Eyre Peninsula Landscape Board

PEST SPECIES REGIONAL MANAGEMENT PLAN

Rhamnus alaternus Italian buckthorn

This plan has a five year life period and will be reviewed in 2027.

INTRODUCTION

Synonyms

Alaternus angustifolia Mill., Gard. Dict., ed. 8. n. 3. (1768), *Alaternus balearica* Duhamel ex Steud., Nomencl. Bot. 685 (1821), *Alaternus glabra* Mill., Gard. Dict., ed. 8. n. 2. (1768), *Alaternus hispanicus* Steud., Nomencl. Bot. 685 (1821), *Alaternus latifolia* Mill., Gard. Dict., ed. 8. n. 4. (1768), *Alaternus phylica* Mill., Gard. Dict., ed. 8. n. 1. (1768), *Alaternus rotundifolia* Steud., Nomencl. Bot. 685 (1821), *Alaternus variegata* Steud., Nomencl. Bot. 685 (1821), *Rhamnus clusii* Willd., Enum. Pl. [Willdenow] 1: 250 (1809), *Rhamnus myrtifolia* Willk., Linnaea 25: 18 (1852) **[1]**

Buckthorn, blowfly bush **[1]**, Evergreen buckthorn.

Biology

Italian buckthorn *Rhamnus alaternus* L., is a large shrub or small tree growing up to 5.0 m tall. In New Zealand Italian buckthorn grows to heights of 15 m but more commonly forms 2-3 m tall shrubs. Older branches have dark brown furrowed bark, while younger branches are pale brown or purplish in colour. Younger stems are greenish and hairless (glabrous) or with fine hairs (puberulent). The roots grow from a woody lignotuber at the base of the trunk and form a large taproot.

Italian buckthorn leaves are 2 - 7.5 cm long and 0.5-4 cm wide, are oval (elliptic) to egg-shaped (ovate) and grow alternately along branches on short 2-12 mm stalks (petioles). The leaves have sharply toothed (serrate) margins and pointed tips (acute apices), they are hairless and feel leathery with dark green and glossy upper surfaces and paler undersides.

Flowers are a relatively inconspicuous pale green or yellow-green (up to 3 mm long) colour and grow in small dense clusters (0.5-2 cm long) in the leaf forks (axils). Separate male and bisexual flowers are produced in these clusters (i.e. this species is monoecious), with the majority of the flowers being male (staminate) and only a few bisexual flowers present towards the top of each cluster. Each flower is borne on a short stalk (pedicel) 1-2 mm long and has five tiny sepals and four or five petals fused at their bases into a tiny tube (corolla) about 2 mm long. The bisexual flowers have five stamens and an ovary topped with a branched style, while the male flowers only have the five stamens. The fragrant flowers are produced during winter and early spring (from May to October).

Fruiting is prolific over summer on mature plants. The small berry-like fruits (drupes) turn from green to red, and then eventually to black or brown, as they mature. The fruit (3.0-7.0 mm across) are rounded in shape (globose) and usually contain three hard nut-lets.

This species reproduces mainly by seed, however plants will re-shoot vigorously from the base whenever top growth is damaged or removed. Seeds germinate in autumn or spring.

NOTE: Italian buckthorn may be confused with native Sea Box *(Alyxia buxifolia)* or Coast Bitterbush *(Adriana quadripartia)* **[4]**.

Origin

Italian buckthorn *Rhamnus alaternus* originated in the Mediterranean region, and was introduced to Australia as a garden plant.

Distribution

Despite being described as drought tolerant, Italian buckthorn is generally found in areas receiving an annual rainfall greater than 500mm. Populations are widely scattered across southern Australia (Figure 1) with the major infestations occurring in South Australia and southern Victoria **[4]**.

