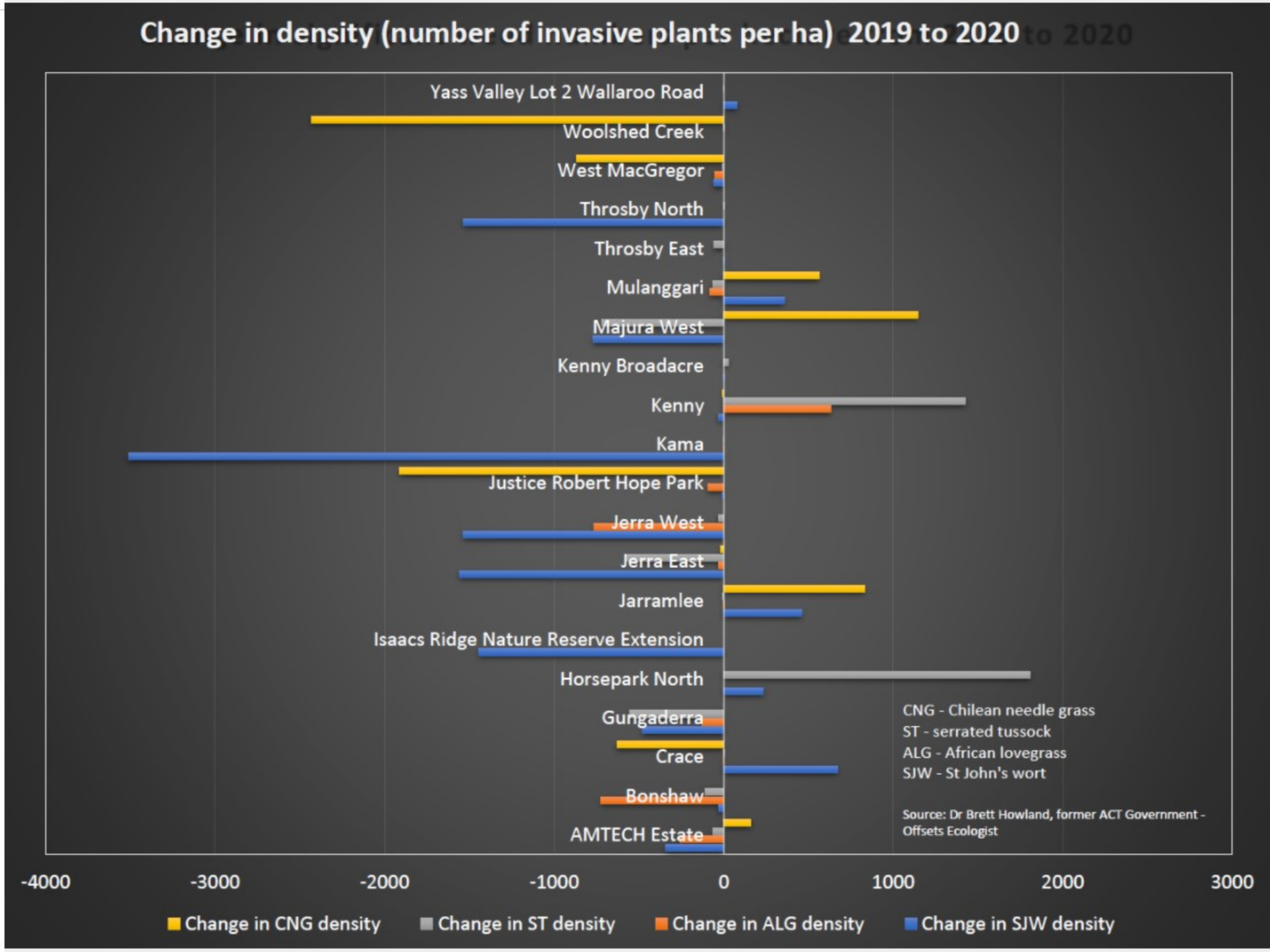
Restoration examples:

- Photo monitoring points show examples of successful:
  - passive restoration in montane forest
  - active restoration in lowland native grassland
  - post-fire novel active restoration in highland grassland
- Story Map about the active restoration of the Lower Cotter Catchment.

