



PHOTO TAKEN IN VICTORIA

FERAL ANIMALS *of* TASMANIA

how YOU can help control the State's worst pest animal species



Threatened
Species
Network



Australian Government



WWF

The Threatened Species Network is a community-based program of the Australian Government and WWF-Australia.

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For copies contact:

Threatened Species
Network
WWF-Australia
191-193 Liverpool St
Hobart TAS 7000
P: 03 6234 3552
E: tsntas@wwf.org.au
URL: www.wwf.org.au/tsn

Author/editor: Stephanie Pfennigwerth,
Melampus Media
Introduction: Peter McGlone,
Threatened Species
Network,
WWF-Australia
Designer: Kelly Eijdenberg,
In Graphic Detail
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Introduction

When Captain James Cook released two pigs on Bruny Island in 1777, it was perhaps the first in a long list of animal introductions into Tasmania. Although Cook's pigs died, many other introduced species continue to thrive and, in some cases, threaten Tasmania's unique biodiversity. The confirmed arrival of the European red fox in recent years signals one of the greatest environmental challenges faced by the Tasmanian community.

The purpose of *Feral Animals of Tasmania* is to improve the community's knowledge and understanding of feral animals, and to encourage people to become involved in reporting and managing them. Greater community awareness and reporting will result in improved management decisions and better outcomes for Tasmania's native fauna and flora, as well as for agriculture and other industries.



IN SOME WATERWAYS IN MAINLAND AUSTRALIA, CARP CAN COMPRISE MORE THAN 90% OF THE TOTAL FISH BIOMASS.

WHAT IS A 'FERAL ANIMAL'?

In the Tasmanian context, an introduced animal is any animal that is not native to Tasmania. Animals native to mainland Australia, and which do not naturally occur in Tasmania, are also considered to be introduced animals. Such animals may arrive in Tasmania accidentally, or be deliberately introduced for a variety of reasons, including sport and recreation, primary industry, biological control, and companionship (pets).

A feral animal is any introduced animal which has become established in the wild. Feral animals are able to reproduce and maintain populations, or have the potential to do so without significant human support.



IMPACTS OF FERAL ANIMALS

Feral animals are one of the biggest threats to biodiversity in Tasmania. They threaten native animals and plants through predation, competition for food and habitat, habitat destruction, spreading weeds and diseases, and hybridising or cross-breeding with them, compromising their genetic integrity.

Feral animals also seriously affect agriculture by damaging crops, preying on livestock, competing for pasture or degrading the land by causing soil erosion, water turbidity and the spread of weeds.

The social impacts of feral animals include effects on human health, and damage of infrastructure or culturally important sites. The presence of feral animals in the Tasmanian Wilderness World Heritage Area and the Macquarie Island World Heritage Area not only detracts from the internationally significant natural values of these areas, but also diminishes their social and cultural value to humans as 'pristine wilderness'.

Other impacts are easier to quantify. According to the Australian Pest Animal Strategy, 11 of Australia's major

IF PERMITTED, THE IMPORTATION OF NEW, 'WILDER' POLECAT BLOODLINES INTO THE DOMESTIC FERRET BREEDING POPULATION MAY RESULT IN THE DEVELOPMENT OF A LARGER, MORE AGGRESSIVE ANIMAL EVEN BETTER SUITED TO SURVIVAL IN AUSTRALIAN CONDITIONS.

pest animal species are conservatively estimated to have impacts valued at over \$720 million annually. ¹

PRIORITISING FERAL SPECIES

In recent years there has been growing concern in Tasmania about the impacts of feral animals, and a growing community effort to help control them. We have consulted with many of Tasmania's experts in feral animal management to create a priority list of terrestrial and freshwater feral animal species for Tasmania, and an

agreed role for the community in each case. This publication provides information on species in this priority list.

The priority feral animals are those which are thought to have the greatest impact on native species and ecosystems if they are not managed effectively. The most cost-effective approaches to feral animal management are prevention and early intervention. Animals that are currently not found in Tasmania, but have the potential to cause significant ecological damage if they establish, have been included. Because eradication is achievable when populations are small and are discovered early,

the help of a vigilant community in early detection is invaluable.

