Northern Tablelands Regional Weed Committee High Risk Pathways & Sites Management Plan 2018 - 2022

May 2018

NEW ENGLAND WEEDS AUTHORITY

Inverell Shire Council

TENTERFIELD SHIRE COUNCIL

GLEN INNES SEVERN COUNCIL

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ABBREVIATIONS

AIIMS	Australian Inter-service Incident Management System
AUSBIOSEC	Australian Biosecurity System for Primary Production and the Environment
BO	Biosecurity Officer
LCA	Local Control Authority
NT	Northern Tablelands
NTRWC	Northern Tablelands Regional Weed Committee
NTRWC WIP	NTRWC Incursion Plan 2018 - 2022
NTRWC RRP	NTRWC Rapid Response Plan 2018 - 2022
NTRSWMP	NT Regional Strategic Weed Management Plan 2018 - 2022
NTRWC WAP	NTRWC Weeds Action Program 2015 - 2020
NTRWC WIT	NTRWC Weed Incursion Team
NSW DPI	NSW Department of Primary Industries
NSW ISP	NSW Invasive Species Plan 2015 - 2012
NWIP	National Weed Incursion Plan 2008 - 2015
RISO	Regional Invasive Species Officer
SWC	State Weed Committee
WMP	Weed Management Plan
WRA	Weed Risk Assessment

ACKNOWLEDGEMENTS

The NT RWC High Risk Pathways & Sites Management Plan 2018 – 2022 has been modelled on the Australian Weed Strategy 2017 – 2027 and the Queensland Weed Spread Prevention Strategy.

EXECUTIVE SUMMARY

The physical characteristics of weeds allows them to be easily transported by a broad range of mechanisms over road, rail, waterways and airborne transmissions which include contaminated grain, soil and gravel, garden products, stock movement, machinery movement, feral animals, climatic conditions and human activities. The majority of spread is a direct result of human activities. With this considered, coupled with increasing costs of control it is necessary to change community attitudes and practices towards preventing weed spread. For this reason the Plan will focus on pathways and sites attributable to human activity.

The rationale for the Plan is in line with the National Weed Spread Prevention Draft Action Plan July 2006[1] (NWSPDAP) which states that;

1. Pathways for weed spread need to be identified and addressed
2. Effective consistent and complementary measures need to be identified and addressed
3. Government, industry and communities need to be encouraged and empowered to undertake effective preventative actions.
4. The implementation of strategic actions from the proposed Australian Weed Strategy (AWS) need to be supported.

The NTRWC High Risk Pathways and Sites Management Plan (NTRWC HRPSMP) is an integral component of the NSW Invasive Species Plan 2015 – 2022 (NSW ISP) goal to prevent the establishment of new invasive species.

This document is specifically designed to meet the NTRWC Weeds Action Business Plan 2015 – 2020 Objective 1.1 being *" to prevent the establishment of new invasive species and high risk species and pathways are identified and managed"* and maintains strong links with the NSW ISP and the National Weed Prevention Action Plan 2006.

Issues relating to threat assessment or responses to new weed incursions in the region are covered in the NTRWC Weed Incursion Plan 2018 – 2022 and NTRWC Rapid Response Plan 2018 – 2022 respectively.

Included within the Plan are identified high risk pathways, high risk sites and other priority sites within the NTRWC region.

The operational program for the implementation of the High Risk Pathways and Sites Management Plan is the NTRWC Regional Inspection Program. This document provides for the inspection of private and public land in the Northern Inland of NSW under the New South Wales Invasive Species Plan 2015 – 2022 and the NTRWC Weeds Action Plan 2015 – 2020.

A case study is included of an historical outbreak of Parthenium in 1982, and reinforces the importance of monitoring high risk sites and pathways to reduce the chance of new weed incursions in the region.

[1] National Weed Spread Prevention Draft Action Plan
http://www.weeds.org.au/docs/Draft_National_Weed_Spread_Action_Plan.pdf

1. INTRODUCTION

1.1 Background

Weeds have a significant adverse impact on primary production, ecosystem biodiversity and the conservation values of the region and more widely across the state. They can also have a detrimental effect on human and animal health.

Although preventing the spread of weeds is difficult, it is the cheapest and most effective method of weed control. Along with airborne and our road, rail and waterway networks, some of the potential carriers for 'hitchhiking' weed seeds are machinery, equipment, garden waste, livestock, grain, produce, fodder, landscaping material, extractive materials, native animals, wind, water and humans.

Many weeds have physical characteristics that allow them to be easily transported over long distances. Viable seeds and other plant material can be spread accidentally, especially by human activity. Vehicles can readily spread the small seeds for example Parthenium and Giant Parramatta Grass, just a few seeds of which can easily colonise and dominate new areas. Other weeds, such as the waterweed Cabomba, can spread even if just a part of the plant gets caught on a boat or trailer and is moved to another river or dam. The seeds of prickly acacia can survive eight days inside a cow and still germinate once the animal has defecated.

1. 2 Purpose of the Plan

This Plan has been designed to minimise the economic, environmental and social impacts of new widespread and emerging weeds in the NTRWC region of the Northern Tablelands. This can only be achieved through coordination, cooperation and commitment from weed managers and the community.

The National Weed Spread Prevention Draft Action Plan 2006[2] has developed six broad goals to reduce the risk of weed spread caused by human activity within Australia. These are;

1. To ensure a consistent and strategic approach to weed spread prevention at local, regional, state and national levels.
2. To develop innovative, practical and cost-effective solutions to minimise weed spread.
3. To provide procedures for effective weed spread prevention.
4. To inform and motivate communities, industries, governments and land managers in order to minimise weed spread.
5. To implement effective measures to minimise weed spread.
6. To monitor, evaluate and report on the effectiveness of weed spread prevention.

The NTRWC High Risk Pathways and Sites Management Plan will provide management actions for the six goals listed above at a regional level to address the problem of weed spread, enabling all parties to make the best use of available resources.

[2] National Weed Spread Prevention Draft Action Plan
http://www.weeds.org.au/docs/Draft_National_Weed_Spread_Action_Plan.pdf

1. 3 The NTRWC Region

The Northern Tablelands region is situated in northern inland New South Wales and includes the Local Government Areas of Tenterfield, Glen Innes-Severn, Armidale Regional, Uralla, Walcha and Inverell covering an area of approximately 40,000 km² with a population of around 72,000.

The region has a diverse climate, ranging from temperate to sub-tropical, with considerable differences in climate between the east and the west, and great variety in its landforms, hydrology, vegetation, and soils. Natural resources and land use in the region reflect climatic and geographic influences. Grazing predominates as the agricultural land use, with cropping occurring in the north- west of the region. Mixed farming, horticulture, viticulture and other agricultural enterprises add to the regional diversity.