[Return to Planned budgets and projects] [Return to Table of Contents]



Planned budgets and projects

Integrated Prioritisation determines ACT Government budget allocation to invasive plant control and restoration projects. The project lists will change over the five year period when significant new threats arise, adaptive management reveals the need to change

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Integrated Prioritisation determines ACT Government budget allocation to invasive plant control and restoration projects. The project lists will change over the five year period when significant new threats arise, adaptive management reveals the need to change restoration methods, or resourcing changes.

2020-21 budgets (excl. GST):

$1.6m - Nature Reserves, National Parks & Catchments

- $0.286m - Namadgi National Park, Rural Roads
- $0.191m - Tidbinbilla NR, Gibraltar, Rural Roads | $0.041m - Birrigai
- $0.155m - Googong FS, Kowen, Molonglo Gorge | $0.08m - City Services protected areas
- $0.172m - Canberra Nature Park North | $0.168m - Canberra Nature Park South
- $0.281m - Murrumbidgee River Corridor, Northern Namadgi NP, rural roads
- $0.285m - Salaries, technical support, post-fire projects, training, & vehicle lease

$0.6m (excl. GST) **- Lower Cotter, Offsets, Molonglo River Reserve**

- $0.091m - Lower Cotter (TBC)
- $0.272m - Offsets (TBC) | $0.245m - Molonglo River Reserve

Anticipated annual budgets for 2021-25 (excl. GST):

- $1.4m to $1.6m - Nature Reserves, National Parks & Catchments
- $0.5 to $0.7m Lower Cotter, Offsets, Molonglo River Reserve

In 2020-21 the Federal Government is assisting the ACT by providing grants for post-fire wildlife and habitat recovery.

The control work can be viewed as it occurs on the Operations Dashboard.

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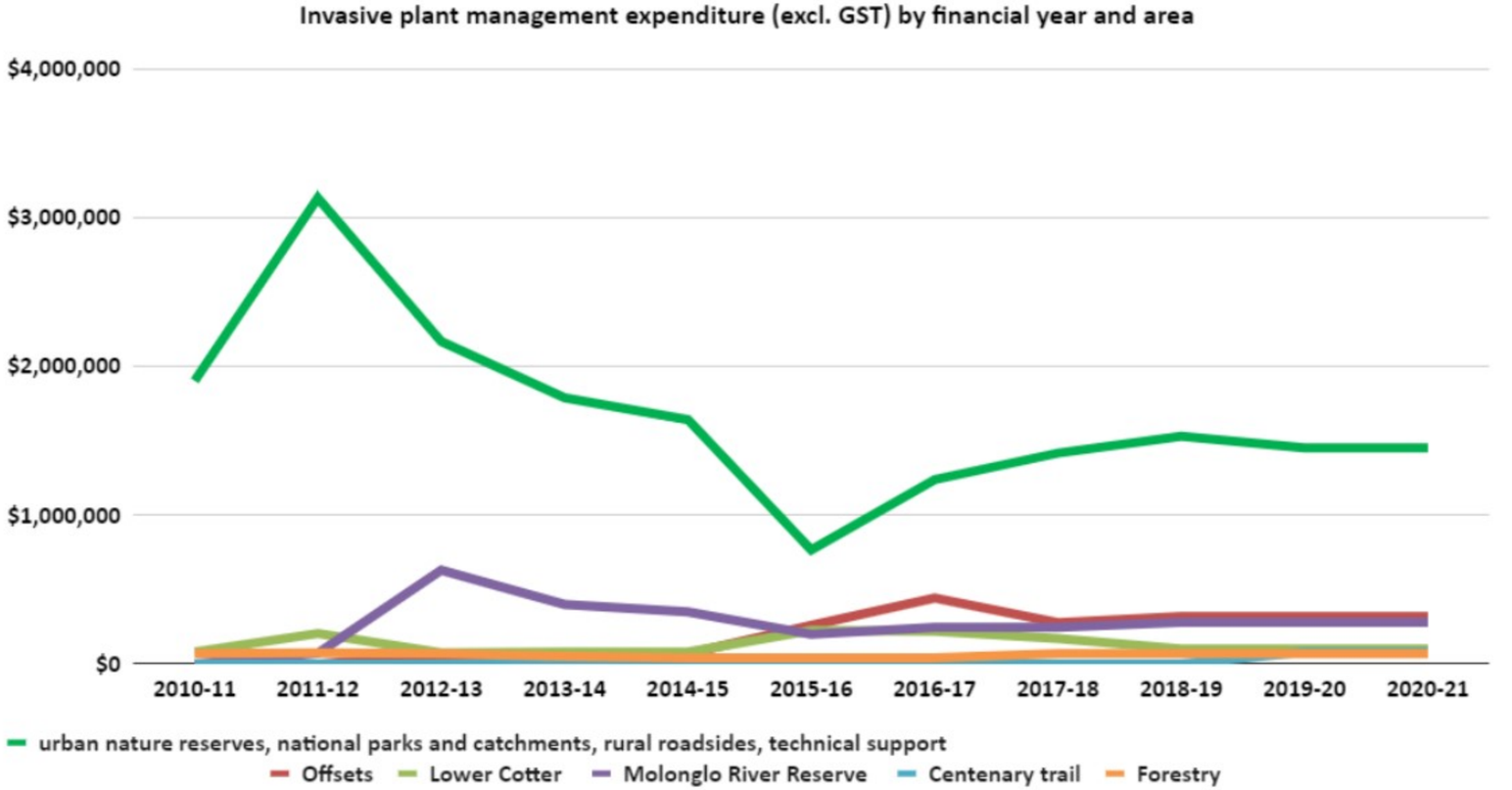