Some species, such as the feral cat and rabbit, may have a significant impact on the environment but are widespread, numerous and impossible to eradicate from Tasmania due to social, financial or technological constraints. However, they can be eradicated from off-shore islands, and efforts can be made to limit or exclude them around areas of high conservation significance on Tasmania's mainland, such as breeding areas or sites containing threatened plant species. The bumblebee, which is currently restricted to Tasmania, has also been included



A SINGLE FERAL CAT MAY KILL MORE THAN 20,000 INDIVIDUAL VERTEBRATES IN A 7-YEAR LIFETIME.

because the community can play a crucial role in preventing its spread to the rest of Australia.

The feral status of animals such as brown trout and fallow deer may be disputed. To some people these animals are a valued sporting resource or are visually appealing. To others, they are the cause of significant environmental and agricultural damage. They are included because experts and the Tasmanian Government agree that there are places from which they should be excluded. Close monitoring by an informed and watchful community can help ensure these animals do not extend their current range.

¹ McLeod, R., 2004. *Counting the Cost: Impact of Invasive Animals*. Canberra: Cooperative Research Centre for Pest Animal Control. Quoted in Natural Resource Management Ministerial Council, 2007. *Australian Pest Animal Strategy – A National Strategy for the Management of Vertebrate Pest Animals in Australia*. Canberra: Commonwealth of Australia: 1.



CLIMATE MATCHING STUDIES INDICATE THAT, IF INTRODUCED, FERAL PIGS MAY THRIVE IN LARGE AREAS OF CENTRAL AND EASTERN TASMANIA. THEY ARE ALREADY ESTABLISHED ON FLINDERS ISLAND.

How to use this publication

Feral Animals of Tasmania is designed to help you identify, report and take direct action to monitor and manage feral animals. Anyone who spends time in the bush or on the water – Landcare volunteers, farmers, landowners, recreational fishers, guides, recreational shooters, professional pest controllers, field naturalists, bird watchers, bushwalkers, environmental consultants,

botanists, forestry workers and park rangers – should keep a copy on hand.

INFORMATION ON EACH CARD

The front of each card or species profile includes pictures and a description to help you identify the species. The back of the card provides more detailed information covering the history and current distribution of the species, its known impacts, current management and sources of further information. A grey coloured section advises what action you can take, including phone numbers for reporting sightings, as well as relevant legal information.

CATEGORIES OF FERAL ANIMALS

The animals in this publication are divided into three categories and are colour-coded in order of priority.



Highest priority: unwanted in the wild and to be eradicated from Tasmania, e.g. fox, gambusia, myna.



Second priority: unwanted in the wild but can only be feasibly/efficiently eradicated or controlled from specific areas around special values, e.g. cat, rabbit.



Third priority: wanted in the wild but within defined managed areas, e.g. deer, trout.

The management response is different for each priority category, so take careful note of an animal's category to see what you can do to assist in its control or eradication.

NOTE REGARDING DISTRIBUTION MAPS

Each animal profile features a map showing locations where that feral animal has established breeding populations in the wild. In cases where breeding populations have not been confirmed, such as the ferret and long-necked turtle, the maps represent where individual animals have been found in the wild.

MAKING A REPORT OF A FERAL ANIMAL

If you spot a feral animal, it is important to positively identify it.

- Thoroughly check the animal's characteristics against the photographs and descriptions in this publication.
- Where possible, take a photograph or video of the animal and any tracks, scats or other traces you have found. Do not collect a specimen unless specifically instructed to do so.
- Immediately write down a description of the animal and what it was doing.
- If possible, immediately record the location using a GPS or mark it on a map.

- If possible, mark the site with bright tape to help identify the site if you and/or another person need to return to it.
- Submit your report by phoning the number/s in the grey section on the back of the species profile.

No matter what action is suggested, it is important to avoid any unnecessary disturbance of the animal or area. Such activity may result in removing evidence, such as tracks or scats, or make the animal more wary of people and consequently harder to control. Always be aware of the health and safety of yourself and others before undertaking any action.

