Declared Animal Policy

This policy relates to natural resources management, as per section 9(1)(d) of the Landscape South Australia Act 2019 *(the Act), enabling co-ordinated implementation and promotion of sound management programs and practices for the use, development or protection of natural resources of the State. Specifically, this policy provides guidance on the use and management of natural resources relating to the prevention or control of impacts caused by pest species of animals/plants that may have an adverse effect on the environment, primary production or the community, in accordance with section 7(1)(f) of the Act.*

House mouse
(*Mus musculus*)

This policy summarises the requirements to manage house mice under the following legislative instruments: *Landscape South Australia Act 2019* (the LSA Act), and the *Landscape South Australia (General) Regulations 2020* (the General Regulations). This policy also provides interpretation and recommended best practice on how legislative requirements can be met.

Preamble

The non-native house mouse is widely established across South Australia and can build to plague levels following favourable seasonal conditions, particularly in grain production areas. The majority of mice remain on properties where they were born and as such landholders are the primary beneficiaries of any control they undertake.

As a result of this, formal government intervention under the LSA Act to enforce the control of house mice by landowners is not warranted. However, roles for government, industry and the wider community in house mouse management are detailed in this policy.

Purpose

- Minimise the adverse impacts of mice on the environment, primary production and community.

Objectives

- Government, industry and community recognise their shared roles and responsibilities for mouse management and collaborate where required at state, regional and local levels.
- Best practice in the prevention, early detection and control of mouse impacts is adopted by stakeholders.
- Cost effective control measures developed by industry are promoted, to reduce impacts on primary industry, environment and community.

Management Plan:

Under section 185(1)(a)(i) of the LSA Act, the Minister for Environment and Water has declared that sections 187(1) and 189 of the LSA Act apply to wild form house mice, meaning they must not be kept or released.

Sections 189 and 191(1) of the LSA Act apply to domestic form house mice, meaning they must not be released and that a person in possession of domestic mice must comply with instructions of an Authorised Officer.

Implementation

The above policy objectives will be implemented through the following shared roles and responsibilities:

Department of Primary Industries and Regions (PIRSA)

- Should collate information on mouse activity from regional landscape boards and other sources in February each year and subsequently notify stakeholders (i.e. farmer and agronomist networks, bait manufacturers, landscape boards, local government) in years where there is a risk of a significant regional or state-level build up in mouse numbers occurring. Note that the national, grains industry farm-based mouse monitoring system MouseAlert[1] has been developed for farmer reporting of mice activity, to provide data for modelling of mouse plague risks.
- Should (with assistance from industry organisations and landscape boards) utilise rural media, industry workshops and extension materials to promote the need for farmers to inspect cropping paddocks, consult with agronomists and order bait from resellers at the earliest possible time.
- Should collaborate with industry to make current information on best practice mouse management available via factsheets, media and other extension activities.
- Should participate in, or provide input to, national policy and research initiatives on improved control strategies for mice management with other state and interstate government agencies, industry bodies and research organisations, where there are clear benefits for SA.
- Should provide planning and technical advice to local governments, in collaboration with landscape boards, to address emerging mice problems around townships arising from interfacing with cropping lands and/or grain storage.

Landscape boards

- Should utilise their local and regional networks with private agronomists, chemical retailers, local government and individual farmers to gather any pertinent information on build-up of mice populations in February each year (e.g. trends in mouse activity, whether baiting is occurring), reporting this to PIRSA Biosecurity Division.
- Should assist PIRSA as needed in targeting information to specific localities, including rural townships at risk (through communication with local governments).

[1] http://www.feralscan.org.au/mousealert/

- Should undertake field-based monitoring, where seen as cost-beneficial, to indicate local trends in mice populations during the cropping season.

Rural landowners

- Are responsible for the control of mice on their land as part of their normal management practices, including paddock hygiene measures to minimize build-up of mouse populations.
- Are encouraged to inspect cropping paddocks, consult with agronomists and, where judged to be required, order bait from resellers at the earliest possible time.
- Are encouraged to assist industry (through MouseAlert), landscape boards and Primary Industries and Regions in their efforts to provide situation reports on mouse numbers in years where there is a risk of a significant regional or state-level build up in mouse numbers occurring.
- Are informed that the manufacture, supply and application of baits for control of house mice is the responsibility of private industry. The government will not undertake these functions.