Glossary of terms (i)

Abiotic threshold - break point of altered physical process such as soil nutrients and water availability.

Active restoration - the management approach that requires further interventions aimed

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Glossary of terms (i)

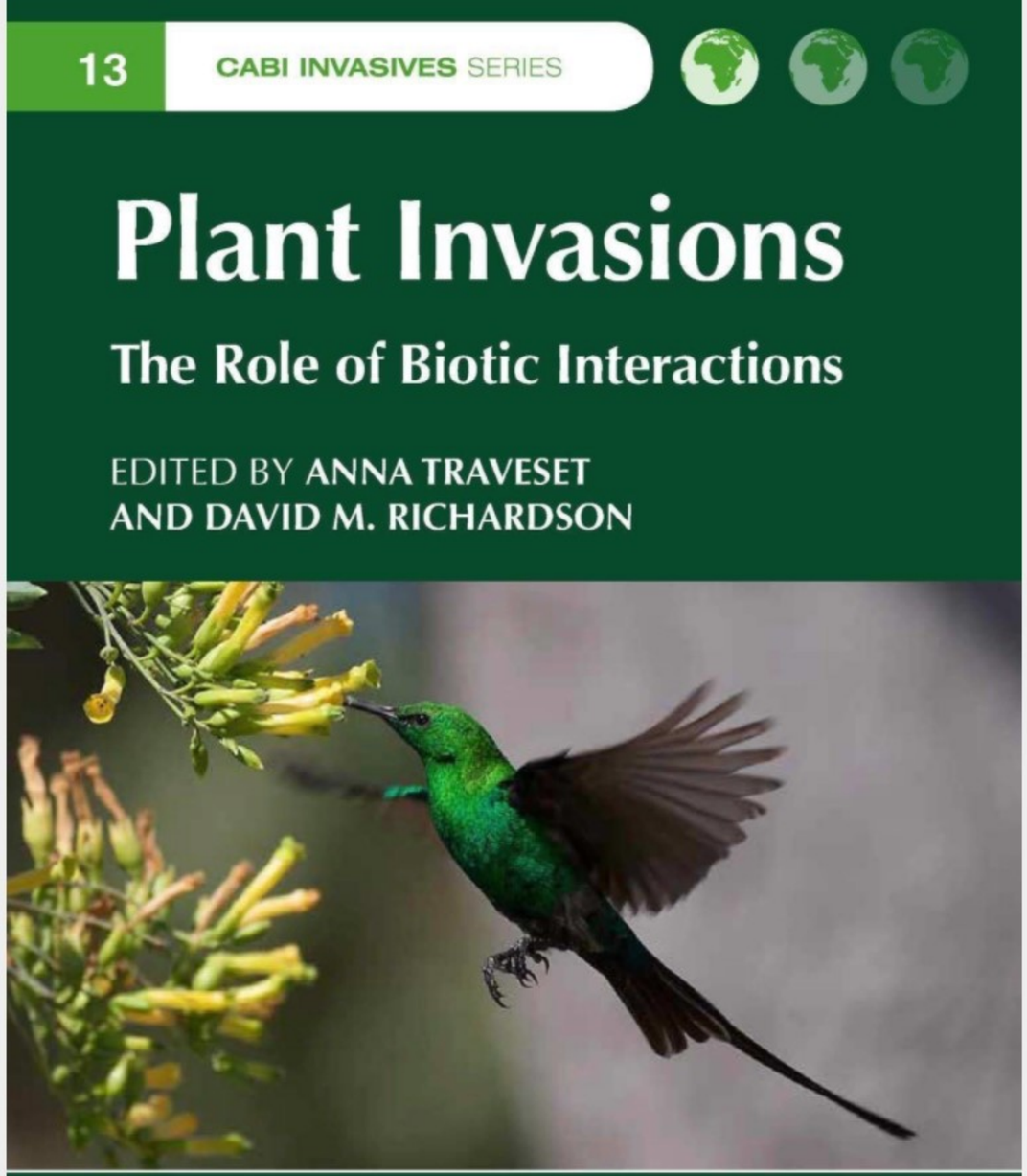
Abiotic threshold - **break point** of altered physical process such as soil nutrients and water availability.
Active restoration - the management approach that requires further interventions aimed at assisting the recovery of the degraded ecosystem after the degrading disturbance is removed or reduced.
Alien plants - Plants introduced with human help (intentionally or accidentally) to a new region or country where they were not naturally found.
Biotic threshold - **break point** of increased invader biomass and seed production resulting in a dominance of alien plant seedlings.
Biotic-abiotic feedback threshold - **break point** to a novel stable **ecosystem** state due to positive feedbacks that entrench alien plants. Positive feedbacks include: allelopathy, altered nutrient cycles and microbial systems.
Break point - Loss of **ecosystem** resilience, leading to a regime shift.
Disturbance - A physical force, agent or process, either abiotic (eg. wildfire, landslips, climate change) or biotic (eg. invasive species, pathogens), causing a perturbation (including stress) in an ecosystem. Disturbances can act quickly, be cyclic, or occur over a long period of time.