All records are important, but with some of the widespread animals, such as cats, rabbits, wasps or trout, it is more important to make reports where the animal is obviously outside the known area of distribution as marked on the map.

EUROPEAN RED FOX WITH PREY



WANT TO BECOME INVOLVED IN ACTIVE CONTROL PROGRAMS?

With some feral animals your involvement may be limited to reporting a sighting. This is often the situation where the control methods are very dangerous or difficult, or could render you subject to legal action. In other cases members of the public can take direct action.

You can also make a major contribution by being a responsible pet owner, adhering to quarantine rules, and not feeding or harbouring feral animals.

The animal profiles refer to active control programs in which you can become involved. However, it is not possible to list all the details for all of the groups and programs. Contact the Threatened Species Network for further information about control programs in your area.

BUMBLEBEE



Abbreviations

ACT	Australian Capital Territory	IUCN	International Union for the Conservation of Nature and Natural Resources (the World Conservation Union)
AQIS	Australian Quarantine and Inspection Service	NSW	New South Wales
DFTD	Devil Facial Tumour Disease	NT	Northern Territory
DPIW	Department of Primary Industries and Water (Tasmania)	PWS	Parks and Wildlife Service (Tasmania)
EHN	Epizootic Haemopoietic Necrosis (virus)	RHDV	Rabbit Haemorrhagic Disease Virus
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	SA	South Australia
IFS	Inland Fisheries Service (Tasmania)	TWWHA	Tasmanian Wilderness World Heritage Area
		WA	Western Australia

FERAL CAT



Glossary

aestivation period of torpor during weather extremes, during which an animal's metabolic processes slow down

barbel slender, fleshy outgrowth on the lower jaw of some fishes, equipped with sensory and chemical receptors

carapace the upper shell of a turtle or crustacean

cephalothorax the fused head and thorax of some crustaceans

herpetofauna reptiles and amphibians

lateral line sensory organ running along the sides of a

fish, between gill opening and tail base; number of scales along this line is useful in identifying species

piscivorous fish-eating animal

plastron the lower shell of a turtle

Ramsar site internationally important wetland identified for conservation under the Convention on Wetlands, an intergovernmental treaty signed in Ramsar, Iran, in 1971

rostrum in crustaceans, the beak-like spike that points forward from between the eyes

scute large horny scale or plate found on the outer layer of a turtle's carapace and plastron

speculum iridescent patch on the secondary feathers of a duck's wing

thorax the middle section of an insect or crustacean's body, between its head and abdomen

tubercle small rounded bump on an animal's skin

vagrant a 'stray' animal found in an area outside of its usual habitat

FERRET



Further reading

**Federal Government:
Department of Environment,
Water, Heritage and the
Arts, Biodiversity Section:**
“Feral Animals in Australia”
URL: <www.environment.gov.au/biodiversity/invasive/ferals/index.html>

**Tasmanian Government:
Department of Environment,
Parks, Heritage and the Arts,
Tasmanian Parks and Wildlife
Service**
URL: <www.parks.tas.gov.au/>

**Tasmanian Government:
Department of Primary
Industries and Water,
Resource Management and
Conservation**
URL: <www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/LBUN-6XW2D7?open>
URL: <www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/DREN-4VH82R?open>

**Tasmanian Government:
Department of Primary
Industries and Water, Fox
Eradication Branch**
URL: <www.dpiw.tas.gov.au/fox>

**Tasmanian Government:
Inland Fisheries Service**
URL: <www.ifs.tas.gov.au>



HYBRID MALE MALLARD

**Invasive Animals Cooperative
Research Centre**
URL: <www.invasiveanimals.com>
URL: <www.feral.org.au>

WWF-Australia
URL: <www.wwf.org.au>

Contacts

Department of Primary Industries and Water (DPIW)

Biodiversity Conservation Branch

P: 1300 368 550 or

(03) 6233 6556

E: wildlife.enq@dpiw.tas.gov.au

or fill in the form at

URL: www.dpiw.tas.gov.au/inter.nsf/FeedbackForm?OpenForm

URL: www.dpiw.tas.gov.au

Fox Eradication Branch

P: 1300 368 550 or (03) 6336 5320

Report fox sightings or activity to the 24 hour hotline:

1300 FOX OUT (1300 369 688)

E: Fox.Enquiries@dpiw.tas.gov.au

URL: www.dpiw.tas.gov.au/fox

Parks and Wildlife Service Tasmania (PWS)

P: 1300 135 513 or

(03) 6233 2270 or (03) 6233 6556
(wildlife and incident reporting)

E: fill in the form at

URL: www.parks.tas.gov.au/enquiries.html

URL: www.parks.tas.gov.au

Inland Fisheries Service (IFS)

P: 1300 463 474 or

(03) 6259 8166

(Liawenee Field Station)

(03) 6254 0058

(Lake Crescent Field Station)

AH: 0408 145 768

(Senior Inspector)

E: infish@ifs.tas.gov.au

URL: www.ifs.tas.gov.au

Bushwatch

P: 1800 333 000

Quarantine Tasmania

P: 1800 084 881 or

(03) 6233 3352

(Hobart)

(03) 6391 8286

(Launceston)

(03) 6421 7613

(Devonport)

AH: 0418 125 634

E: Quarantine.Enquiries@dpiw.tas.gov.au

tas.gov.au

URL: www.dpiw.tas.gov.au/quarantine

Australian Quarantine and Inspection Service (AQIS)

P: 1800 020 504 or

(03) 6233 3352

(Hobart)

0418 125 634

(Duty Officer)

(03) 6421 7622

(Devonport ferry terminal)

URL: www.aqis.gov.au

PHOTOGRAPH CREDITS

m = main image; tr = top right;
br = bottom right; tl = top left;
bl = bottom left; c = centre;
cl = centre left

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Fox and dog track illustrations courtesy DPIW Fox Eradication Branch; all other illustrations based on *Tracks, Scats and Other Traces* by Barbara Triggs, OUP Australia.



RAINBOW LORIKEET

Trichoglossus haemotodus moluccanus
(Blue-bellied lorikeet, blue mountain parrot,
Swainson's lorikeet, coconut lory)

Colourful, gregarious parrot (26–31 cm long, 46 cm wingspan), often seen flying in small flocks or gathered in communal roosts at dusk. Appears slim in flight; angular wings and tapered, pointy tail. Flight swift and direct above canopy; darts and twists among trees. Can fly more than 50 km from its roost to forage. Has a wide vocal repertoire: rasping screeches during flight, constant noisy chatter when feeding; fledglings have high-pitched wheeze.



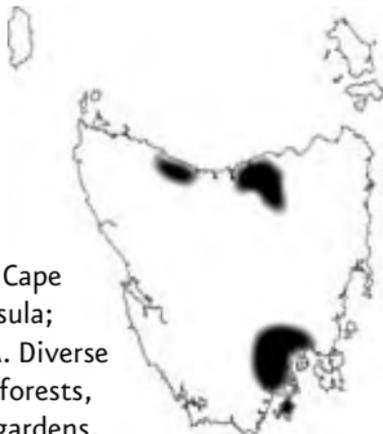
RAINBOW LORIKEET

NOTE No other Tasmanian parrot has a blue head.

ORIGIN Native to mainland Australia.

HISTORY AND DISTRIBUTION Cape York Peninsula to Eyre Peninsula; feral population in Perth, WA. Diverse habitat includes tropical rainforests, sclerophyll forest and urban gardens. Numbers in urban areas increasing due to year-round supply of native and exotic food plants. Vagrants sighted in Tasmania since at least 1979. Small but growing flocks of escaped or released aviary birds regularly sighted in Hobart and surrounding region.

KNOWN IMPACTS Monopolises food (pollen, nectar, blossoms, fruits, leaf buds, berries, seeds and insects) and increasingly scarce nesting hollows, excluding other species and evicting nestlings. Could outcompete Tasmanian parrots, including musk lorikeet and endangered swift parrot. Escaped aviary birds could transmit Psittacine beak and feather disease to wild



parrot populations. Serious agricultural pest of apple, pear, stone fruit, nut and grape crops on mainland Australia; noise and droppings a public nuisance.