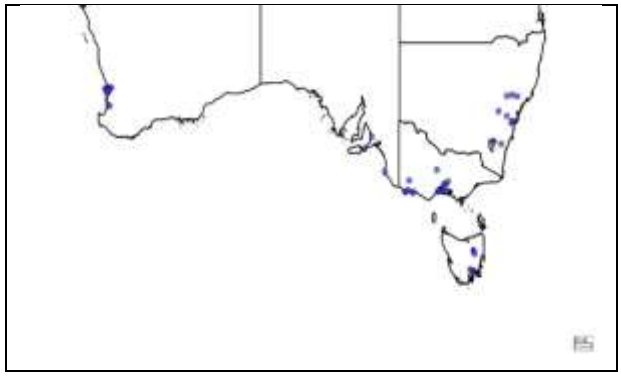

Figure 1: Distribution of *Rhamnus alaternus* in Australia. Source: Australasian Virtual Herbarium

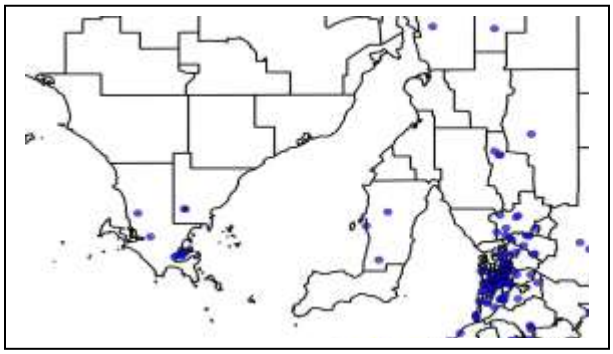

Figure 2: Distribution of *Rhamnus alaternus* in Australia. Source: atlas of Living Australia, Sept 2017.

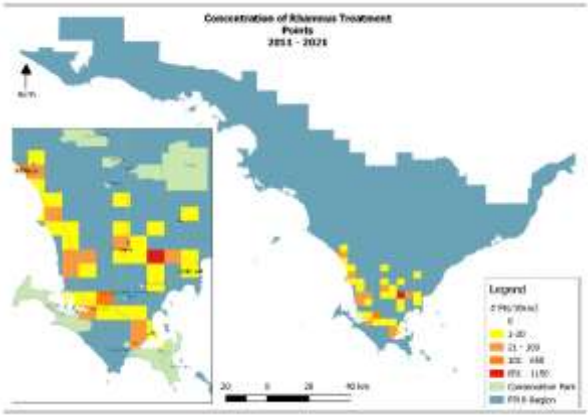

Figure 3: Concentration of Italian Buckthorn Treatment points 2011-2021.

Considering its current distribution, Italian buckthorn could potentially establish across arable areas of South Australia. It has been recorded as far north as Orroroo and Melrose, on Kangaroo Island and in the South East, southern Eyre Peninsula, the Adelaide Hills and Fleurieu Peninsula **[1].** In Western Australia it has naturalised on Rottnest Island, the Swan River cliffs, Helena Valley, and at Harvey, and is rapidly spreading in other places around Australia.

RISK ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national framework for environmental management (including the recognition of nationally threatened species and ecological communities), thereby directing resources towards the delivery of improved environmental protection. The EPBC Act applies where declared pest species threaten any listed species or ecological community, or where its control may have adverse effects on matters of national environmental significance on Commonwealth land.

South Australian weed risk assessment process

The Primary Industries and Regions SA (PIRSA) Biosecurity SA division, in cooperation with the then Natural Resources Management (now Landscape) Boards developed the Biosecurity SA Weed Risk Management System **[9]** to rank the importance of pest plants, standardise the prioritising of these plants for control programs and to assess weed species for declaration.

The Biosecurity SA Weed Risk Management System uses a series of questions to determine weed risk and feasibility of control for a species within a specific land use type. The result of the assessment is used to determine and prioritise weed management actions within each land use type.

Weed risk characteristics assessed include; invasiveness (i.e. its rate of spread); economic, environmental and social impacts, and potential distribution (total area) of the weed.

Appropriate management objectives are determined and can be prioritised using a risk matrix which compares weed risk scores against feasibility of control scores. Pest plants that have both high weed risk and are feasible to control have higher priority management objectives e.g. eradication. Conversely, species that are not feasible to control will not rank as a high priority, monitoring or limited management action may be the most appropriate management objective.