Map 1: Northern Tablelands Local Land Services Region

Map 2: LCAs within the NTRWC region

1.4 Objectives

This Plan will complement the implementation of the weed spread prevention objectives of the NTRWC Weed Action Business Plan 2015 – 2020 and the NTRWC Weed Incursion Plan 2018 2022.

The Plan is specifically designed to meet objectives of the NSW ISP and the NTRWC WAP 1520-Objective 1.1, being to prevent the establishment of new invasive species and high risk species and pathways are identified and managed.

The objectives of the Plan are to manage weed spread in the NTRWC region by:

- Identifying and documenting regional high risk pathways;
- Development of effective regional management protocols of high risk pathways;
- Strengthen links across local governments, industry and agencies within NTRWC and bordering LCAs in the prevention of weed spread;

The Plan focuses on regionally identified pathways and priority sites and the commitment of all stakeholders to work in a strategic, collaborative and cooperative manner to ensure favourable outcomes.

1.5 Scope

The scope of this Plan is limited to the management of high risk pathways and sites within the NTRWC region.

It does not include management actions for:

- border control (refer NSW Weed Incursion Plan)
- weed risk assessment (refer NTRWC Weed Incursion Plan and NTRWC Rapid Response Plan)
- detection and incursion response (refer NTRWC Rapid Response Plan)
- survey and mapping (refer NTRWC Regional Inspection Plan)

2. WEED SPREAD MECHANISMS

Weed spread can be defined as movement and subsequent establishment of a weed species in new areas[3].

The three main mechanisms of weed spread are:

- Natural spread (physical activity) - seeds moved by wind and / or water;
- Wild and feral animal activity;
- Human activity.

Natural spread of weeds includes;

- birds – through consumption and excretion of seeds and fruit;
- other animals – through consumption and excretion of seeds and fruit, and external attachment to native and introduced wildlife;
- wind – distribution of wind blown seeds;
- water – distribution of seeds or plant parts via waterways.

Controlling weed dispersal by natural means is far more difficult, and highlights the importance of managing source populations in order to minimise spread by natural vectors.

Wild and feral animal activity includes wild dogs, feral pigs, rabbits, foxes, feral goats, feral cats and carp. It is estimated that pest animals cost the Australian economy over $1 billion annually [4].

Human activity induced spread includes the movement of weeds by people, and by the use of items such as vehicles, machinery, domestic animals, grain, and feed that are contaminated.

[3] National Weed Prevention draft action Plan
[4]NSW Invasive Species Plan 2008 - 2015

Human-induced spread is seen as the most prolific form of weed spread. This is because seeds are generally moved further and in larger numbers through humans and their activity than by other means.

The spread of weeds along natural and artificial corridors - roadside verges, railways, utilities (transmission lines, gas pipelines), waterways, recreational trails and drainage lines – is a significant avenue for increasing weed distribution throughout the region. A key area of concern is the spread of weeds along road and rail corridors, where they may then provide a source of infestation for neighbouring properties.

Garden plant introductions are the dominant source of new naturalised plants and weeds in Australia.[5]

Of the 2,779 introduced plant species now known to be established in the Australian environment, 1,831 (or 66%) are escaped garden plant species.

The University of New England conducted a project on assessing the weed spread in Australia using Pathway Risk Analysis. A comprehensive report has been produced and Appendix 2 provides a summary fact sheet of the results and details of the link to the website containing the full document.

This plan focuses on high risk pathways and sites involving human activity because it being the most prolific form of weed spread and also the one that is the most preventable and cost effective.

[5] Jumping the Garden Fence: Invasive Garden Plants in Australia

2. 1 Pathways involving human activity

This Plan adopts the Queensland Weed Spread Prevention Strategy [6], which identifies ten pathways for potential weed spread involving human activity.

Table 1. Ten pathways for potential weed spread involving human activity (source: Department of Natural Resources and Water 2008).

Pathway	Examples
Transportation over land	Agricultural machinery, stock carriers, cars, trucks, buses, all-terrain vehicles, construction equipment and fire fighting equipment, trains, hikers, horses, and pets, and also via tankers and pipelines when transferring water (containing aquatic weeds) from one storage to another.
Transportation over water	All types of ships (including cruise ships), recreational boats and other large or small craft including industrial, tourist, recreational and law enforcement vessels, military crafts, barges, semi-submersible dry docks, oil derricks (freshwater, marine or both), and stowaways in holds.
Tourism	For recreation, business or relocation purposes. A particular risk in national parks and protected areas.
Movement of plants and plant parts	Fruit, vegetables, nuts, roots, seeds and edible flowers; plants 'in trade' (intentionally released - authorised or unauthorized - or escaped); 'hitchhiker seed' such as weed seeds that have contaminated other seed for sowing or eating, or transported in water, food, growing media, nesting or bedding; and particularly, the dumping of garden waste in parks, reserves and council dumps.
Transportation of live food animals and animal parts	Movement of stock and/or their contaminated waste (containing viable weed seed from a food source such as prickly acacia) and 'hitchhikers' on or in live animals and in their water, food, growing medium, nesting or bedding.
Plant and aquarium trade	Importation and supply of plants, plant parts, seeds and aquatics, and sites of deliberate introduction such as botanical gardens, nurseries, landscaping and garden suppliers, research facilities, public and private plantings, and aquariums/water gardening facilities.
Movement of construction and landscaping material	Extraction and storage of soil, gravel, sand, mulch and rocks.
Gas, power and mineral resources	Mining of resources and development and maintenance of movement corridors.
Waste disposal	Illegal dumping, unsafe disposal and movement of weed waste.
Ecosystem disturbance	Habitat creation, restoration or enhancement; forestry use; road construction; provision of utilities; land clearing; development; stream channels; construction of highways, railroads and utility rights of way; bushfires and fire management; grazing; agriculture; and extreme weather events such as cyclones and drought.

All land managers have a role to prevent the spread of weeds and to work cooperatively to ensure optimal prevention outcomes are achieved. Appendix 4 summarises activities identified to minimise weed spread from each pathway mentioned above.

[6] QLD Weed Spread Prevention Strategy - http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Weed-Spread-Strategy.pdf

3. KEY DEFINITIONS OF NTRWC HIGH RISK PATHWAYS, SPECIES AND SITES

Weeds replace the habitat of threatened ecological communities or species and can make the recovery and conservation of those species or communities impossible without effective weed control on public and private land (including on agricultural land).

The NTRWC Regional Biosecurity Officer Team held a workshop in June 2017 to distinguish between high/low risk pathways, high risk sites and private property high risk areas in relation to the NTRWC Weed Action Plan objectives. The resulting definitions are detailed below;

3.1 High Risk Pathway

Definition: Pathways that are heavily trafficked, being main road, rail and waterways that have a high risk of new weeds incursions being introduced from external sources,
and/or
Pathways that have an existing issue with a high risk species present.
Example: Serrated Tussock in the New England.
and/or
High Risk Pathways that are a means of spread and include pet shops, nurseries, machinery, border crossings as well as

- Major highways/state roads/minor roads containing existing high risk invasive species;.
- LLS Travelling Stock Routes adjoining major road networks;
- Railway Corridors.