CURRENT MANAGEMENT Has yet to be formally declared as a pest species under legislation. Importation without a permit is illegal under legislation including the *Nature Conservation Act 2002*.

Do not feed birds. Report all sightings to DPIW 1300 368 550 or PWS 1300 135 513 with a view to humane trapping. Prompt action is vital: feral population in Perth WA established in late 1960s with fewer than 10 birds; in 2005 the population was 8,400 and rising.

FURTHER INFORMATION

Chapman, T., 2005. *The Status and Impact of the Rainbow Lorikeet (Trichoglossus haematodus moluccanus) in South-West Western Australia*. Perth: Government of Western Australia.

Higgins, P.J. (ed), 1999. *Handbook of Australian, New Zealand and Antarctic Birds, Volume 4 (Parrots to Dollarbird)*. Melbourne: OUP: 195.

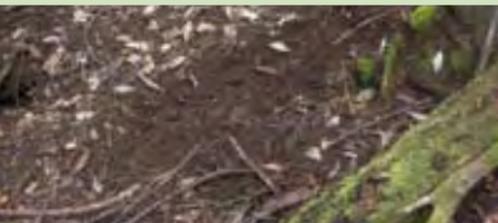


SUPERB LYREBIRD

Menura novaehollandiae
(Lyrebird, bush pheasant)

Elusive bird (male 80–100 cm long; female 75–85 cm) with coppery back and wings, grey underparts and head; female and immature male have rufous throat; mature male has plumed tail. Famous for mimicry; also composes own songs. Flight short and laborious; usually runs from danger. Male performs courtship displays on soil mound; nest of sticks, fronds and leaf litter built in crevice, tree fern, hollow stump, etc.

TYPICAL LYREBIRD SCRATCHING



INTACT LEAF LITTER



DISTURBED BY LYREBIRD

SUPERB LYREBIRD

NOTE Introduced to Tasmania (then fox-free) primarily due to fears that foxes and habitat loss would cause species' extinction on mainland.

ORIGIN Native to mainland Australia.

HISTORY AND DISTRIBUTION

Naturally occurs in rainforests, moist eucalypt forests and fern gullies in eastern NSW, ACT and Victoria. In Tasmania, total of 22 lyrebirds released at Mt Field National Park from 1934–49 and at Hastings Caves in 1945. Now an estimated 8,000 birds, mostly in TWWHA; could reach northwest and far southwest within next decade.

KNOWN IMPACTS Powerful claws dig and rake leaf litter and soil while foraging or building mounds. Also strip bark, rip logs, shift rocks and uproot shrubs; some birds can turn over 10–36 kg of soil and litter per hour. In Tasmania, invertebrates impacted by predation and habitat changes due to soil disturbance. Undergrowth,



ground ferns and saplings also damaged or removed; habitat of the threatened myrtle elbow orchid has been altered. Disturbance may prevent regeneration; cause erosion; change food supply and habitat of other species; and eventually change forest community composition, with impacts on ecosystem function.

CURRENT MANAGEMENT Not currently managed; lyrebird is a protected species under the *Nature Conservation Act 2002*. Eradication difficult even if permitted; birds' stronghold in TWWHA is rugged and largely inaccessible. Studies are underway to measure ecological impact; birds have been excluded from myrtle elbow orchid habitat in TWWHA.

Identified as a potential threat, but more study is vital to better understand impacts. The community is encouraged to report all sightings of lyrebirds and their activities (scratchings, etc.) outside of the Mt Field/Hastings Caves area to DPIW 1300 368 550 or PWS 1300 135 513.

FURTHER INFORMATION

Tanner, Z., 2000. *Ecological Impacts of the Superb Lyrebird in Tasmania*. Honours thesis. Hobart: University of Tasmania.



MYNA

Acridotheres tristis
(Indian myna, common myna)

Chocolate-brown bird, 16 cm high, with glossy black-brown head and yellow skin 'mask' around eye. Wings have white flashes, seen in flight; tail tip and under-tail feathers also white. Walks with a jaunty, strutting gait. Highly social; all birds except incubating females gather in communal roosts, usually in trees or vegetation, or in buildings. Not to be confused with noisy miner, a mostly grey native honeyeater with a smaller 'mask'.



