Action statement No.262

Flora and Fauna Guarantee Act 1988

White Sunray *Leucochrysum albicans* var. *tricolor*

Department of Environment, Land, Water & Planning

State Government Victoria

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White Sunray *Leucochrysum albicans* var. *tricolor*

Description

The White Sunray (*Leucochrysum albicans* var. *tricolor* (DC.) Paul G. Wilson *Asteraceae*) is a perennial everlasting daisy with narrow leaves 2 – 10 cm long that are covered in white cottony hairs. The flower heads are 2 – 5 cm in diameter and surrounded by showy whitish ovate-oblong bracts, with the outer layer often tinged purple. The cluster of bisexual flowers in the centre of the flower-head is yellow. The fruits (cypselas) are brown, ovoid and 2 – 3 mm long; they bear 14 – 20 pappus bristles (Wilson, 1992; Short, 1999). Although perennial, this species dries out over summer.

Distribution

In Victoria, the White Sunray occurs in the Volcanic Plains Bioregion between Inverleigh, Ballarat, Ararat and Hamilton. It is known from 50 populations. The species was once more widespread in south-western Victoria, with records at the National Herbarium of Victoria (MEL) from Port Fairy, Macarthur, Creswick and Mt Cole. This taxon also occurs in the Midlands region of Tasmania and in the Southern Highlands region of NSW/ACT.

Habitat

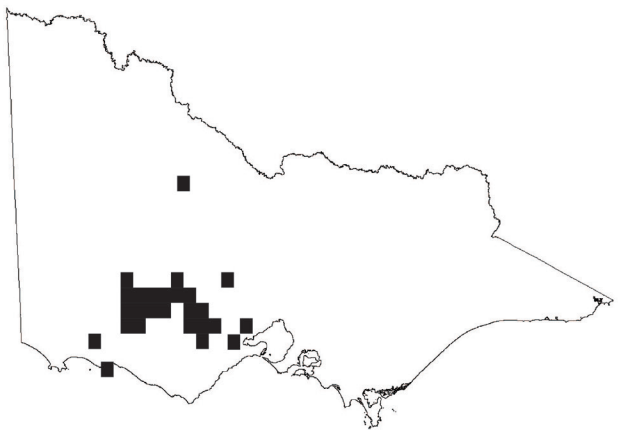
Known populations are almost entirely restricted to grasslands and woodlands on relatively heavy soils. The continual exposure of open/bare ground is required for their persistence. In Victoria, White Sunray occurs almost exclusively on acidic clay soils derived from basalt, and in a few cases on nearby sandy-clay soils derived from sedimentary material (Costin, 1999; Costin *et al.*, 2001). Most Victorian occurrences are in grassland communities dominated by *Themeda triandra*. The White Sunray generally occurs in the spaces between grass tussocks in association with other herb species.

Life History and Ecology

Individuals are short-lived (maximum seven years) (J. Morgan pers. comm. 2014). The adult plant survives above-ground disturbance as rootstock, while recruitment requires canopy gaps. Seeds from Victorian plants are generally highly viable and germinate rapidly (within seven days) (Morgan *et al.*, 2013). When self-pollinated, the White Sunray does not set any seed, showing that it is entirely dependent on the transfer of pollen between individuals for successful reproduction (Costin *et al.*, 2001). Pollination is effected by many different insects, including bees (Apidae) and flies (Tephritidae) (McClaren 2013).

Fire is known to be an important disturbance agent in many native grasslands, particularly those which rapidly form a closed grass sward, including the Victorian basalt plains grassland (Morgan, 1996). White Sunray plants resprout after fire, and seedlings germinate on the bare ground. Indeed, the largest remaining populations of this species occur in areas that are burnt frequently (e.g. Glenelg Highway near Wickliffe, Bolac Plains Rd at Woorndoo, Willaura roadsides).

White Sunray (Bill Higham)



Distribution in Victoria (DELWP, 2015)

Conservation status

National conservation status

White Sunray is listed as endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Victorian conservation status

The White Sunray has been listed as threatened under the *Flora and Fauna Guarantee Act 1988* (FFG Act).

