

## Parthenium Incident in the Pilbara, Western Australia – How is this ‘A Good News Story’?

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**Summary** Weed management in the resources development sector (i.e. mining, and oil and gas) in the Pilbara in Western Australia does exhibit the critical elements of effective weed management programs. This includes strong partnerships, development and implementation of sound weed management strategies and plans. The focus is three-fold: to prioritize and target key weed species and areas identify appropriate levels of resourcing and coordination to implement control programs; and to identify the monitoring requirements of these elements to inform adaptive management programs.

This paper provides an overview of examples from resource sector companies, and their partnerships with contractors and government, to implement weed management programs for project sites in the Pilbara. This includes the implementation of rapid and effective eradication programs.

**Keywords** Parthenium weed, *Parthenium hysterophorus*, Pilbara, Western Australia, resource development sector, management, Kellogg Brown & Root Pty Ltd (KBR), Rio Tinto Iron Ore (RTIO).

### INTRODUCTION

This is a good news story for weed management in Western Australia. It illustrates that strong positive partnerships between the resource sector industry (i.e. mining, and oil and gas development), contractors, and government regulators are achievable. It also shows effective private sector implementation of weed management programs in the Pilbara, Western Australia (WA). The Pilbara is an arid environment with its own unique challenges for undertaking weed management.

The effectiveness of private sector weed management is primarily achieved through development of approved weed management strategies and implementation approaches for the early detection of weed infestations. WA legislation requires reporting on weed management outcomes as part of State Government Conditions of

Approval for resource sector projects. There is also a requirement for reporting of weed incidents such as incursion of Declared Plants such as Parthenium weed. Some resource sector companies such as Rio Tinto Iron Ore (RTIO) have strongly embedded sustainability and biodiversity management principles and practices. RTIO is undertaking innovative and proactive measures to identify and manage weeds within its project development sites amongst a range of other environmental activities. This is supported by contractor partnerships with consultancies such as KBR that undertake engineering design and construction of resource sector projects for companies such as RTIO.

This paper includes case studies that illustrate the effective and strong partnerships between resource sector companies (i.e. the client), and contractors (i.e. engineering and environmental consultancies, and weed control contractors). These partnerships also include external parties such as government regulators (e.g. the Department of Agriculture and Food WA (DAFWA) and the Department of Environment and Conservation (DEC)).

An overview of RTIO's weed management strategy and associated programs which are supported by consultancies such as KBR is provided to illustrate the 'client/contractor' partnership.

A specific example is described which looks at a weed incident for WA in 2011 where an incursion of Parthenium weed (*Parthenium hysterophorus*) was detected at an Apache Energy oil and gas facility in the Pilbara. This case study exemplifies how strong partnerships between all stakeholders can achieve early detection and eradication of a serious weed.

### WEED MANAGEMENT METHODS AND PROCESSES

**Overview of resource sector and its weed management approach** Resource sector companies undertake the development (i.e. construction) and operation of a range of resource areas throughout the Pilbara region. This includes

mine sites such as iron ore mining (e.g. RTIO). Oil and gas companies develop offshore gas fields and develop and operate onshore gas plants to process this gas for domestic consumption (e.g. Apache Energy (Apache)) or liquefied natural gas (LNG) for overseas export.

Resource sector companies implement weed management programs through effective use of tools for early detection and rapid eradication. This is targeted at preventing new weed introductions or the spread of existing weed species (i.e. those weed species already present in the project area prior to the company commencing development).

These tools include: i) conducting baseline weed surveys; ii) implementing hygiene management during construction activities and operational phases; and iii) implementing ongoing weed inspection and control programs which are supported by monitoring and auditing programs. The programs incorporate adaptive management elements, such as 'Plan-Do-Check-Act' cycles, as a component of the survey or inspection and control activities. These programs also target specific areas that may contain existing wide-spread species.

Health, safety, and environmental (HSE) management is a high priority for companies such as RTIO and KBR. HSE considerations are factored into all site activities and underpin all weed management aspects. This includes: i) undertaking baseline and monitoring biological surveys in remote and often rugged environments in the Pilbara; ii) assessing chemicals to be used in relation to worker health and potential impact on often sensitive environments; and iii) implementing weed management programs in hot arid environments.