MYNAS COMPETE FOR NESTING
HOLLOWS

NATIVE NOISY
MYNA



BIRDS

MYNA

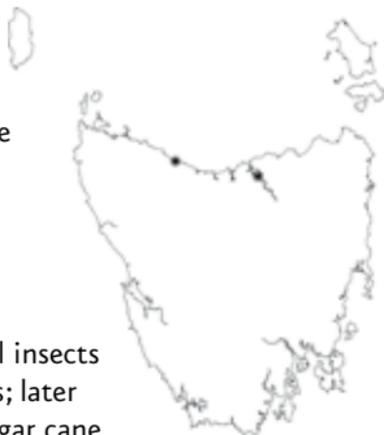
NOTE Included in IUCN list of 'World's 100 Worst Invasive Species'.

ORIGIN Afghanistan through India to Indochina.

HISTORY AND DISTRIBUTION

Introduced in 1862 to control insects at Melbourne market gardens; later introduced to Queensland sugar cane plantations. Now established in NSW, ACT, Victoria and Queensland. In Tasmania, birds eradicated by DPIW in Devonport in 2003 and 2005 and at Launceston Airport in 2006.

KNOWN IMPACTS Bird of open woodland; has adapted easily to urban and woodland-like areas. Competes aggressively with native wildlife for food and tree hollows, thus reducing biodiversity; attacks nesting birds and destroys eggs and chicks. Current range means myna does not compete with threatened species; however, its increasing range (to woodland-like rural areas) could eventually impact such animals; in Tasmania, could



outcompete endangered orange-bellied parrot. A major nuisance in urban areas; noisy, smelly roosts and nests in wall and roof cavities create fire, vermin and disease hazards. Scavenges around urban areas but also eats insects and chicks of other birds; damages grain, fruit and vegetable crops.

CURRENT MANAGEMENT Specially-designed traps now in regular use on mainland. Mynas detected in Tasmania are eradicated by DPIW. No management plan currently in place in this state. Importation without a permit is illegal under legislation including the *Nature Conservation Act 2002*.

The community should be on high alert for this species. Report sightings to DPIW 1300 368 550 or PWS 1300 135 513. Prompt action is vital: about 100 mynas were released in Canberra in 1968; there are now more than 100 mynas per km² in that city.

FURTHER INFORMATION

Tidemann, C. and Australian National University, 2007. *Common Indian Myna Web Site*. URL: <<http://fennerschool-associated.anu.edu.au/myna/index.html>>



MALLARD

Anas platyrhynchos

Male mallard (55–70 cm long) and Pacific black duck (50–60 cm) easily distinguished. Female mallard resembles pale Pacific black duck. All mallards have blue-purple speculum; all Pacific black ducks have iridescent green-purple speculum. Appearance of mallard/black duck hybrids vary, but all have blue speculum.