It is considered endangered in the Department of Environment, Land, Water and Planning (DELWP)'s *Advisory List of Rare or Threatened Plants in Victoria - 2014* (DEPI, 2014).

Threats

The greatest threats to the species are weed invasion, habitat destruction, soil erosion, herbivory and inappropriate fire regimes (i.e. season or frequency of fire).

Standard threat	Source of threat	Explanation
Competition	Invasion by environmental weeds	Invasion by pasture grasses, pine trees (*Pinus* spp.), Phalaris (*Phalaris aquatica*), non-indigenous *Melaleuca* spp. and Hedge Wattle (*Acacia paradoxa*) (Inverleigh site) are a threat to White Sunray. Large-flower Wood-sorrel (*Oxalis purpurea*) is a threat at Rokewood Cemetery.
Habitat damage or loss	Soil erosion	Vehicles and machinery are a threat if they grade or scrape the topsoil off a site, thereby destroying plants. This includes activities such as grading fire breaks, ploughing or bulldozing to subsoil level, will destroy White Sunray plants.
Herbivory	Insects	Reproductive effort can be decreased by herbivory, for example, at Rokewood, an unidentified insect is removing flower heads before seed set is completed.
Inappropriate fire regimes	Fire - season or time	Timing and frequency of fuel reduction burning is important to the persistence of the White Sunray. White Sunray is vulnerable to fire in spring (ie. during flowering period). Long fire-free intervals (ie. greater than 4-5 years) are detrimental to White Sunray.

Important locations

Catchment	Location name	Land manager	Bioregion
GLENELG-HOPKINS	Chatsworth-Wickliffe Rd	Ararat Rural City Council	Dundas Tablelands
	Eurambeen -Streatham Road	Pyrenees Shire	Central Victorian Uplands
	Glenelg Highway - Streatham	Ararat Rural City Council	Victorian Volcanic Plain
	Maroona-Glenthompson Rd	Ararat Rural City Council	Dundas Tablelands
	Mortlake-Ararat Rd	Ararat Rural City Council	Victorian Volcanic Plain
	Willaura-Wickliffe Rd	Ararat Rural City Council	Dundas Tablelands

GLENELG-HOPKINS	Woorndoo Rd	Moyne Shire	Dundas Tablelands
CORANGAMITE	Hamilton Highway - Cressy	VicRoads	Victorian Volcanic Plain
	Inverleigh Flora Reserve	Parks Victoria	Victorian Volcanic Plain
	Lismore Rd	VicRoads	Victorian Volcanic Plain
	Rokewood Cemetery	Rokewood Cemetery Trust	Central Victorian Uplands

Past management actions

Action	Result explanation
Assessed habitat characteristics and/or condition	Surveys of the habitat where White Sunray occurs have taken place at: Chatsworth-Wickliffe Rd; Glenelg Highway, Streatham; Hamilton Highway, Cressy; Lismore Rd; Maroona-Glenthompson Rd; Willaura-Wickliffe Rd and Woorndoo Rd.
Erected/maintained signs to restrict or discourage access	Signs to clearly identify the site and increase awareness have been installed at Chatsworth-Wickliffe Rd; Eurambeen-Streatham Rd; Hamilton Highway, Cressy; Hexham-Chatsworth Rd; Lismore Rd and Mortlake-Ararat Rd.
Managed environmental weeds	The South African Weed Orchid *Disa bracteata* has been removed from the Willaura-Wickliffe Rd and Wickliffe-Chatsworth Rd sites. The fuel break for this latter site was treated by contractors in December 2012 as part of a strategic weed control program between Department of Sustainability and Environment (now DELWP) and VicRoads. Weed control was undertaken in 2010 at Eurambeen-Streatham Rd. Follow-up weed control works were undertaken in 2012/2013 and targeted *Phalaris aquatica* and other exotic pasture grasses within the roadside verge and along the fuel break adjacent to the grassland. *Disa bracteata* has been recently been discovered in the Rokewood Cemetery grassland and removed. Weed control has also occurred at Glenelg Highway, Streatham; Hexham-Chatsworth Rd; Mortlake-Ararat Rd site. At Inverleigh F.R., *Acacia paradoxa* was removed in 2009/2010.
Liaised with private landholders	Liaison occurred with the landholder at Chepstowe with regard to management of the site in 2010/2011.
Liaised with government agencies	Liaison initially occurred in 2009/2010 with VicRoads and the Pyrenees Shire in regards to the location of the Eurambeen-Streatham Rd site. At the Lismore Rd site, liaison occurred with VicRoads to restrict slashing of roadside vegetation to when the species is not flowering. At the Hexham-Chatsworth Rd site, liaison occurred between Department of Sustainability and Environment (now DELWP), CFA and Moyne Shire Council with regard to the management of the site in 2010/2011.