The risk matrix categorises each weed species into one of nine risk categories for regional management:

1. ALERT: to prevent species which pose a significant threat arriving and establishing in a management area.
2. ERADICATE: remove from a management area.
3. DESTROY INFESTATIONS: significantly reduce the extent in a management area.
4. CONTAIN SPREAD: prevent the ongoing spread in a management area.
5. PROTECT SITES: prevent spread to key sites/assets of high economic, environmental and/or social value.
6. MANAGE WEED: reduce the overall economic, environmental and/or social impacts through targeted management.
7. MANAGE SITES: maintain the overall economic, environmental and/or social value of key sites/assets through improved general weed management.
8. MONITOR: detect any significant changes in the species' weed risk.
9. LIMITED ACTION: species would only be targeted for coordinated control if its presence makes it likely to spread to land uses where it ranks as a higher priority.

Pest risk

Italian buckthorn is a hardy, adaptable species that establishes in full sun or partial shade can grow on a range of soil types. It establishes well on disturbed soil and **[5]**, is able to invade relatively intact vegetation **[6]**.

It tolerates a wide climatic range including frosts to -15°C, seasonal dry spells and drought, it also tolerates salt spray conditions and intense fire. **[3].**

Italian buckthorn is a copious seed producer, with plants yielding up to 3000 fruit per m^2 from

October to February. Each fruit contains two or three seeds **[6].** Fruit production per plant is variable; however has been estimated at approximately 11,000 berries per plant. The seeds are thought to have a reproductive viability period greater than 10 years.

The species is fast growing once established **[3]**, and reshoots vigorously (coppices) after being cut back at ground level or burnt.

Italian buckthorn threatens native biodiversity, it invades coastal dunes and cliffs, heath lands, melaleuca swamps, forests and woodlands **[2][4],** forming dense, evergreen canopies that shade out native understorey plants.

It has been shown to progressively replace native plants on Rangitoto Island in New Zealand where it forms an 80-100% vegetation cover, and reduced species diversity. Its vigorous growth shades out ground flora and prevents regeneration of native shrubs and trees **[7]**. If left unhindered, it is likely to smother areas reserved for reforestation.

Shade is regarded as the main agent in suppressing other plant species, however it is unknown whether the species has allelopathic properties that may affect other species **[3]**.

The fruits are primarily bird dispersed, reported to be eaten by starlings and blackbirds, and are possibly also spread by foxes and possums. Young Italian buckthorn plants are often found at the base of other trees where birds have perched and voided seed. In Europe ants have been observed dispersing seed.

The leaves of Italian buckthorn contains emodin which is thought to deter insects that feed on the plants leaves and fruits **[3]**.

Emodin in the fruits may also: deter birds from consuming too much, reducing the possibility of seeds being excreted beneath the parent plant; and shorten the bird's digestion increasing the seeds viability but reducing the distance of dispersal. The starling has a seed dispersal range of up to 40 km, but the dispersal range may be less than this because of the effect of emodin. It's still likely to be more than 1.0 km.

Italian buckthorn is palatable to sheep, goats and rabbits, but can tolerate moderate levels of grazing. Grazing, however is thought to limit the species potential for seed production and seed dispersal **[3].**

Italian buckthorn can reproduce by suckering and is easily spread in dumped garden waste. Seeds are also be spread in dumped garden waste **[2].**

In the Adelaide Hills environmental weed invasion by Italian buckthorn has been identified as a threat to the Little Dip Spider-orchid *Caladenia richardsiorum* **[8]**.

Feasibility of control

Italian buckthorn is viewed as a persistent weed because of its ability to sucker and re-shoot, long seed viability and the intensive effort required to kill mature plants.

Italian buckthorn has been planted as a hedge, these together with the plants ability to sucker can pose a physical barrier to control activity.