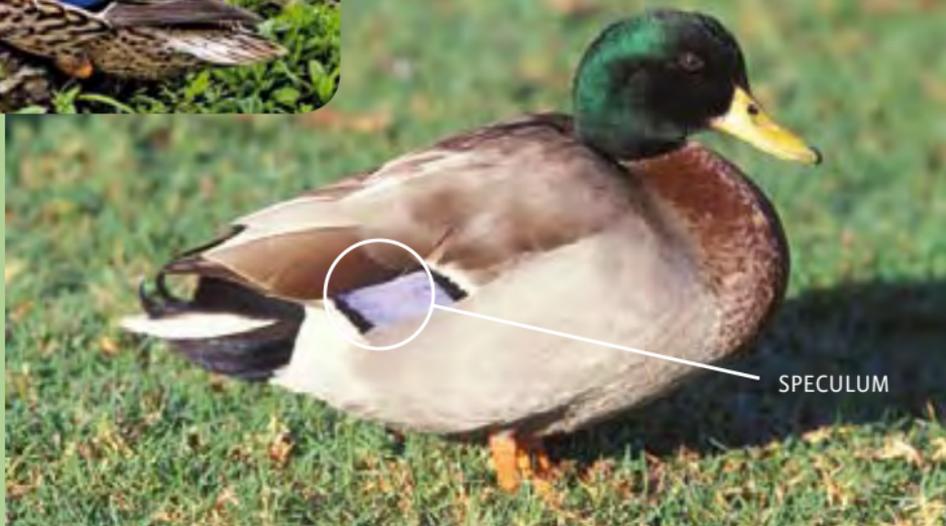
NATIVE PACIFIC BLACK DUCK



FEMALE



HYBRID



SPECULUM

MALE

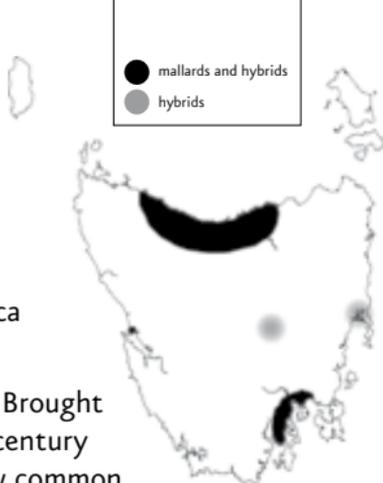
MALLARD

NOTE Feral mallard/Pacific black duck hybrid always identifiable by blue-purple speculum.

ORIGIN Europe, North America and Asia.

HISTORY AND DISTRIBUTION Brought to Australia in the late 19th century for its ornamental value; now common in urban parks and rural ponds and dams in southeast Australia, extending to eastern and central Queensland, and southwest WA. In Tasmania, purebred mallards are confined mostly to urban areas, but hybrids have been found long distances from urban areas and have the potential to disperse throughout the state.

KNOWN IMPACTS Interbreeds with the native Pacific black duck and produces fertile offspring, threatening the genetic integrity of the native species. Also carries a parasite that causes the bird pain and eventual starvation. This parasite can be spread to native waterfowl, including black swans. Mallards accustomed



to hand-feeding also foul public amenities and can pose a traffic hazard.

CURRENT MANAGEMENT Classified as stock under the *Nature Conservation Act 2002*, mallards are technically someone's property and cannot be culled without the owner's permission. Local council campaigns to reduce feral numbers around the Derwent Estuary have declined due to public controversy. Importation without a permit is illegal under legislation including the *Nature Conservation Act 2002*.

Like all stock, mallards should be kept in a secure enclosed area. Report free-ranging mallards to your local council. Do not feed ducks. Pacific black ducks can be taken by licensed shooters during the hunting season. There is no penalty for bagging hybrids. For more on Recreational Game Licenses, contact DPIW 1300 368 550.

FURTHER INFORMATION

Morcombe, M., 2000. *Field Guide to Australian Birds*. Archerfield: Steve Parish Publishing: 26, 28.

Watts, D., 2002. *Field Guide to Tasmanian Birds*. New edition. Sydney: Reed New Holland: 11.



ORIENTAL WEATHERLOACH

Misgurnus anguillicaudatus

(Japanese weatherloach, Japanese loach, Japanese weatherfish, dojo loach, mud loach, weatherfish)

Cylindrical fish (15–25 cm long); differentiated from catfish and eels by its five pairs of barbels. Single short-based dorsal fin half-way along back; tail rounded. Body covered with mucous and difficult to handle.

ADULT



JUVENILE



FISH

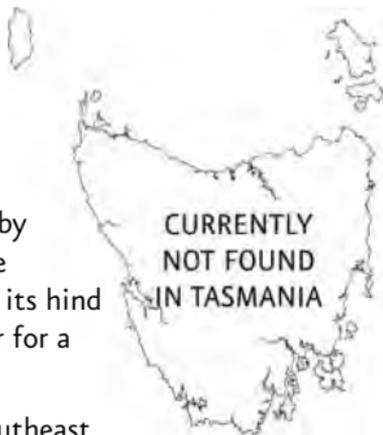
ORIENTAL WEATHERLOACH

NOTE Tolerates water temperatures from 2–38° C. Survives in degraded waters by gulping air and absorbing the atmospheric oxygen through its hind gut. Can survive out of water for a short time.

ORIGIN Europe, central to southeast Asia.

