

A close-up photograph of several orange hawkweed flowers with bright orange and yellow petals, set against a blurred green background. The flowers are the central focus of the top half of the page.

ORANGE HAWKWEED IN TASMANIA

SUMMARY REPORT

A BRIEF HISTORY

Orange hawkweed (*Pilosella aurantiaca* subsp. *aurantiacais*) is an aggressive invasive species that can be found in and around alpine regions in Victoria, NSW and Tasmania.

A declared weed in Tasmania, its known distribution across our State is limited to Hobart's outskirts and the Central Highlands. It has previously also been recorded in Circular Head, Meander Valley, Maydena and Kingborough municipalities.

Opinions differ on exactly how this plant made its way into Tasmania, but one fact is certain; without effective control it has significant potential to wreak havoc across our agricultural and natural landscapes.



Orange hawkweed is native to alpine regions of Central and Southern Europe

THE RISKS TO OUR LANDSCAPES

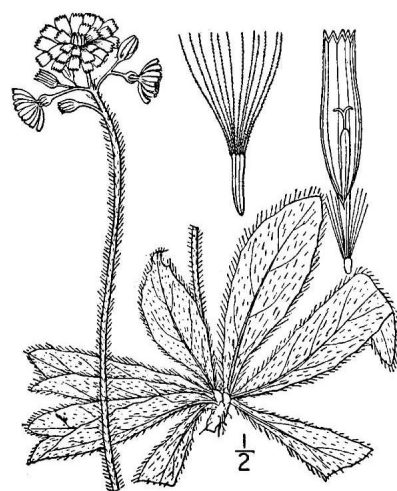
Orange hawkweed poses a serious threat for multiple reasons. It can form dense mats, outcompeting other species – with negative impacts on biodiversity and productivity. It's an unfussy invader that can establish on sites with a range of soil and climatic conditions, and it can tolerate low-nutrient, acidic or disturbed soils (such as after a fire). Not only that, some species of hawkweed can alter soil chemistry, organic matter levels and microbial activity under patches – changing soil biology to such an extent that other plants can't establish. Its pollen also has properties that inhibit the pollination, seed germination or seedling growth of other plants.

Its current distribution puts it in close proximity to the Tasmanian Wilderness World Heritage Area and while it prefers elevations about 1,000m, it can survive at lower altitudes.

HOW DOES IT SPREAD?

Orange hawkweed can reproduce asexually and establishes via vegetative spread (via stolons and rhizomes) and seed production. While it is primarily spread by wind (most likely only within a close range) it can also travel to new sites via waterways or by hitching a ride on people, birds, animals or machinery.