A specific example of private sector development and implementation of weed management methods and processes is the RTIO Pilbara Weed Management Strategy. RTIO developed the Pilbara Weed Management Strategy (WMS) to meet specific objectives in its Biodiversity Action Plan (BAP). These objectives outline mitigation of environmental issues and potential environmental impacts from its operations. RTIO's operational areas encompass an extensive rail network, mining and exploration leases, civil and port infrastructure and pastoral leases in the Pilbara.

RTIO recognises that weeds are one of the most significant threats to biodiversity, and prepared a strategy for the management of weeds in order to improve its coordination, evaluation and outcomes

of weed management within its Pilbara operations. The objectives of RTIO's WMS aim to i) improve legislative compliance related to weed management; ii) achieve RTIO's policy objectives for weed management in the BAP; iii) reduce existing or potential weed impacts to identified conservation assets; iv) improve weed management outcomes across all RTIO Pilbara locations; and v) improve weed monitoring and reporting across all RTIO Pilbara locations. The WMS identifies a range of actions to support achievement of these objectives. This includes development of project specific Weed Action Plans (WAPs), which have already been developed and implemented for a significant number of RTIO sites. The WMS also identifies the need for integrated weed management processes such as prevention (e.g. through hygiene and inspection) and, control and/or eradication. Other key components of the WMS are monitoring and evaluation, as well as a framework for implementation of the strategy.

The WMS is part of RTIO's Health, Safety, Environment and Quality (HSEQ) Management System. RTIO's HSEQ Management System incorporates legislative and regulatory compliance requirements as well as RTIO's own internal policy, guidelines, standards and procedures. All RTIO personnel and projects and RTIO contractors must comply with relevant components of the RTIO HSEQ Management System.

**How contractors work with clients** The types of contractors in this context are: EPCM (engineering, procurement, construction and management) consortiums, biological survey companies, and weed control contractors.

How contractors work with clients is illustrated using the example of using the example of KBR's EPCM project relationship with Rio Tinto Iron Ore Expansion Projects (RTIOEP).

At the EPCM level, KBR works not only within government legislative and regulatory environments, but also within RTIO procedures and process - in this instance RTIO's WMS. KBR is working with RTIO to implement this strategy on projects such as the Koodaideri Iron Ore Mine and Infrastructure project in the Pilbara.

KBR's work with RTIO includes i) doing technical reviews of documents such as the proposed Weed Monitoring Plan Guideline from an EPCM perspective, ii) review of project baseline weed survey data and development of associated project site weed maps, iii) reviews of RTIO's

weed survey data standards for on-going monitoring, mapping and management; and iv) identification of weed hygiene points for construction, and implementation of these requirements during construction.

The development of the project's required weed monitoring and control program includes prioritization of weed species and associated weed inspection and control areas. This also includes working with the weed control contractor engaged to undertake the on-ground control works. An additional component includes working with the biological survey contractor to undertake weed audits over the project site.

**How clients and contractors work with government** In Western Australia, resource development projects involve a range of government regulators and processes. For example, at the project approvals phase, the Environmental Protection Authority (EPA) sets a range of Conditions of Approval which generally include specific weed management actions to meet a desired outcome, such as no introduction of new weed species or the prevention of proliferation of existing weed species in a project area through project activities.

The DEC also sets Conditions of Approval through native vegetation clearing permit approvals. Engagement with resource sector companies through the review of project activities that may impact on neighbouring conservation reserve lands in terms of weed management is also undertaken by the DEC. This includes the DEC identified invasive species weed prioritization process. Legislative responsibility for environmental weed management in the state also sits with the DEC. Review of the accommodation area amenity planting lists for resource sector projects to prevent introduction of potential new weed species may also be undertaken by the DEC.

DAFWA manages the Declared Plants list gazettal process through its legislation and regulation. This includes provision of management requirements and advice for these Declared Plant species where necessary.

Whilst these traditional 'regulatory stick' approaches are often perceived as the standard method of operation, there are many positive examples and benefits where creating open, transparent and honest relationships between clients, contractors and regulators have been successful. The honest sharing of information

builds trust between all stakeholders. It also aids the development of an appreciation and understanding of what each stakeholder is trying to achieve, as well as being able to learn from each other's experiences. As all those involved in weed management appreciate, being able to share 'lessons learned' is a critical factor to improvement of weed management practices. For example, DAFWA utilised its experiences with the Parthenium weed incursion at Christmas Island to develop the *Management Plan for Parthenium weed (Parthenium hysterophorus) in the Rangelands (Kimberley and Pilbara)* for the incursion in the Pilbara. This was supported by extensive experiences from management of Parthenium in other Australian states.