[Return to Table of contents] [Return to Scope of this plan] [Return to Introduction-naturalisation-invasion] [Return to Integrated prioritisation] [Return to Control methods and restoration principles] [Return to Adaptive management] [Return to Resilience to drought, fire and climate change] [Return to Measuring success] [Return to Glossary of terms (ii)]

Source: D.M. Richardson, et al (2000) , P.M. Holmes et al (2020), E.J Rykiel(1985)

Glossary of terms (ii)

Ecosystem - A biological community of interacting species and physical processes.
Ecosystem functioning - The cycle of nutrients, biomass and energy that safeguard the provision of multifaceted **ecosystem services** and the stability and persistence of embedded species assemblage.
Ecosystem services - The many and varied services that are gifted to humans by ecosystem functioning. Examples include: carbon sequestration, water quality enhancement, food and material production, bio-chemicals, tourism and recreation.
Environmental biosecurity - Measures to prevent and manage biological invasions.
Facilitation - A species interaction where one species benefits another.



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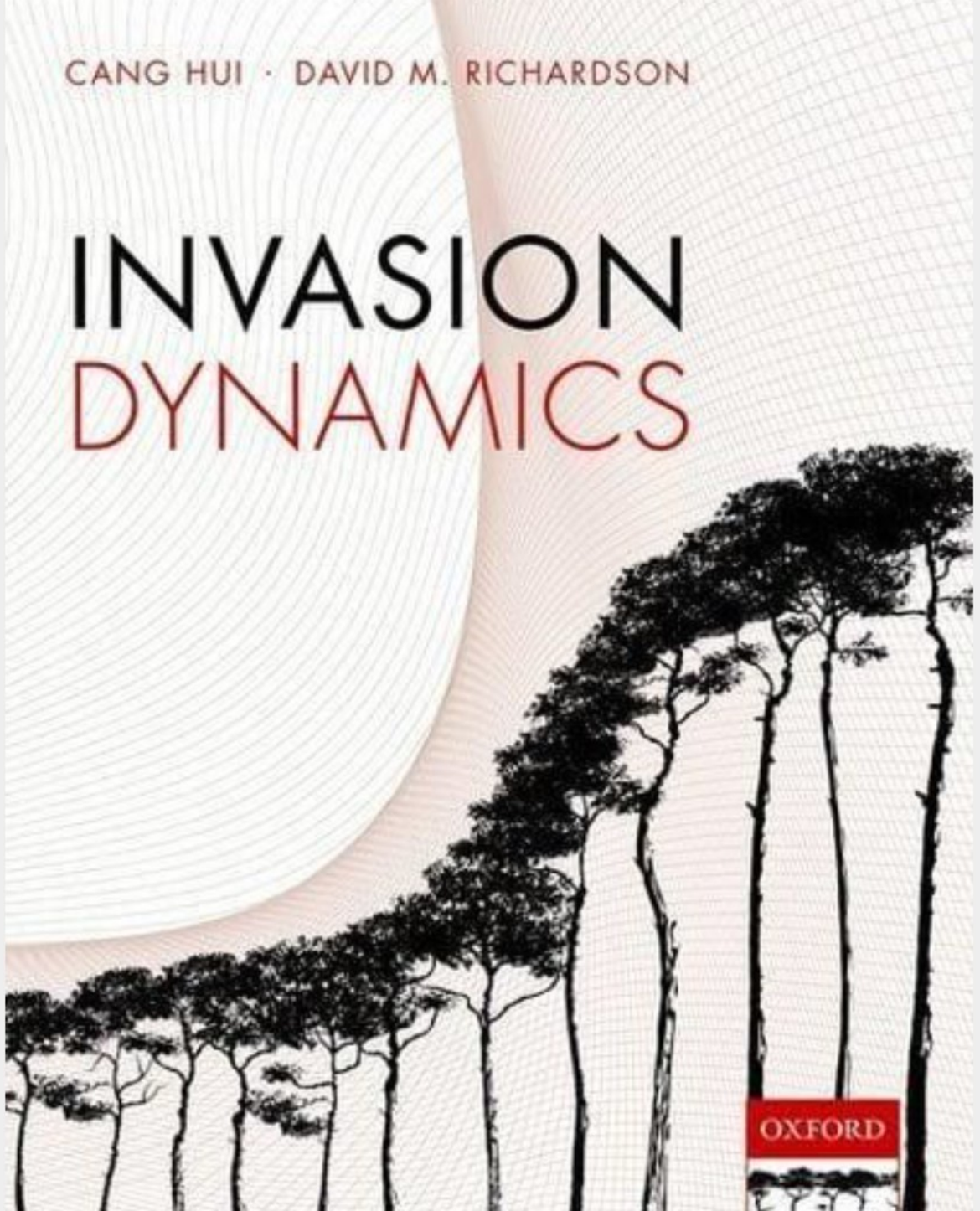
Facilitation - A species interaction where one species benefits another.
Invasibility - The properties of a community, habitat or ecosystem that determine its inherent vulnerability to invasion.
Invasion pressure - The probability that an environment will experience an invasion within a specified period. Determined by propagule pressure and **invasibility**.
Invasive plants - **Naturalised plants** that produce reproductive off-spring, often in very large numbers, at considerable distances from parent plants, and thus have the potential to spread over a considerable area.
Invasion syndrome - A combination of pathways, alien species traits, and characteristics of the recipient ecosystem which result in predictable dynamics and impacts.
Naturalised plants - Alien plants that do not need human help to reproduce and maintain themselves.

[Return to Table of contents] [Return to Scope of this plan] [Return to Introduction-naturalisation-invasion] [Return to Integrated prioritisation] [Return to Post-fire restoration]

Source: D.M. Richardson, et al (2000) , P.M. Holmes et al (2020) & D.M. Richardson (2011)

Glossary of terms (iii)

Old fields - Lands formerly managed for cultivation or grazing but later abandoned.
Passive restoration - the management approach that relies on **spontaneous succession** after the degrading disturbance is removed or reduced.
Pathways - the processes that result in the movement of alien species from one location to another.
Perturbation - deviations in the values describing the properties of an ecosystem relative to a specified reference condition. For example an alteration of the density of one or more members of a plant community. This can be an instantaneous or a sustained