Note: High Risk pathways will need to be identified on an LCA basis and mapped regionally to meet the requirements of ISP Objective 1.1 of the NTRWC Weed Action Business Plan 2015 - 2020

High Risk Pathways directly relate to the Goals 1 and 2 of the NTRWC Weed Action Business Plan 2010 – 2015;

Goal One
Exclude: *Prevent the establishment of new invasive species*

Goal Two
Eradicate or Contain: *Eliminate or prevent the spread of new invasive species.*

3.2 Roadside Inspections High Risk Pathways

Definition:

- Roadside Inspections to check the condition of high risk pathways where no control measures have been undertaken.
- Roadside Inspections to check the condition of a high risk pathways that involve routine control works.

3.3 Waterways High Risk Pathways

Definition:

- A major river system and its tributaries where the risk of introduction and dispersal of high risk species is greater than minor waterways and/or are currently present, including a lagoon, dam, or other water body that has high risk species present or has had high risk species in the past. It may also include the riparian areas adjacent to the waterway that can also aid the dispersal of aquatic species as well as terrestrial species.

3.4 Waterways Private Property

Definition:

- Waterways that are inspected as part of the regional inspection program where the presence of high risk species are not expected to be found and form part of the regular inspection program. These waterways include minor lagoons, dams and other riparian areas.

3.5 High Risk Sites

Definition:

- High risk sites are comprised of nurseries, Australian Rail Track Corporations inspections, gravel quarries, aquaria / pet shops, weekend markets, grain handling sites, border crossings, saleyards, machinery dealers, boat ramps, roadside truck stops within the NTRWC region with western areas containing more high risk sites due to border and landuse influences. Average size estimated at 2 hectares per site and an estimate of 10% treated per year.

3.6 Private Property High Risk Sites

Definition:

- Properties that adjoin a high risk pathway that have the potential for high risk weed incursions
  being introduced.
- Properties that have an outside influence where the potential for introduction of high risk species is greater eg - mine sites that introduce external contractors. Cropping areas that introduce external contractors.
- Properties that have isolated high risk species present that can be eliminated or the spread can be prevented.

3.7 Other Priority Sites

- Other priority sites are the estimated 2,800 private property high risk areas that will be inspected in each LCA in a 5 year inspection program for the region with 10% allocated for yearly treatment.

3.8 Weed Definitions and Categories:

Naturalised Species: species from outside the NTRWC region that can maintain populations in the wild without cultivation.

Invasive Species: naturalized species that are spreading

Environmental Weed: Those naturalized plant species that have invaded areas of native vegetation. The species are presumed to impact negatively on native species diversity or ecosystem function. Environmental weeds are usually non-native species, although native plant species that are invasive beyond their indigenous range are also included.

Regional Priority Weed: weeds that are currently not found in the region and pose a significant biosecurity risk and prevention of the biosecurity risk is a reasonably practicable objective.

State Priority Weed: Weeds that are currently not found in some parts of the state, and pose significant biosecurity risk and prevention of the biosecurity risk posed by these weeds is a reasonably practicable objective.

Weeds of National Significance (WONS): A list of weed species, nominated under the National Weeds Strategy of 1997, which require a national (trans-boundary) effort to tackle their management. These weeds affect extensive land use systems such as conservation areas and grazing systems, rather than cropping systems.

3.9 High Value Areas

a) High Value Agriculture Areas

Definition:

- Areas of land that are engaged in high return extensive agricultural practices such as cotton and grain farming, sheep and cattle grazing properties.

b) High Value Conservation Areas

Definition:

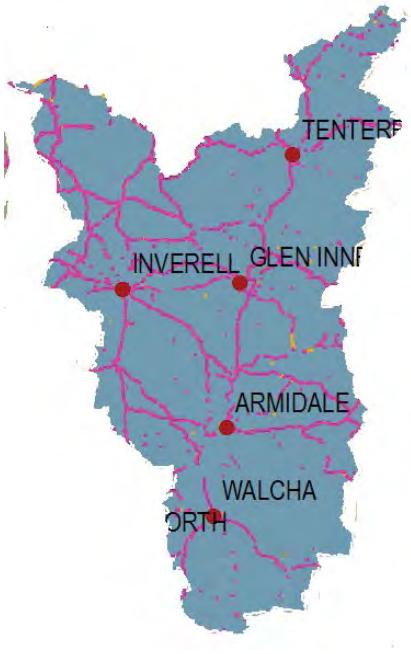
- Areas of land that have been deemed protected in order to ensure that natural features, cultural heritage or biota are safeguarded. A conservation area may be a nature reserve, a park, a land reclamation project, or other area (refer Appendix 3)

4. NTRWC REGIONAL HIGH RISK PATHWAYS

To implement the Management Plan and the Regional Inspection Program it is crucial to have an understanding of the pathways that enable weeds to spread and is paramount to preventing new incursions of invasive species within the region.

4.1 Transport over land – by roadways

The NTRWC regional high risk road pathways that enable the transport of weeds into the region are outlined in the map below.



Map 4: Major roadways in the NTRWC region

Map 5: Travelling Stock Routes follow the main roads and are a high risk pathway.

All pathways allow vehicles to move into and within the NTRWC member council area and require priority actions to ensure weed spread is prevented.

The mechanisms along which high risk species may be introduced through road pathways include:

- Supply and movement of machinery and equipment;
- Tourism and recreational activities and includes general travel;
- Roadside vegetation maintenance activities;
- Foot traffic;
- On-ground activities such as road and rail maintenance and construction activities;
- Construction and development projects such as mining, seismic and pipeline construction;

- Energy and telecommunications infrastructure construction activities;
- Property development which involves the disturbance and removal of soil materials;
- Quarry activities which involves the supply and sale of quarry type materials such as soil, sand, gravel and rocks;
- Fencing construction and maintenance;
- Audit, survey and research activities and includes mapping;
- Resource recovery and removal and planting activities associated with forestry;
- Weed prevention activities such as chemical applications, slashing and mowing and manual removal;
- Waste disposal – both discriminate and indiscriminate.

Weed spread is not limited to vehicle movement along pathways.

4.2 Transport over land – by other means

Mechanisms along other overland pathways include:

- Fencing construction and maintenance activities
- Domestic stock between paddocks
- Native and non-native animal movements
- Property development
- Indiscriminant dumping (such as green waste)

4.3 Transport by Water – Freshwater and Marine pathways

Many kinds of weed seeds, even those without special modifications, are readily dispersed by water. Weed seeds differ in their ability to float on water, and there are also various adaptations of fruit and seed that aid water dissemination. Water Lettuce (Pistia stratiotes) is an excellent example of a weed species equipped for water dispersal. The seed is buoyant, being flattened at the apex and containing an air chamber.