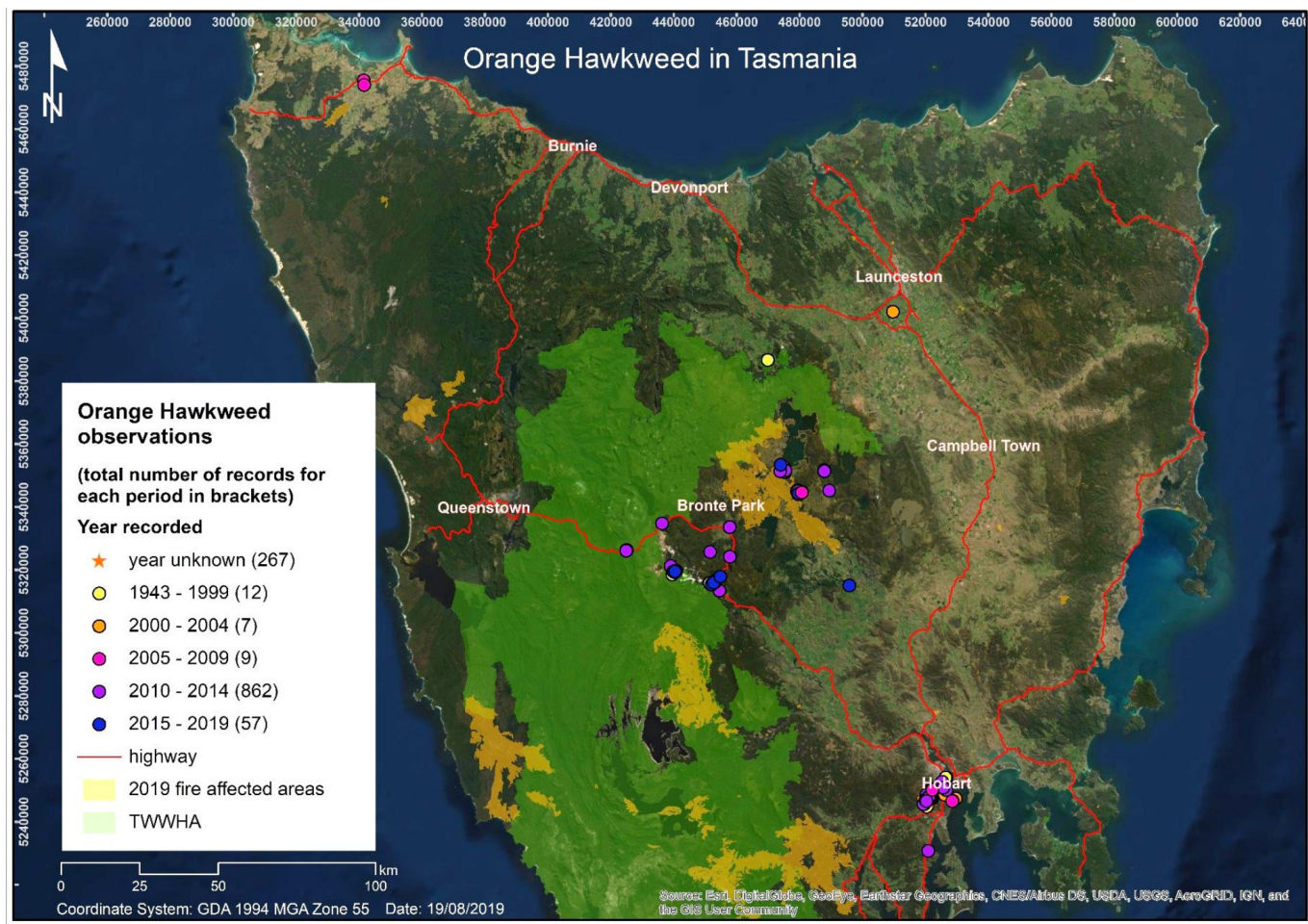
ONE SQUARE METRE OF ORANGE HAWKWEED CAN PRODUCE UP TO 40,000 SEEDS A YEAR.



Orange hawkweed is hard to identify when not in flower and difficult to control. Known populations have been monitored and controlled for a number of years in Tasmania, with many land managers, landowners and organisations contributing financially and in-kind. However, there hasn't been a sustained or co-ordinated approach to its control.

Identifying the most cost-effective means of achieving early detection and control is a priority and, in 2019, Biosecurity Tasmania commissioned NRM South to develop the first steps towards a co-ordinated eradication strategy. This will involve identifying stakeholders involved in orange hawkweed management, reinstating a network of key landowners and managers, exploring alternative funding options, improving distribution mapping, examining different approaches to eradication and developing a status report.

THE ORANGE HAWKWEED NETWORK WAS RE-ESTABLISHED IN EARLY 2019 AND INCLUDES BIOSECURITY TASMANIA, CITY OF HOBART, TASMANIA PARKS AND WILDLIFE SERVICE, CENTRAL HIGHLANDS COUNCIL (VIA THE DERWENT CATCHMENT PROJECT), DEPARTMENT OF STATE GROWTH AND KINGBOROUGH COUNCIL.



2019 distribution of orange hawkweed in Tasmania, from Natural Values Atlas records.

NRM South's work to check and update monitoring records highlighted multiple data gaps. Investigations into 267 records that had missing metadata could not find any additional information. It was not possible to map the changes in the distribution of orange hawkweed over time using the Natural Values Atlas records due to inconsistent survey efforts and areas searched over time – as well as the missing data.