Infestations can be controlled in a number of ways depending on their size and situation. The current known options are:

Hand pull or grub: it is essential to remove the entire root system. Where soil conditions allow small plants and seedlings can be successfully pulled from the ground. For larger plants a tree puller can be used taking care to remove all roots – any roots remaining underground will re-shoot, requiring follow-up treatment **[4].**

Cut and swab: large plants can be killed by cutting the plant at its base as close to the ground as possible and swab the stump **immediately** with chemical. Follow-up is essential as larger plants may re-shoot.

Chemical: Triclopyr 600g/l & diesel 1:30L.

Drill and fill: drill holes in base of the plant using a 10 mm drill bit approximately 3.0 cm apart. Fill each hole with chemical and top-up at least twice or until chemical uptake has slowed.

Chemical: Glyphosate & water 1:4L

Basal barking: involves completely saturating the trunk, and any branches protruding from the trunk with chemical to a height of at least 30 cm (dependent on plant size) above ground level. The bark should be thoroughly sprayed and wet on all sides to point of runoff.

Chemical: Garlon (triclopyr 600g/l) & diesel 1:30L (as per APVMA permit 12932).

Foliar spray: Involves spraying all leaves with chemical while avoiding native plant species.

Chemical: Garlon (triclopyr 600g/l) & water 170-200ml: 100L. A wetter (Chemwet 1000) has also been used at a rate of 100ml: 100L.

Hand pull, cut and swab and drill and fill techniques are very labour intensive and sometimes not effective, a combination of basal barking and foliar spray is more effective (Andrew Freeman pers comms.).

Stock-grazing in areas where grassland is desired will provide reliable protection from Italian buckthorn invasion**.** Stock-grazing and rabbit browsing were integrated into the Italian buckthorn control strategy on Motutapu Island, NZ **[7]**.

Status

Italian buckthorn weed risk assessments vary across the State according to variability in habitats and extent of infestation. On Kangaroo Island and in the Murray-Darling Basin where Italian buckthorn is reasonably localised, 'eradication' is being attempted. The Alinytiara Wilurara, South Australian Arid Lands and the Northern and Yorke regions determine a 'limited action' approach.

The State level risk assessment determines 'limited action' in native vegetation, however the weed risk in coastal vegetation on Eyre Peninsula in much higher (135).

The Eyre Peninsula Landscape Board risk management assessment (Table 1) rates Italian buckthorn as **'manage weed'** in native vegetation Eyre Peninsula.

Table 1: Regional Assessment

Land Use	Pest Risk	Feasibility of Control	Management Action
Native vegetation	High	Low	Manage Weed

REGIONAL RESPONSE

Special considerations/Board position

A State Declared Plant Policy and Management Plan **[1]** exists for Italian buckthorn (*Rhamnus alaternus*). The policy provides State level outcomes, objectives and implementation actions for regional Landscape Board authorities.

The Eyre Peninsula Landscape Board regional pest management plan supports the State Italian buckthorn policy.

Where Italian buckthorn provides critical habitat for threatened fauna, a staged transition from buckthorn to a natural habitat needs to be implemented to provide continuity in habitat function for the species being protected.

Outcomes

To reduce the impact of Italian buckthorn on key environmental sites/assets, control outlier populations and prevent spread into unaffected areas.

Objective

1. Identify and protect key assets under threat from Italian buckthorn.
2. Determine the extent of outlier populations on Eyre Peninsula and undertake control.
3. Undertake survey work in unaffected areas to locate and control new infestations.

Area/s to be protected

Key sites/assets to be protected are:

- EPBC listed vegetation communities
- Areas containing EPBC listed plant and animal species
- Unaffected areas

Actions

Land managers to:

1. survey and control infestations near key sites/assets annually and supply survey and control information on request to Landscape Board staff;
2. prevent the spread of Italian Buckthorn by searching annually for outlier infestations near known infestations; and
3. monitor areas of previous control works and undertake follow-up control works as required.