All water pathways allow weed material to move along the watercourse with the NTRWC area and require priority actions to ensure weed spread is prevented. In addition to waterways in the north carry a large amount of recreational and commercial traffic along and between them.

The NTRWC region has four river systems traversing the region, being the Gwydir, Namoi, Macleay and Clarence rivers.

Map 6: River Systems from QLD Border, south to Newcastle, showing the Gwydir, Namoi, Macleay and Clarence river systems.

The mechanisms along which high risk species may be introduced through water pathways include:

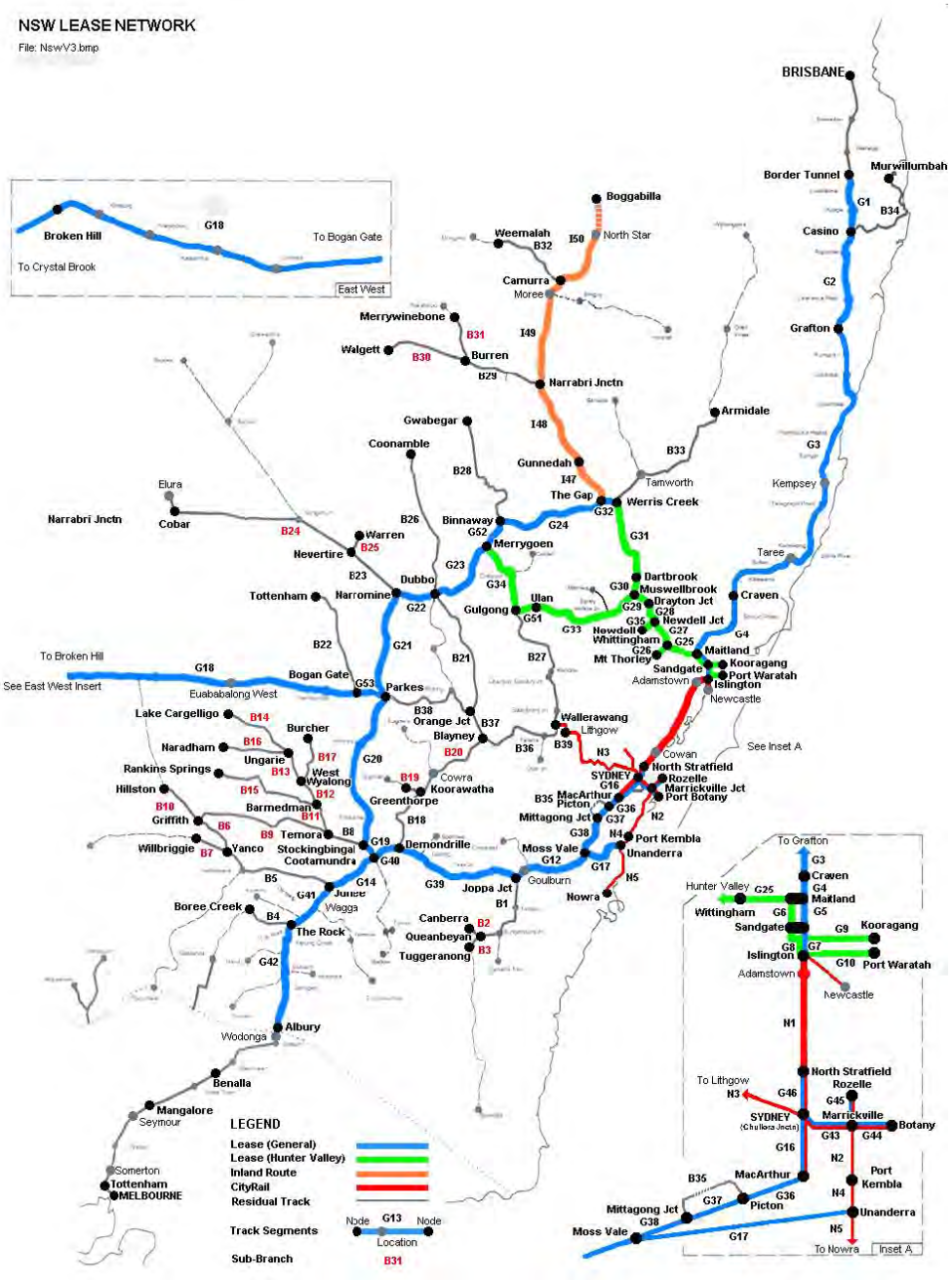
- All types of recreational and commercial craft
- Recreational activities such as fishing and camping
- Recreational boating activities and includes fishing, skiing and swimming
- Commercial fishing activities

4.4 Transport by rail

There is an extensive rail network throughout the NTRWC region, with some 2,955km of operational lines and 2,805km of disused lines.

Mechanisms along rail corridors

- Windrows are left after grading
- Machinery used from other areas may be contaminated
- Corridor used as a garbage dump (garden escapes)
- Grain/coal movement of commodities (eg coal, grain)



Map 7: NSW Rail Corridors

4.5 Transport by air pathway

There is significant air traffic movement both in and out of the area and within the region. As air traffic can carry people and commodities significant distances in a short period of time so too can weed material be transported. Map 9 shows some of the typical commercial flight paths based from Sydney.