Private sector

- Are responsible for control of mice in domestic/industrial situations. Local government may provide information on mouse control to landholders as part of their general role in urban pest control.

Regional Implementation

Refer to regional landscape boards for regional risk assessments and management plans (where available) for further details.

Landscape Region	Actions
Hills & Fleurieu	Manage populations
Green Adelaide	Manage populations
Alinytjara Wilurara	Limited action
Eyre Peninsula	Manage populations
Kangaroo Island	Limited action
Northern and Yorke	Manage populations
South Australian Arid Lands	Limited action
Murraylands & Riverland	Manage populations
Limestone Coast	Manage populations

The action ‘Manage populations’ usually applies to a widespread pest and is generally achieved through development and promotion of integrated pest management packages to landholders, whether by government or industry.

Declaration

To implement this policy wild form and domestic form house mice are declared under the *Landscape South Australia Act, 2019*.

CLASS 5 **MAMMALS** **RODENTIA** *Mus domesticus* **House mouse (domestic varieties)**	189, 191(1)	3	Whole of the State
CLASS 18 **MAMMALS** **RODENTIA** *Mus domesticus* **House mouse—wild forms**	187(1), 189	3	Whole of the State

Review

This policy is to be reviewed by 2024 or in the event of a change in one or more regional management plans for house mice.

State level risk assessment:

Pest Risk

Invasiveness

House mice (*Mus musculus*), as with other rodents, are typically highly fecund. The young grow rapidly and reach sexual maturity early.

Breeding generally varies with environmental conditions. Reproduction is correlated with rainfall, presumably through its effect on food availability. Breeding by mice is mostly in spring and early summer but can extend to any time of year when conditions are favourable. Young rodents reach sexual maturity well within the span of a breeding season. Female mice can produce a litter per month and the doubling time for a population can be as short as three to four weeks. Numbers fluctuate annually with peak density at the end of the breeding season in late autumn or early winter.

House mice plagues occur at irregular intervals in the cereal growing areas of South Australia and cause substantial losses to agriculture. During severe plagues mouse densities frequently exceed 500 mice ha-1 across many thousands of square kilometres. All habitats within the area are affected but grain crops comprise the largest proportion of the total area and support the highest mouse densities, so are the key habitats in plague development. Mouse plagues develop by a gradual increase in numbers between spring and autumn, over a period of one or sometimes two years. However, the ‘plague’ is usually only recognised as such when population levels reach a peak in late autumn or early winter. Mouse plagues often end

suddenly with rapid population decline in late winter or early spring due to natural causes (e.g. disease, lack of food, cold and wet conditions).

Mouse population levels and mouse damage levels are related to food resources available within individual paddocks and most of the mice on a landholder's property during a plague were born there. However, it is possible that the greater continuity of favourable habitats provided in no-till farming systems has increased the mobility of mice in farming landscapes, such that cooperative mouse control at the multi-farm level may have some shared economic benefits.

Impacts

In crops, mice dig up and consume seed grain and recently emerged shoots, then at later stages they damage developing tillers and chew off maturing heads of grain. Mouse damage can cause major losses within a week or two of sowing, necessitating re-sowing. Damage is estimated to cost primary industries tens of millions of dollars in severe plagues. The most recent assessment of economic impacts of vertebrate pests in Australia states that the average annual impact of mice on all types of primary production in Australia is $22.8 M2. The level of damage can vary greatly, depending on the timing of mouse population declines relative to crop sowing/flowering.

During plagues, mice invade areas adjoining cereal crops in vast numbers. All areas on farms are at risk, including grain storages, intensive livestock industries, dwellings and storages for farm plant and equipment. Mice also invade dwellings in rural townships, commercial enterprises in rural townships (including food outlets) and rural service industries (including hospitals). In this way, mice can cause substantial economic losses, social nuisance and potential health problems.