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Propagule pressure - A concept that encompasses variation in the quantity, quality, composition and rate of supply of alien organisms resulting from transport conditions and pathways between source and recipient regions.
Regime shift - Large and persistent change in the structure and function of an ecosystem which shifts it to another state. For example: The shift from a natural state ecosystem to a disturbed state ecosystem because the biotic threshold break point has been crossed.
Rehabilitation - management actions that reinstate a level of ecosystem functioning on degraded sites, where the goal is provision of ecosystem services rather than the biodiversity and integrity of a native reference ecosystem.
Resilience - Ability of an ecosystem to recover spontaneously from a perturbation or disturbance.
Self-repair - See resilience.
Spontaneous succession - natural regenerative processes following a disturbance.
Stress - an effect on the physiology of an individual or on the function of an ecosystem.
Taxon - Taxon refers to a category in biological classification (taxonomy). The IUCN usage in the definition of invasive alien taxon refers to species and lower taxonomic levels (eg. subspecies, varieties, cultivars, or breeds) and those not yet formally described.
Weeds - Plants (not necessarily alien) that grow at sites where they are not wanted.

[Return to Table of contents] [Return to Scope of this plan] [Return to Terminology - weeds or invasive plants?] [Return to Integrated prioritisation] [Return to Control methods and restoration principles] [Return to Adaptive management] [Return to Resilience to drought, fire and climate change] [Return to Post-fire restoration] [Return to Measuring success] [Return to Glossary of terms (i)] [Return to Glossary of terms (ii)]

Source: D.M. Richardson, et al (2000) , P.M. Holmes et al (2020) , E.J Rykiel(1985) , D.M. Richardson (2011)

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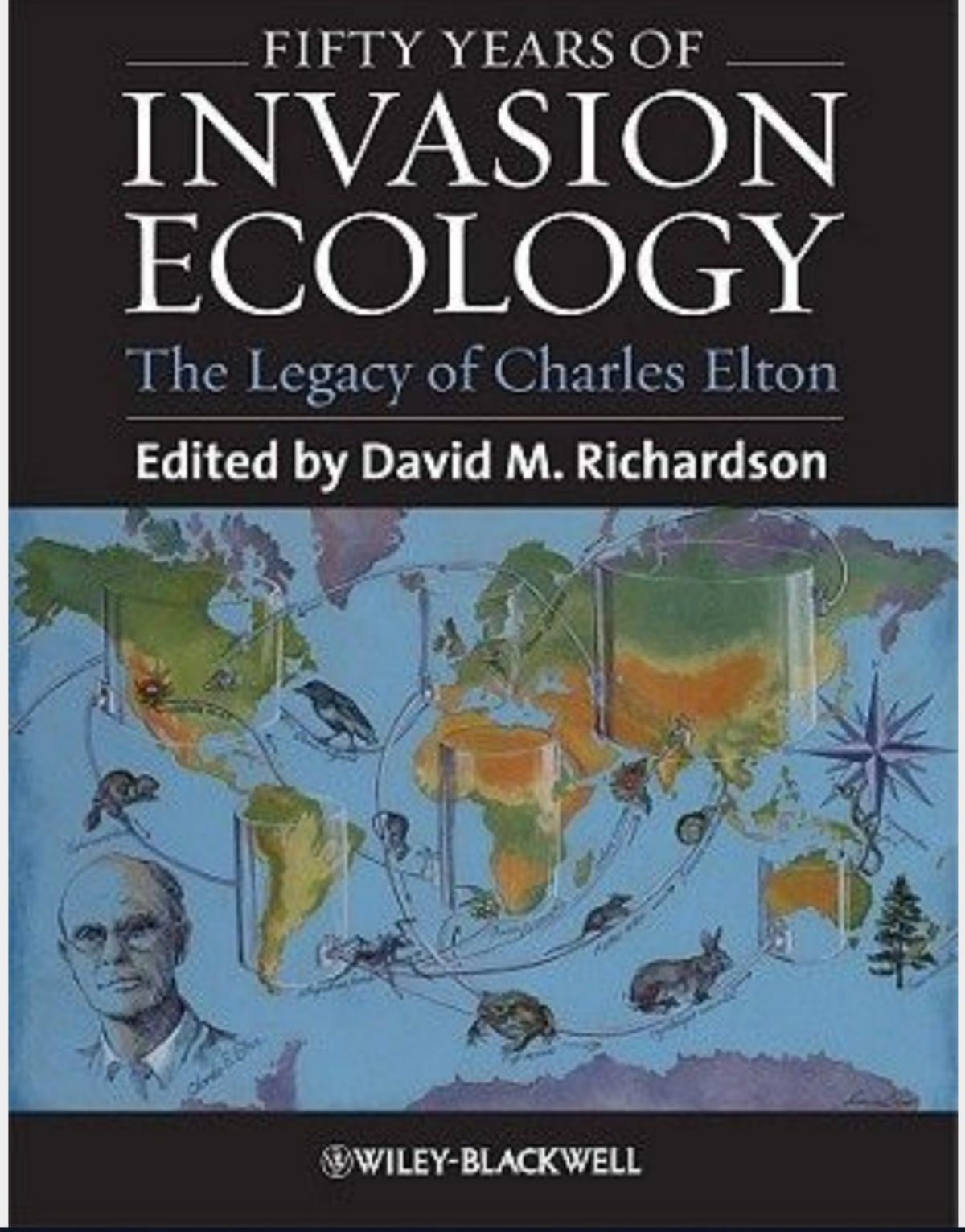