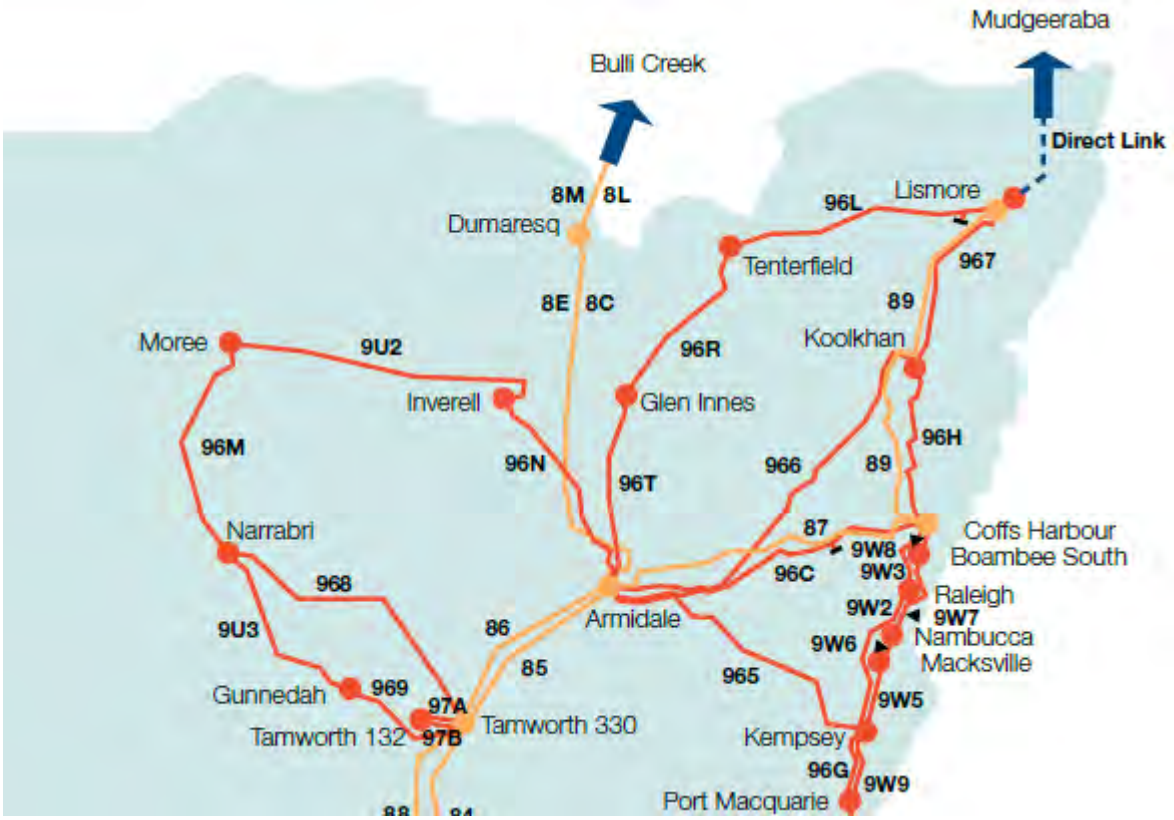
Mechanisms along air pathways

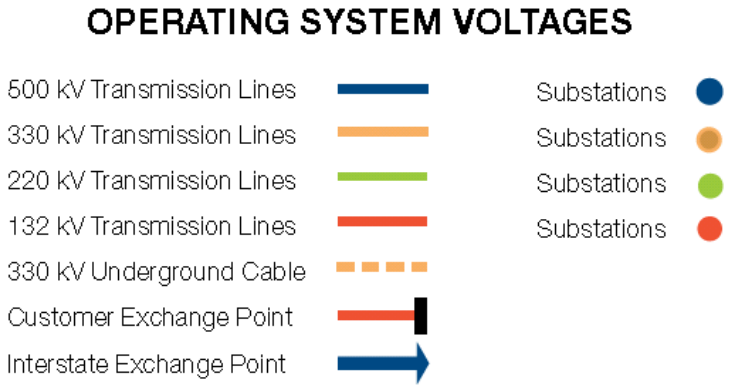
- Private light aircraft
- Commercial charter
- Supply and movement of machinery, equipment and produce by air
- Tourism and recreational activities including general air travel and aerial sporting activities
- Military activities

Map 8: Qantas Commercial Flight paths

4.5 Transport by electricity grid pathway

Throughout NSW, Transgrid has a network of around 12,609km of high voltage overhead transmission line and 47km of underground cable operating at voltages of up to 500kV.