2019 WEED CONTROL AND SURVEYS

HOBART

Over the 2018/2019 summer, City of Hobart council monitored the extent of orange hawkweed in Fern Tree, and revisited private properties last surveyed in 2011/2012. The data will help to inform the development of an eradication program.

Following the surveys, City of Hobart found that orange hawkweed has not moved across properties in the past five years, with low flowering rates limiting its spread. The occurrence of orange hawkweed has also declined, even when taking into account that new properties were added to the survey. Moving forward, City of Hobart regard public education as essential as well as extending the survey area, trialling a landholder incentive scheme for orange hawkweed eradication and treating orange hawkweed on council land.

KINGBOROUGH

Orange hawkweed has not been seen at its previously known location for over five years. While it's unlikely that this weed is still present in the Kingborough region, it is possible that there may be unidentified infestations in the Neika area. City of Hobart Council is interested in working with Kingborough Council to survey for orange hawkweed on the boundaries of the two municipalities, specifically in the Neika area.

CENTRAL HIGHLANDS

Orange hawkweed remains a serious concern in the Central Highlands. Weed control and management in this municipality is coordinated by The Derwent Catchment Project (DCP). While control at several known sites appears to be working, surveys show that the weed has spread to new sites.

There are 14 known infestations in the Central Highlands, although they are concentrated across just 100 ha - at Shannon, Butlers Gorge, Miena and Tarraleah. A further 11 sites, comprising less than 1ha, are mostly roadside locations.

During 2019, surveys at known sites near the Tasmanian Wilderness World Heritage Area (TWWHA) found that orange hawkweed was either not present or located in outlying areas. Infestations at Shannon and Butlers Gorge had reduced in area. There is some evidence of spread at four sites; Maydena, The Steppes Reserve, Bothwell and the Cattle Hill Wind Farm.

A data review by DCP identified eight additional locations; five of which are within the Central Highlands municipality (Bothwell, Bronte Park, Fourteen Mile Rd, Cattle Hill and The Steppes). All but two are on private land.

Overall, DCP consider that the total coverage of orange hawkweed across Central Highlands has been underestimated and identified some data had not been entered into the Natural Values Atlas. DCP have found control efforts effective at many of the sites in the Central Highlands and have developed recommendations for ongoing control.

STATE GROWTH

State Growth contracted surveyors to assess the Squires Creek infestation in 2016-17 and 2017-18, with no plants found. Contractors also treated orange hawkweed near Arthurs Lake.

HYDRO TASMANIA

Hydro Tasmania have been managing orange hawkweed for nine seasons on their land but are concerned that surrounding landowners are not, meaning reintroductions may be occurring - particularly in areas adjoining riparian zones at Shannon.

LAKE ST CLAIR

Staff from Tasmania's Parks and Wildlife Service identified several infestations next to the Lyell Highway near Lake St Clair National Park and had been managing some of them. Additional sites have been located and mapped (at Derwent Bridge and further along the highway in the Griffiths Creek/ Mt Arrowsmith area). Control work has been carried out on both the Derwent bridge site and the Mt Arrowsmith sites, although here also there are concerns that surrounding landowners have not been controlling orange hawkweed on their properties.

CONTROLLING THE SPREAD

Based on work done on the mainland, effective control and eradication will depend on a range of survey strategies, particularly those suited to remote and difficult sites. Innovative approaches are being examined, including detector dogs, drones and satellite imagery. Modelling is another tool that may help, using information on dispersal vectors such as wind, water and roads to predict areas where orange hawkweed may have spread and concentrating survey efforts at these sites.