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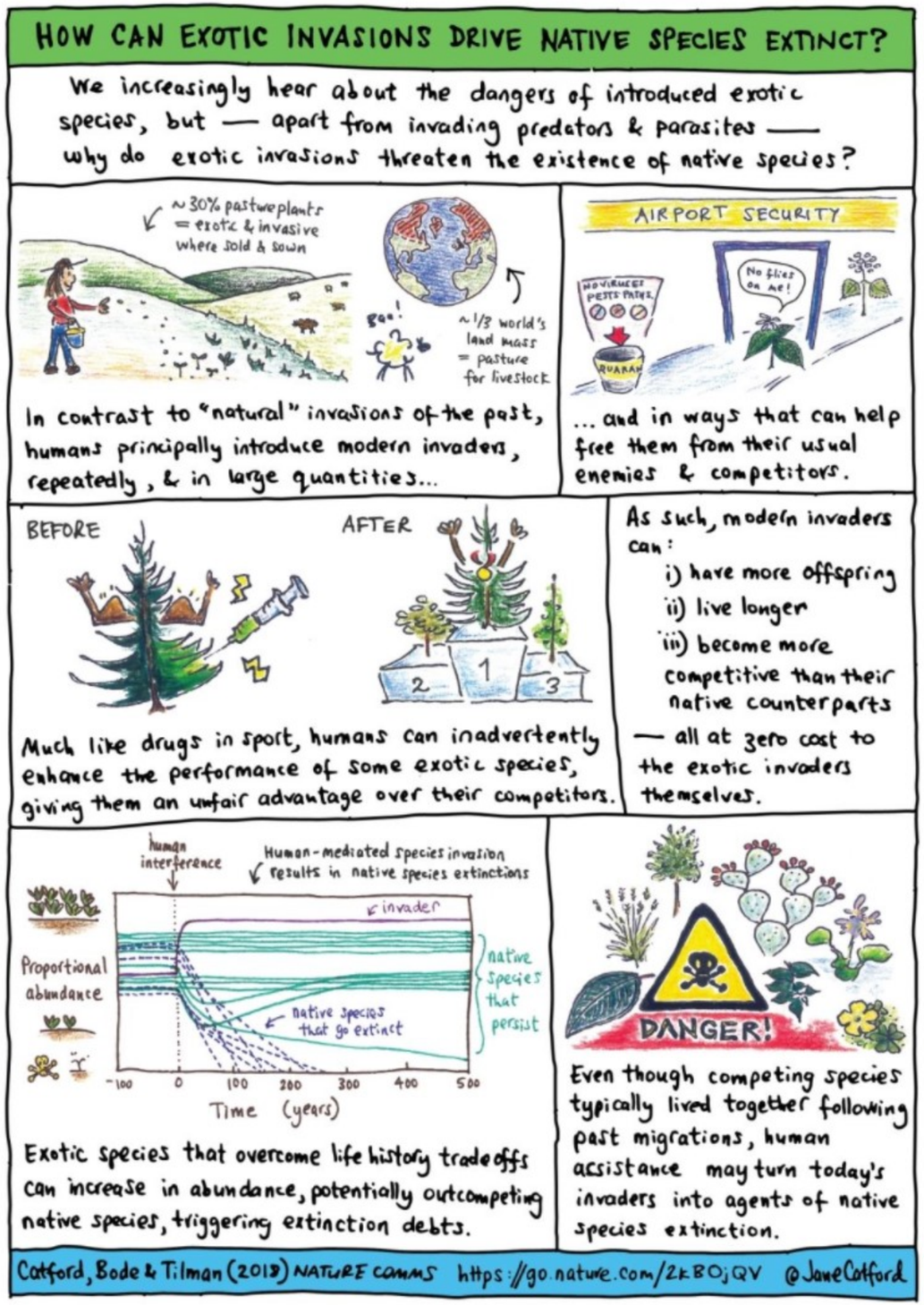