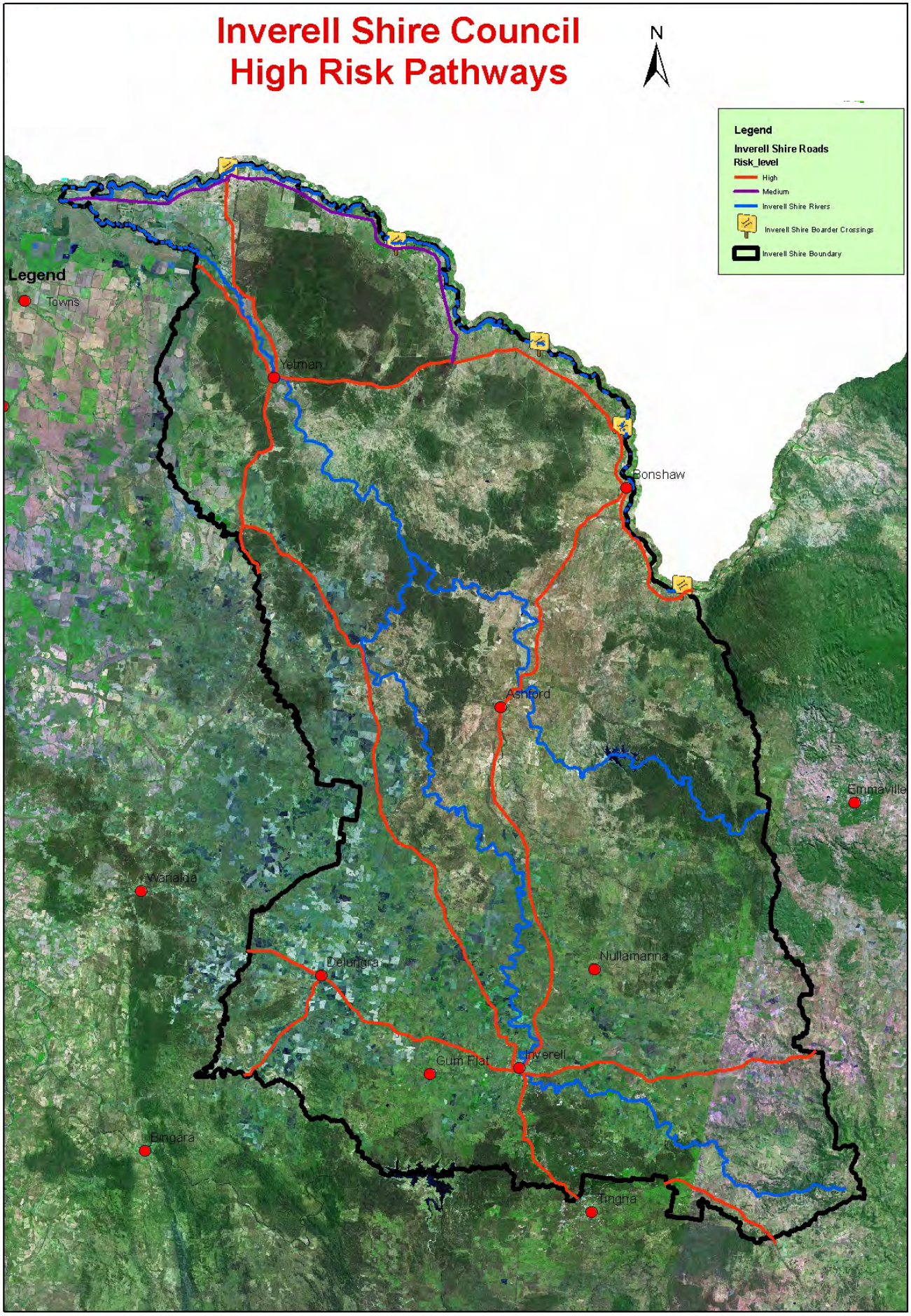


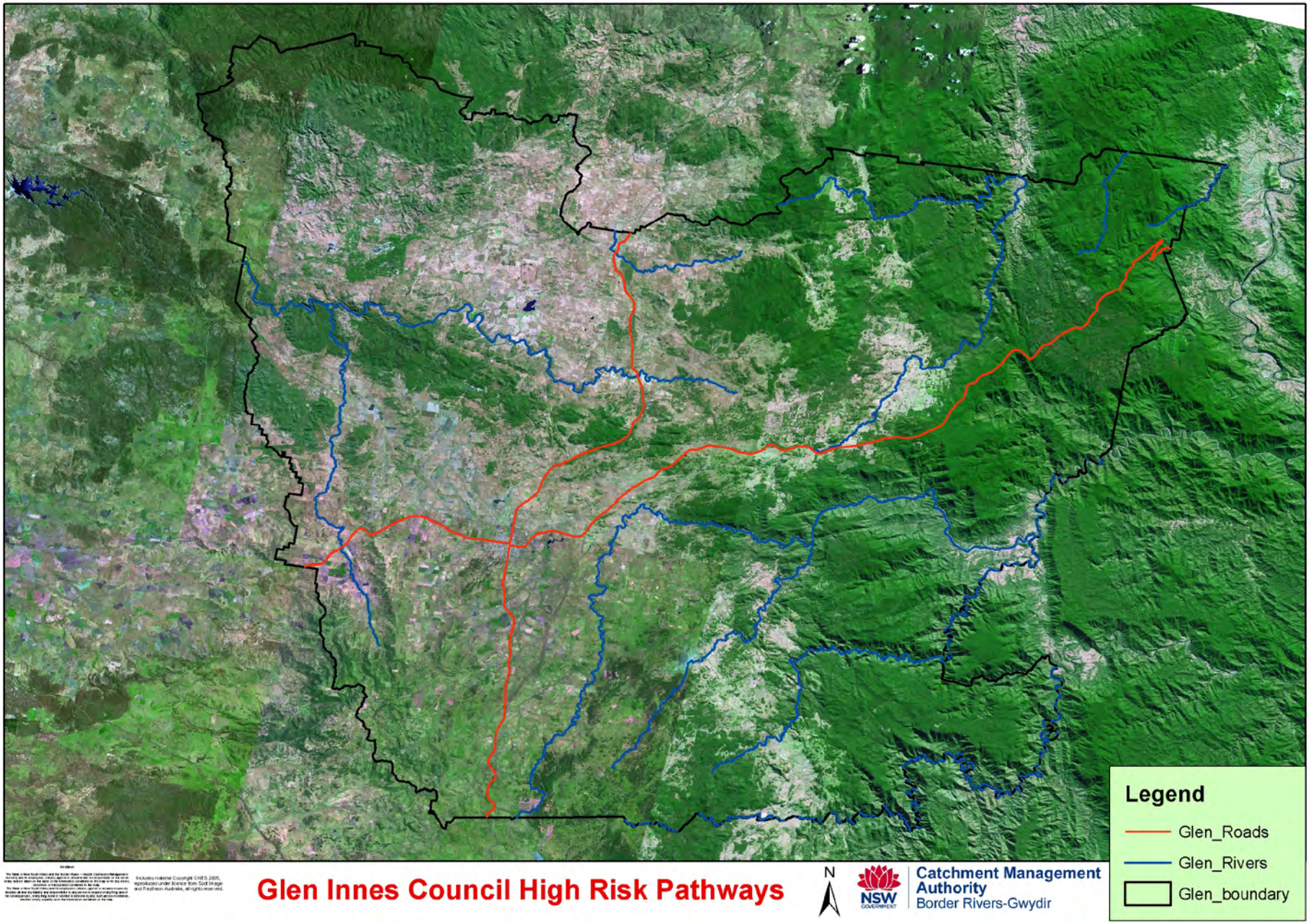


Map 9: TransGrid's Electricity Network Map - Northern NSW

4.6 LCA High Risk Pathways

Following are the high risk pathways for each Local Control Authority within the NTRWC region.





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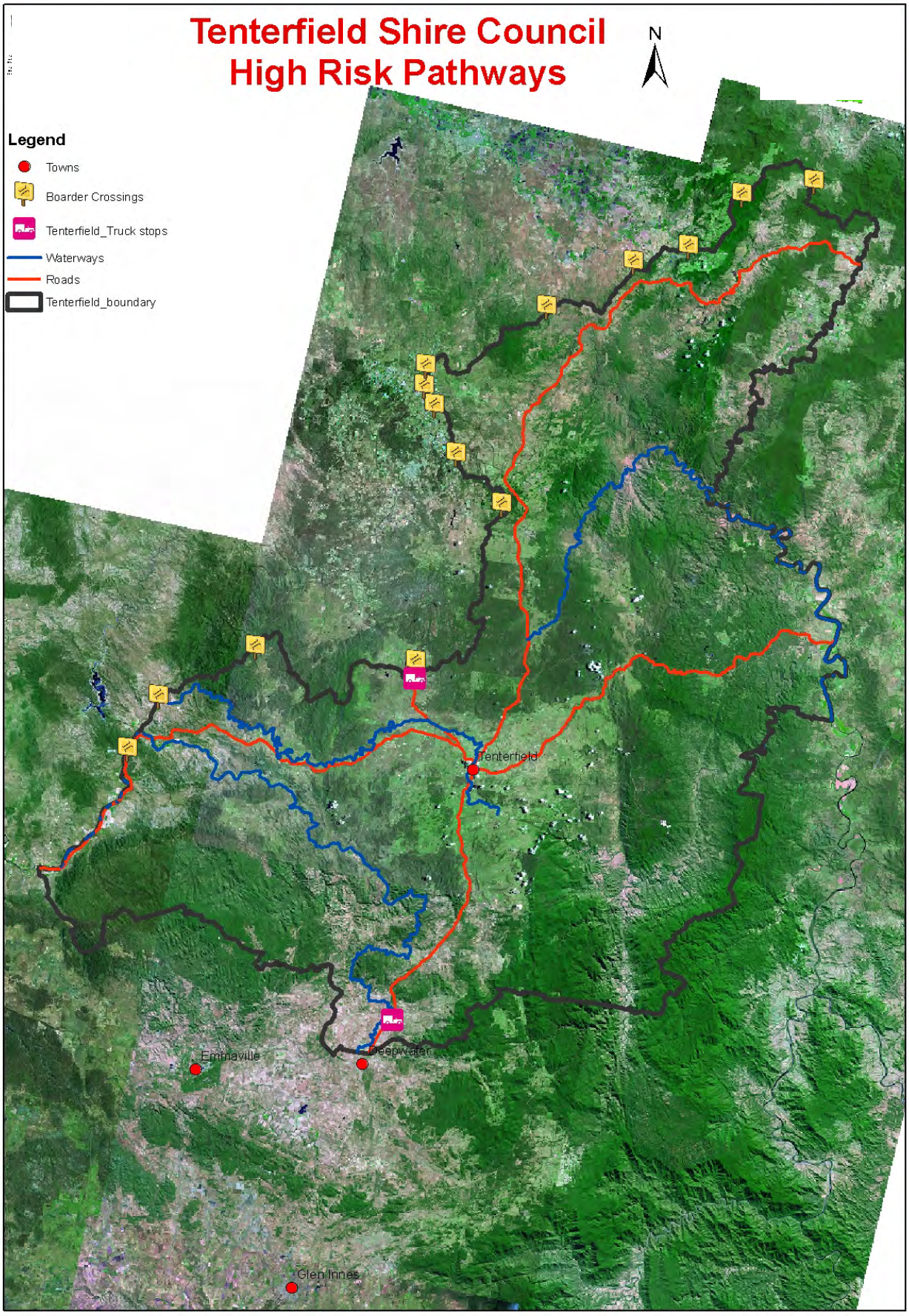
Glen Innes Council High Risk Pathways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High Risk Pathways
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Legend
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Roads
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Emmaville
Deepwater
Glen Innes