**Effective early detection and eradication: Case study of the Parthenium weed (*Parthenium hysterophorus*) find in the Pilbara, Western Australia** In October 2011, 48 specimens of Parthenium weed in an area of approximately one square metre, including seedlings and at least one mature plant, were detected during a routine weed inspection and control site visit at Apache Energy's Devil Creek Gas Plant site. This site is approximately 50 km from Karratha in the Pilbara in WA. The weed specimens were detected on the shoulder of the access road into the gas plant's accommodation facilities, between the bitumen and the roadside drainline, which drains into the nearby Devil Creek waterway.

As this was the first detection of this species in the Pilbara in WA, a formal identification process was required, through both DAFWA and the DEC's WA Herbarium.

DAFWA has a policy of prohibiting the entry of Parthenium weed into WA, and to eradicate all known infestations within the state. Parthenium weed is declared at P1, P2 (eradication) levels for the whole of the State under the *Agriculture and Related Resources Protection Act 1976*. Parthenium weed is also one of the Weeds of National Significance (WoNS). It is a major weed of rangelands and cropping areas of Queensland. It also causes serious human health problems including allergic reactions such as dermatitis and adverse respiratory responses. Its invasiveness, economic impacts and capacity for rapid spread are well documented (e.g. Navie *et al.* 1998 Weeds Australia Website).

DAFWA therefore developed the required Declared Plant weed incident management plan,

i.e. the *Management Plan for Parthenium weed (Parthenium hysterophorus) in the Rangelands (Kimberley and Pilbara)*. This included input by Apache and the weed control contractor as part of the document review process for the sections of the plan that deal specifically with the Devil Creek site infestation.

This site specific review process included consideration of HSE risk factors such as the potential risk to human health (i.e. to the weed control technicians and Apache staff in the vicinity) as well as potential for ecological impacts such as on resident native fauna such as burrowing frogs, significant native vegetation such as the associated Priority Ecological Community (PEC), and the riparian vegetation of the Devil Creek system.

The management plan identified the control program for immediate implementation to undertake eradication of this small population, as well as on-going monitoring program to detect any potential future outbreaks of the weed. This included the specification of the area for chemical control application, including a buffer distance. The effective chemicals are also specified. This is to ensure both knockdown of existing plants, but also to provide a pre-emergent prevention for inhibiting any potential for future germination that may occur between weed control site visits. The pre-emergent application is considered essential due to the species' ability for significant proliferation under even quite adverse conditions. The plan also identified the monitoring requirements for the project area and surrounds.

#### OUTCOMES

What does this 'good news story' show? Essentially it reinforces the key messages of weed management such as the necessity and importance of: i) good partnerships and strong relationships between all stakeholders to have positive and beneficial outcomes for all those involved; and ii) the development and implementation of effective weed management strategies and management plans.

These strategies and plans incorporate: a) undertaking robust baseline surveys; b) on-going and appropriate funding (i.e. resourcing) of weed management programs; and c) regular inspection and control programs that incorporate the prioritization and targeting of key weed species and areas. These areas include sites such as vector points, and high priority assets such as culturally significant sites or significant conservation assets.

RTIO provides a leading example for undertaking strategic implementation of weed management across diverse operational areas throughout the Pilbara. This illustrates that weed management in the private sector is being done in a manner that incorporates the essential elements of effective weed management programs.

The Parthenium weed case study shows that through implementation of the above key elements, and continued close liaison between all stakeholders, we can be assured that effective and rapid eradication of weed incursions is possible. That indeed, good news can be found in the situation of an invasion of one of Australia's worst weeds into Western Australia at a location where it hasn't previously been detected.

#### ACKNOWLEDGMENTS

Stuart Anstee (RTIO), Hanouska Bishop (RTIO), Jae-Ho Choe (RTIO), Kelcey Ross (KBR), Doug Shooter (KBR), Sonia Green (KBR), Sandy Lloyd (DAFWA), Jon Dodd (DAFWA), Andrew Reeves (DAFWA), and Libby Howitt (Apache Energy).

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