Conducted survey to determine abundance/ extent	Surveys to determine abundance and extent of populations of White Sunray have occurred at: Glenelg Highway, Wickliffe site; Hamilton Highway, Cressy; Inverleigh; Lismore Rd; Mortlake-Ararat Rd and Willaura-Wickliffe Rd.
Undertook detailed population monitoring and collect demographic information.	Population monitoring has occurred at the following sites, in the years indicated: • Glenelg Highway, Streatham: 2006/2007, 2008/2009, 2010/2011, and 2012/2013. • Hamilton Highway, Cressy: 2006/2007, 2007/2008, 2008/2009 and 2010/2011. • Hexham-Chatsworth Rd: 2011. • Inverleigh: 2008/2009 and 2011/2012. • Lismore Rd: 2006-2010. • Maroona-Glenthompson Rd: 2006 to 2009. • Mortlake-Ararat Rd: 2011 and 2012. • Rokewood Cemetery: 2006 to present. • Willaura-Wickliffe Rd: 2008/2009, 2011/2012 and 2012/2013. • Woorndoo Rd: 2006 to 2010, and 2012/2013.
Applied ecological burning	Ecological burning occurred in February 2012 at the Hamilton Highway, Mortlake site. Ecological burning is regularly carried out at Rokewood Cemetery.
Acquired baseline population data	At the Hexham-Chatsworth Rd site, a population survey and biomass assessment occurred in December 2011.
Assessed threats	At the Inverleigh site, threats were assessed in 2008/2009 and were found to consist of vehicle disturbance. In 2009/2010 machinery damage to the site occurred during *Acacia paradoxa* removal. The threat of *A. paradoxa* at this site was reduced by burning in autumn 2011.
Identified potential sites for reintroduction/ translocation	At the Inverleigh site, an area was identified for translocation in 2008/2009.
Restocked populations with seed or propagated plants	At Inverleigh, 100 seedlings were planted on 16/9/2009; a follow-up visit in January 2010 found 40 live plants.
Constructed/maintained information boards	At the Rokewood Cemetery site, a large interpretative sign was installed in 2009.

Conservation objectives

Long term objective

To ensure that the White Sunray can survive, flourish and retain its potential for evolutionary development in the wild.

Objectives of this Action Statement

• To increase knowledge of biology, ecology or management requirements

- To secure populations or habitat from potentially incompatible land use or catastrophic loss
- To maintain or increase the extent of habitat
- To maintain or improve the condition of the habitat
- To increase the number of populations or individuals
- To maintain or increase community awareness and support

Intended management actions

The actions in this action statement have been developed taking into consideration relevant social and economic matters, as required under the FFG Act.

These actions are designed to support the conservation, management or control of flora and fauna and the management of potentially threatening processes, which will assist in mitigating any impact of climate change on White Sunray, and will have no impact on greenhouse gas emissions.

The intended management actions listed below are further elaborated in DELWP's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

Standard objective	Objective explanation
To increase knowledge of the biology, ecology and management requirements	Abundance, extent, distribution, life history and critical habitat of White Sunray to be accurately determined. Threats to the species to be determined and used to inform site management. Research on the biology and ecology of White Sunray to be conducted with re-sults reported on.