5. NTRWC HIGH RISK SITES

High risk sites are comprised of nurseries, Australian Rail Track Corporations inspections, gravel quarries, aquaria / pet shops, weekend markets, grain handling sites, border crossings, saleyards, machinery dealers, boat ramps, roadside truck stops within the NTRWC region with western areas containing more high risk sites due to border and landuse influences. Average size estimated at 2 hectares per site and an estimate of 10% treated per year.

The High risk sites in the NTRWC region are summarised in the compilation map below. The NTRWC Regional Inspection Program 2015 - 2020 document provides more detailed information on specific high risk sites.

6. NTRWC – OTHER PRIORITY SITES ALERT LIST

Other priority sites are the estimated 525 sites including other Council lands, Department of Lands, national parks and reserves and recreational areas that will be inspected in each LCA in a 5 year inspection program for the region with 10% allocated for yearly treatment.

The NTRWC Regional Inspection Program 2017 - 2022 document provides more detailed information on other priority sites.

7. HIGH RISK PATHWAYS AND SITES MANAGEMENT ACTION PLAN

The High Risk Pathways and Sites Action Plan details the measurable outcomes and actions identified in the NTRWC Weed Action Business Plan 2015 - 2020 as necessary to deal with high risk pathways and sites.

The Plan is structured under four categories:

- Coordination, Planning, Procedures and Documentation
- Execution
- Education / Extension
- Evaluation and reporting

Each category relates to a specific goal within the NTRWC Weed Action Program. These are:

1. **EXCLUDE:** Prevent the establishment of new invasive species
2. **ERADICATE OR CONTAIN:** Eliminate or precent the spread of new invasive species
3. **EFFECTIVELY MANAGE:** Reduce the impact of widespread invasive species
4. **CAPACITY:** Ensure NSW has the ability and commitment to manage invasive species

Activities and measurable outcomes are listed beneath each goal. These have been developed so that NTRWC can assess how effectively the Weed Action Plan has been implemented.

7. 1 ACTIONS - COORDINATION, PLANNING, PROCEDURES & DOCUMENTATION

Goal 1: EXCLUDE – Prevent the establishment of new invasive species							
ISP Objective 1.1 High Risk species and pathways identified and managed							
Measurable Outcomes	**Activities**	**Responsibility**	**Overall Target**	**YEAR (1 to 5)**	**STATUS**		
					Pending	Commenced	Completed
Regional High risk pathways identified and documented	Stakeholders engaged to identify pathways - NTRWC	Lead Agency	1	1			
	Identify historical outbreaks in the region & document them in relation to high risk pathways	Regional Biosecurity Officer Team	1	1			
	Map of regional high risk pathways produced	Regional Biosecurity Officer Team	1	1			
Effective regional management protocols of high risk pathways developed	Assessment of known species carried out and identified	Regional Biosecurity Officer Team	1	1			
	High Risk Pathway Management Plan adopted by NTRWC and circulated to all stakeholders and available on website	NTRWC	1	1			
	Education material made available on pathways such as transportation of contaminated material and retail industry and inappropriate disposal of weed material	Lead Agency	1	1			
	Educate and encourage private land holders to adopt hygiene practices to prevent introduction and dispersal of weeds	LCA's	1	1			

Goal 1: EXCLUDE – Prevent the establishment of new invasive species (Cont'd)

ISP Objective 1.2 Develop and implement early detection capabilities

Measurable Outcomes	Activities	Responsibility	Overall Target	YEAR (1 to 5)	STATUS		
					Pending	Commenced	Completed
List of High Risk Species identified using WRM scores	Workshop to review high risk species identified using WRM scores	Regional Biosecurity Officer Team	1	1			
	Regional high risk species documented and distributed. Also available on the web	Lead Agency	1	1			
	List of high risk weed species reviewed annually	NTRWC	1	1			
Regional Inspection Program implemented	Draft regional inspection program circulated to region for comment	Lead Agency	1	1			
	Final regional inspection program adopted by NTRWC region	NTRWC	1	1			

Goal 2: ERADICATE OR CONTAIN – Eliminate, or prevent the spread of new invasive species

ISP Objective 2.1 Timely detection of new weed incursions

Measurable Outcomes	Activities	Responsibility	Overall Target	YEAR (1 to 5)	STATUS		
					Pending	Commenced	Completed
Regional Inspection program implemented	Regional inspection program with baseline reporting in accordance with Local Control Authority Plan	Regional Biosecurity Officer Team	1	1			

Weed Management Plans reviewed and monitored using MERI	Weed Management Plans reviewed by Local Control Authorities (Yr 1 MERI Plan developed, Yr2-5 review MERI Plans)	Regional Biosecurity Officer Team	1	1			

7. 2 ACTIONS - EXECUTION

Goal 2: ERADICATE OR CONTAIN – Eliminate, or prevent the spread of new invasive species

ISP Objective 2.1 Timely detection of new weed incursions

Measurable Outcomes	Activities	Responsibility	Overall Target	YEARS (1 to 5)	STATUS		
					Pending	Commenced	Completed
Timely detection of new weed incursions	High risk roadside inspections carried out (7,200 km/yr)	LCAs	28,800	2-5			
	High risk private property inspections carried out (no. insp/yr)	LCAs	3648	2-5			
	High risk waterway inspections carried out (80 ins/yr)	LCAs	400	2-5			
	Undertake targeted inspection program on identified high risk locations eg nurseries, saleyards, markets, quarries, agricultural machinery outlets (no 145 insp / yr)	LCAs	580	2-5			

ISP Objective 2.2 Provide a rapid response and eradicate or contain new weeds

Measurable Outcomes	Activities	Responsibility	Overall Target	YEARS (1 to 5)	STATUS