Landscape Board staff to:

4. facilitate, encourage, compel (develop action plans) control on private land to protect key sites/assets;
5. facilitate, encourage, compel or undertake control on public land, including roadsides, to protect key sites/assets (costs may be recovered from land managers);
6. carry out opportunistic monitoring for sale of Italian buckthorn plants at markets and community events;
7. Develop localised annual action plans to achieve the objectives and actions of this management plan
8. undertake systematic data collection (control and survey numbers, location and date information) and storage in a central spatial database; and

9. provide education on control methods and encourage wider control.

Evaluation

Evaluation of success will be based on:

- annual analysis in November of monitoring and control data to evaluate the success of pest plan actions (including the update of spatial layers);
- identify any gaps in delivery and action as soon as possible; and
- review of this pest management plan every five years

Declarations

Italian buckthorn is declared under the *Landscape South Australia Act of 2019*. The movement and/or transport of the plants by itself or as a contaminant, or sale by itself or as a contaminant, is prohibited. Landscape Board authorities may compel land owners to control Italian buckthorn on their land. Landscape Board authorities are responsible for the control of plants on road reserves and may recover costs from the adjoining land owners **[1]**.

Italian buckthorn is declared in Category 3 under the Landscape South Australia Act 2021 for the purpose of setting maximum penalties and for other purposes. Any permit to allow its movement or sale can only be issued by the regional Landscape Board pursuant to section 197 **[1]**.

Table 2: Relevant sections of the Landscape South Australia Act 2019.

Section	How the section applies
Provision for whole of State	
188(1)	Prohibiting sale of the plant
188 (2)	Prohibiting sale of contaminated goods
Provisions for EP Landscape Board region	
192(2)	Land owner must keep controlled the plants on their land

More information

Contact your local Eyre Peninsula Landscape Board office

www.landscape.gov.au/ep/contact-us

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References

1. Declared Plant Policy, Italian Buckthorn *(Rhamnus alaternus)* Primary Industries and Regions South Australia. Accessed online at http://www.pir.sa.gov.au/biosecuritysa/nrm_biosecurity/weeds/pest_weed_policies. January 2015.
2. Queensland Government. 2011. *Italian buckthorn Rhamnus alaternus* Factsheet 2011; Available from: http://keyserver.lucidcentral.org/weeds/data/080c0106-040c-4508-8300-0b0a06060e01/media/html/Rhamnus_alaternus.htm . 2011.
3. Department of Economic Development, J., Transport and Resources,. 2017. *Invasiveness Assessment - Italian buckthorn (Rhamnus alaternus)* in Victoria. 2017.
4. Muyt, A., 2001, *Bush Invaders of South-East Australia: a guide to the identification and control of environmental weeds found in South-East Australia*. Melbourne: RG and FJ Richardson.
5. The Weeds Society of WA (Inc). 2007, *Western Weeds Second Edition – A guide to the weeds of WA, 2007*.
6. Keighery, G., 2005. *Predicting and preventing the west's environmental weeds of the next century. Department of Conservation and Land Management,* WA Wildlife Research Centre, Woodvale, PO Box 51, Wanneroo, WA 6065. Nuytsia, **15(3)**: p. 4.
7. Fromont, M.L., 1997. *Rhamnus Alaternus - Environmental weed on Motutapu and Rangitoto Islands, Auckland,* CI- School of Environmental and Marine Sciences, Tamaki Campus, University of Auckland, Private Bag 92019, Auckland. Tane, **36**: p. 9.
8. Dickson C.R., A.R.A., Murphy A., Pritchard A., and Craig A.,, (2012). *Recovery Plan for three orchid species in South Australia and Victoria: Caladenia richardsiorum (Little Dip Spider-orchid), Caladenia calcicola (Limestone Spider-orchid) and Pterostylis tenuissima (Swamp Greenhood).* . Department of Environment, Water and Natural Resources, South Australia, South East Region & Department of Sustainability and Environment, Victoria, South West Victoria Region.
9. Virtue, J.G., 2008, SA Weed Risk Management Guide February 2008. Adelaide: Department of Water Land and Biodiversity Conservation - South Australia. 22.