Environmental damage directly caused by mice is unquantified, but significant depletion of seed reserves of native vegetation may occur within cereal cropping districts. Mouse damage to crops and pastures sown to stabilise light soils can result in significant soil erosion.

Potential distribution

House mice probably arrived in Australia at the time of European settlement and are now widespread. They occur in all agricultural regions and are found in higher densities in arable land and disturbed areas of long grass (for example, along roadsides, fence lines or channel banks), or around sheds and houses. They usually occur in low densities in natural habitats, except after disturbances such as fire.

Feasibility of Containment

Control costs

The strategic management of mice integrates direct control measures (e.g. baiting) with preventative measures (e.g. minimizing spilt grain at harvest and summer weed seed set).

[2] Gong W, Sinden J, Braysher M and Jones R (2009). *The economic impacts of vertebrate pests in Australia*. Invasive Animals Cooperative Research Centre, Canberra.

The cost of baiting broadacre cropping land is in the range of $5-$15/ha, depending on whether sterilised or non-sterilised grain is used and whether applied by ground or aerially.

Persistence

Changes in agronomic practices during the last 20 years have increased the suitability of cropping areas to mice because minimum tillage provides better vegetative cover and more food over summer-autumn. Past management practices involved repeated tillage before sowing, which often caused mouse numbers to decline before sowing. Under minimum tillage or "no till" systems, crops are sown into undisturbed soil, which can harbor large mouse populations in extensive burrow networks.

Current distribution

At the landscape scale, house mice are widespread through most of the State. However, their distribution is discontinuous at the property scale because presence and abundance depend on management at the paddock level.

State Level Risk Assessment Scores

Assessment using the Primary Industries and Regions Pest Animal Risk Management System (SAPARMS)[3] gave the following comparative pest risk and feasibility of containment scores by land use:

Land use	Pest Risk	Feasibility of containment	Response at State Level
Crop/pasture rotation	very high 202	negligible 158	manage pest populations
Native vegetation	low 18	negligible 737	limited action
Urban	medium 44	low 79	manage sites

This shows that the cropping industry faces the greatest level of risk from mice, but feasibility of containing their spread is negligible as they are already widely established. The SAPARMS outcome of 'Manage Pest Populations' aims to reduce the overall economic, environmental and/or social impacts of the pest animal species through targeted management, through research, development and promotion of integrated pest animal management (IPM) packages for the species, including cultural, chemical and biological control where feasible.

Considerations:

Government intervention in pest management is usually to address a market failure arising from a series of externality problems – situations where the actions, or lack thereof, of an individual will impose a cost or benefit upon another individual. For example, if a landowner does not manage a pest on their property, the pest may spread onto a neighbour's land. Correspondingly, if they do manage a pest, a neighbour will potentially benefit from this. In

[3] http://www.pir.sa.gov.au/biosecurity/weeds_and_pest_animals

making decisions, the landowner is likely to only consider the costs and benefits that they directly experience.

Current science informs us that most of the mice on a landholder's property during a plague were born there. Mouse population levels and mouse damage levels are related to food resources available within individual paddocks, and most crop damage can be prevented by controlling mice in the individual property only. Mice are widespread across the SA landscape and prevention of low-level dispersal between properties is not likely to be a cost-effective investment of government resources. In general, in the absence of such externalities, landholders' mouse problems are their own and they are the major beneficiaries of control.

Accordingly, this policy on mice does not compel landowners to control mice on their land under the provisions of the LSA Act and direct statutory intervention by regional landscape boards is not required. Under the policy the government considers that mice are a localised problem for each property and their management is the responsibility of landholders.

Industry (primarily through Grains Research & Development Corporation) provides leadership in research, development and extension, delivering key messages that farmers need to take measures to prevent opportunities for mouse build-up (e.g. minimise grain spillage at harvest, control of summer weeds before seed set), monitor for mouse numbers within paddocks, and bait using registered/permitted products following label instructions. As the benefits of baiting are primarily economic, farmers need to weigh up costs versus returns for their mouse management activities.

DAVID SPEIRS MP

Minister for Environment and Water

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