					Pending	Commenced	Completed
Implement Appropriate Surveillance on High Risk Pathways	High risk pathways inspected/monitored yearly	NTRWC	5	2-5			

7. 3 ACTIONS - EDUCATION AND EXTENSION

ISP Objective 4 .2 Private landholders motivated to manage invasive species proactively

Measurable Outcomes	Activities	Responsibility	Overall Target	YEARS (1 to 5)	STATUS		
					Pending	Commenced	Completed
Invasive weeds effectively managed on private lands	Regional inspection program in place for invasive species management	NTRWC	1	2-5			
	New Landowners given NW Weed Management Guide (# booklets)	NTRWC	1,000	1-5			
	Landowners contacted as part of inspection process (2000 landowners contacted each year over 5 years)	NTRWC	2,000	1-5			
	Regional extension program in place for invasive species management (Field Days LCA's 20)	NTRWC/ LCA's	100	1-5			
	Community groups encouraged to participate in invasive species management (landcare events 7 per year)	NTRWC / LCA's	45	1-5			
	LCA's engage landowners at regional events eg Shows/Expos (15 events each year)	LCAs	75	2-5			

7. 4 ACTIONS - EVALUATION AND REPORTING

Goal 3: Effectively Manage – Reduce the impacts of widespread invasive species				
ISP Objective 3.2 Provide effective and targeted on-ground control				
Measurable Outcomes	**Activities**	**Responsibility**	**Overall Target**	**YEAR (1 to 5)**
Monitoring Programs Developed Using MERI Principles	Conduct Annual Review of Protocols, Response and Management Plans	NTRWC/ LCA's	5	1-5
Reduce the Impact of Invasive Weeds at Priority Sites	Control programs implemented for priority sites implemented regionally for 4 LCA's/ County Councils over 5 years	LCAs	4	2
	Control programs implemented on priority sites through existing partnerships eg CMA, Landcare (2 per year)	LCAs	4	2
	Regional inspection program in place for invasive species management see 2.1 above	LCAs		1

8. REVIEW OF THE NTRWC HIGH RISK PATHWAYS & SITES MANAGEMENT PLAN

The NTRWC High Risk Pathways and Sites Management Plan will be reviewed biennially as part of the NTRWC Weed Action Program.

It will also continue to be updated in conjunction with the NTRWC Weed Incursion Plan 2010 – 2015, Rapid Response Plan 2010 – 2015 and Regional Inspection Program 2010 -2015 and amended as part of the evaluation process of the response to new weed incursions.

APPENDIX 1 – UNE PROJECT – ASSESSING WEED SPREAD IN AUSTRALIA USING PATHWAY RISK ANALYSIS – SUMMARY

(full report - http://lwa.gov.au/files/products/defeating-weed-menace/pn22274/pn22274.pdf)

Assessing weed spread in Australia using pathway risk analysis

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1. Goals

- Assess the relative risks of the different *sources* and *pathways* of weed ingress within Australia.
- Identify ways to reduce these risks.

2. Methods

- Identify relevant or potentially relevant pathways.
- Assess the risks associated with each pathway.
- Evaluate ease of pathway management.

The project progressed in two stages:

- a literature review; and
- a survey of Australian experts working in weed science, government and extension.

3. Results

The literature review identified:

- 24 sources of weeds (sites or areas of land from which new weed invasions may emerge); and
- 17 deliberate, accidental and natural pathways of weed spread (means of plant/propagule dispersal).

All weed sources and pathways were included in the survey. Over 100 survey responses were received.

3.1 Important weed sources

- Transport sites.
- Land in transition (degraded, abandoned or unused).
- Pastures/rangelands (grazing land).
- Ornamental horticulture (flowers, plants, bulbs, seeds).
- Private gardens.
- Arable/cropping land (dryland and irrigated).

Pastures and rangelands are considered amongst the most important weed sources in Australia (Senecio madagascariensis, Gloucester NSW)

3.2 Important weed spread pathways

- Ornamental plant trade.
- Machinery and vehicles.
- Fodder trade.
- Agricultural produce.
- Livestock movement.
- Wind.
- Birds.

3.3 High-risk pathways

Risk was evaluated according to eight pathway capabilities. The higher the score, the higher the risk (Figure 1).

- *Speed*: transport propagules quickly >1km.
- *Diversity*: transport a high diversity of species.
- *Quantity*: transport large numbers of propagules in a single event.
- *Frequently*: a regular/ongoing rather than occasional event.
- *Hospitability*: deliver viable plants/propagules.
- *Environments*: introduce into suitable environments.
- *Tolerance*: overcome or avoid preventative strategies.
- *Impact*: transport weeds into sensitive areas.

Figure 1: contrasting mean pathway capabilities - fodder trade (high capability) and research sites (low capability) *(where 1 = 'low/non-existent capability' and 5 = 'high capability')*

Unweighted mean capability scores were also produced to illustrate overall risk (Figure 2).

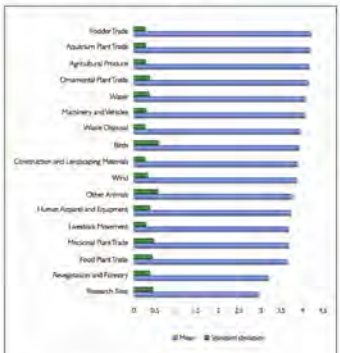

Figure 2: mean overall pathway capability *(where 1 = 'low/non-existent capability' and 5 = 'high capability')*

Ornamental plant trade and ***machinery and vehicles*** stood out as the most significant weed spread pathways.

- *Prevalence*: the highest proportion of respondents were aware of these pathways being a factor in weed spread.
- These were considered amongst the *highest risk* pathways.
- Related weed *sources* were amongst the most important - ornamental horticulture, private gardens, transport sites, pastures/rangelands, arable/cropping land.

The ornamental plant trade and machinery and vehicles pathways (ornamental plants photo J. Moss; vehicle photo L. Tanner)

3.4 Increasing future pathway risk

- Fodder trade: more frequent/severe droughts.
- Water: variable climate, reduced herbicide availability.
- Machinery and vehicles: greater traffic movement.
- Ornamental plant trade: semi-rural population growth, popularity of gardening, drought-tolerant species.

The water (Egeria densa, Yarrawonga VIC) and fodder/fodder plant trade pathways may pose a greater risk in the future due to climate variation

3.5 Improving pathway management

Insufficient management may be due to gaps in regulation, insufficient knowledge, or inadequate implementation.

A specific management/regulation approach is required for each pathway. However, a general strategy includes a mixture of:

- 'negative' regulation: enforcement and fines;
- 'positive' management: education, labelling, codes of practice; and
- more research to assess pathway management options.

4. Outcome

Pathway risk assessment makes it possible to target scarce weed control resources by identifying those pathways (e.g. ornamental plant trade, machinery and vehicles) that have the greatest potential to spread weeds.

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Further information is available at www.ruralfutures.une.edu.au