Standard action	Details	Responsible agents
Conduct surveys to confirm existing records	Survey to confirm population exists and assess and manage threats.	DELWP
Acquire baseline population data	Acquire baseline population data where this has not yet occurred by conducting detailed desk-top and field surveys. Data should include identification of the area and extent of populations.	DELWP
Undertake detailed population monitoring and collect demographic information	Continue collection of demographic information about the species, including estimates of the structure of the population and inferences of population change	DELWP
Conduct surveys to locate additional populations	Identify and survey potential White Sunray habitat.	DELWP
Assess habitat characteristics and/or condition	Collect floristic and environmental information required to describe the general habitat of White Sunray populations.	DELWP
Collate, analyse and report on data	Collate, analyse and report regularly on data collected.	DELWP

Assess threats	Assess threats including weeds, herbivory (including previously unidentified insect), human disturbance. Implement management actions as required .	DELWP
Identify research priorities and facilitate their implementation	Encourage and support research and disseminate results at scientific meetings and in journals.	DELWP
Ensure records of species, communities and locations are documented on the relevant databases	Ensure that DELWP information systems contain up to date information, including reporting all species records and progress on actions.	DELWP

Standard objective	Objective explanation	
To secure populations or habitat from potentially incompatible land use or catastrophic loss	Landholders/land managers to be made aware of White Sunray populations to prevent inadvertent habitat damage. Signage to be erected to identify White Sunray populations.	
Standard action	**Details**	**Responsible agents**
Liaise with stakeholders	Co-ordinate recovery and exchange knowledge with local and interstate agencies to maintain communication.	DELWP
Establish or maintain a Recovery working group	Establish a threatened flora recovery working group. Attend two meetings annually, and prepare work plans.	DELWP
Erect/maintain signs to restrict or discourage access	Install, monitor and maintain signs to clearly identify the site. Engage land managers, as required, to erect signs. Conduct consultation with local government, CFA and adjacent land holders.	DELWP

Standard objective	Objective explanation	
To maintain or increase the extent of habitat	Prevent management activities from negatively impacting White Sunray populations.	
Standard action	**Details**	**Responsible agents**
Prevent habitat loss	Liaise with VicRoads with aim to ensure roadside maintenance and vegetation management do not negatively impact on grassland habitat of White Sunray	DELWP

Standard objective	Objective explanation	
To maintain or improve the condition of the habitat	Weed infestations to be eradicated and new infestations are acted upon. Maintain adequate fire frequency for species survival.	
Standard action	**Details**	**Responsible agents**
Manage environmental weeds	Control weeds, using application of herbicide/hand removal or burning regimes as appropriate	DELWP, VicRoads
Apply ecological burning	Conduct ecological burns at intervals of three years or less and aim to burn in summer/autumn following flowering and fruiting of White Sunray.	CFA Hamilton, Rokewood, DELWP

Standard objective	Objective explanation	
To increase the number of populations or individuals	Increase or maintain the population size at all sites. Genetic variation of White Sunray to be maintained across its range.	
Standard action	**Details**	**Responsible agents**
Collect reproductive material	Conduct an inventory of seed that has been collected. Evaluate need for collection of further seed. Collect seed as required, and store at the Royal Botanic Gardens Melbourne, as part of the Victorian Conservation Seedbank project. Seed to be utilised for future reintroductions and for *ex situ* storage.	DELWP, Royal Botanic Gardens Melbourne

Standard objective	Objective explanation	
To maintain or increase community awareness and support	Information on the ecology of White Sunray to be disseminated. DELWP information systems to contain up-to-date information about White Sun-ray.	
Standard action	**Details**	**Responsible agents**
Develop, publish and distribute educational, technical or publicity material and/or displays.	Community education, and encouragement of individuals to report sightings of White Sunray to regional DELWP staff.	DELWP

Personal Communications

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