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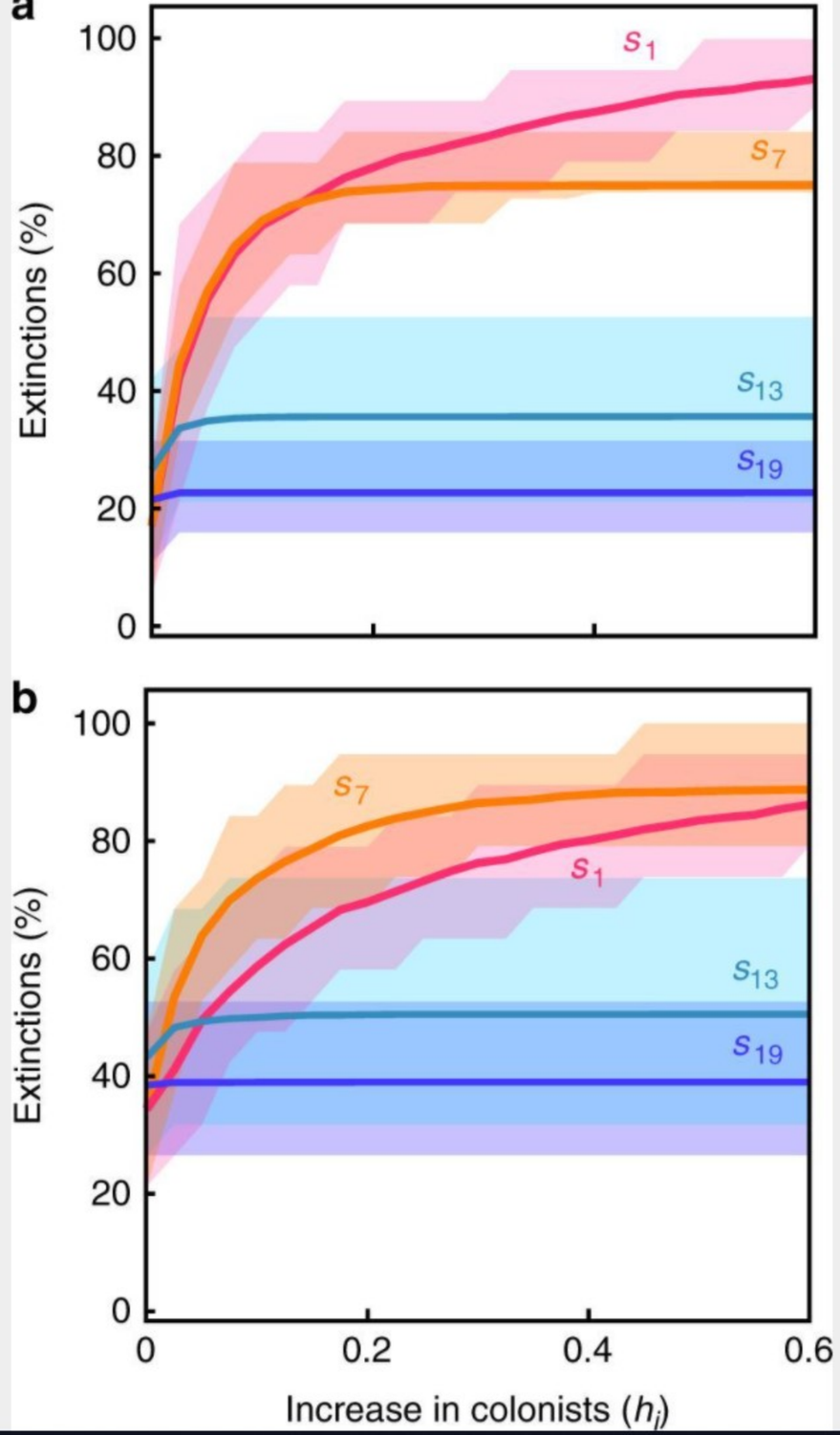

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