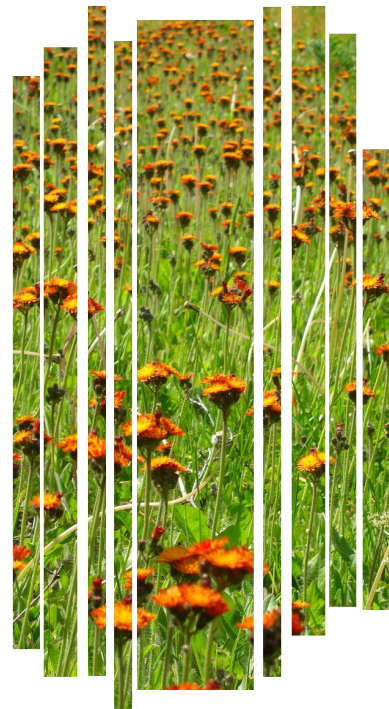
On-going monitoring of known infestations will also be essential. Orange hawkweed is a persistent weed, which may re-sprout from stolons and rhizomes and has seeds that can remain viable for up to five years.

It is well known that trained scent dogs have superior weed, pest and disease detection capabilities compared to humans or other survey methods. While dogs will not replace the need for volunteer, contractors or staff in weed programs, they significantly boost search capabilities.

NRM South funded the training of "Fonz" to detect orange hawkweed. Fonz had previous experience with serrated tussock and, after initial training, Fonz and the handlers visited sites at Fern Tree and in the Central Highlands to further develop his skills. He was joined by an additional detector dog (specifically trained in orange hawkweed) to assist with training. Fonz will continue to work at the Steppes in identifying orange hawkweed (which will then be treated) via an NRM South administered grant.



Fonzie on patrol in the Central Highlands



Drones are a promising tool to detect, map and target a number of species – particularly in remote areas. The detection process can be automated to detect the bright coloured flowers and work is also underway to detect orange hawkweed outside the flowering season, by identifying the distinctive geometry of the plants and leaves. This is currently being trialled in NSW.

Due to the labour-intensive nature of eradication work, the cost of removing orange hawkweed has been estimated at around \$AU20,000–40,000/ha. Time of treatment and the type of herbicides used are being reviewed to ensure the best and most cost-effective outcome.



Drones can survey large or inaccessible areas at low cost

THE FUTURE

Complete eradication of any weed once it has established is notoriously difficult and has not yet been accomplished in Australia. However, dedicating resources to eradicate orange hawkweed is critical, due to the risk to natural and agricultural values that it poses. Achieving eradication demands substantial investment and well-coordinated planning over many years, establishing containment while working towards eradication. This means decreasing the risk of weed spread by eliminating seed and plant dispersal and exhausting the seed soil reserve, a strategy that is being achieved in NSW and Victoria.

Tasmania's orange hawkweed infestations appear to be predominantly in Fern Tree and the Central Highlands. However, there are records further afield, including the northwest coast and there may be other unknown infestations. Further delimiting surveys to determine the full extent of orange hawkweed are needed and modelling may help with defining priority areas. As fire events increase in Tasmania, the risk of orange hawkweed invading new areas also increases, something to be considered in future management.

Once priority areas to be searched are refined (beyond what is already broadly known), methods for delimiting surveys need to be determined. This should be informed by approaches trialled on the mainland - adjusted to local conditions. Evaluations should determine when tools such as drones, detector dogs, volunteers and satellite imagery could be used and surveys must be carefully planned - with all data documented.

Survey data should be held in databases available to relevant stakeholders. It is broadly agreed that whatever herbicide is used must be taken up by the stolons and rhizomes, so the timing of treatment is important. Some herbicides impact other plant species so this needs to be considered in areas with bushland or important natural values. Additional trials on the effectiveness of different herbicides (in cooperation with NSW and Victoria) may be needed. In managing the weed's spread, flowers and seed heads must also be removed to prevent seed set, and hygiene practices are critical.

Whatever the treatment strategy used, a multi-year program will be required to monitor treated areas and re-treat as required. A partnership approach is recommended, allowing collaborators to share resources, streamline work and share scientific and other findings with members. While the Orange Hawkweed Network is the obvious group to undertake these tasks, more work is needed to improve engagement with key agencies and private landowners.