HISTORY AND DISTRIBUTION Imported to Australia in the 1960s as aquarium species; established population in Yarra River in 1984, after escape or deliberate dumping from tanks or ornamental ponds. Now found throughout Murray-Darling Basin (NSW, ACT and Victoria) and several coastal drainages in southeastern Australia. Isolated reports from Queensland and SA.

KNOWN IMPACTS Hardy fish with high reproductive rate (multiple spawnings, 4,000–8,000 eggs per spawning); high survivorship (burrows to avoid predators, can live more than 13 years); and a flexible omnivorous diet of



insect larvae, crustaceans, algae and detritus. On mainland Australia, competes with native galaxiids for food and may also disturb or eat galaxiid eggs, juveniles or adults. Burrowing behaviour may also modify habitat by stirring up sediment and uprooting plants. May carry parasites not previously recorded in Australia.

CURRENT MANAGEMENT Importation banned in Australia in 1986. In Tasmania, it is a declared 'Controlled Fish' under the *Inland Fisheries Act 1995*. The importation, possession, transfer or release of this species into inland waters, including an aquarium or private dam, is prohibited; large fines apply under the Act.

Dumping of unwanted aquarium animals, illegal use as live bait and diversion of water for irrigation contributed to spread on mainland. The community, particularly farmers, anglers and aquarists, should be on high alert for this species. Report sightings to IFS 1300 463 474.

FURTHER INFORMATION

Lintermans, M. and Burchmore, J. "Family Cobitidae: Loaches." In McDowall, R.M. (ed), 1996. *Freshwater Fishes of South-Eastern Australia*. Second edition. Sydney: Reed: 114-15.



REDFIN PERCH

Perca fluviatilis

(English perch; European perch)

Deep-bodied fish (up to 45 cm long and 2 kg in Tasmanian waters) with dark bands down sides and red pelvic, anal and tail fins. Two dorsal fins, the first fin spiny and marked with black blotch at rear. About 63 stout, rough scales along lateral line. Back humped behind head; large mouth; gill cover has broad, flat spine.

JUVENILE



ADULT



FISH

REDFIN PERCH

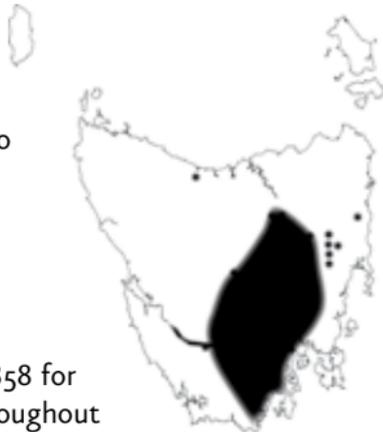
NOTE Carrier of EHN virus in mainland Australia, fatal to many native species.

ORIGIN Europe, central to southeast Asia.

HISTORY AND DISTRIBUTION

Introduced to mainland in 1858 for angling; now widespread throughout southern half of NSW, ACT, Victoria, southeastern SA and southwestern WA. Introduced to Tasmania in 1861. Prefers slow-flowing or still waters; shelters in or near aquatic vegetation.

KNOWN IMPACTS Piscivorous fish; has decimated native species including Murray cod, Macquarie perch and in Tasmania, the endangered Swan galaxias. Also eats crustaceans, worms, molluscs and insect larvae. Male can mature in 12 months; large female can produce up to several hundred thousand eggs per spawning; eggs unpalatable to other fish. Can form dense populations, outcompeting other species for food and habitat.



CURRENT MANAGEMENT Has spread into areas of high conservation significance but difficult to eradicate; preventing spread beyond present distribution a high priority. Spot eradications by IFS at Miena (successful) and Brushy Lagoon (unsuccessful). The *Inland Fisheries Act 1995* prohibits the importation of live fish into Tasmania.

Considered a nuisance by anglers, but good eating; IFS Recreational Angling licence is required. Unwanted fish should be disposed of on land. Do not transfer fish between inland waters, including private dams, or use live fish as bait; large fines apply under the Act. Due to disease risk, fishing equipment used on the mainland must be thoroughly washed and dried before use in Tasmania. Report unusual fish captures or suspicious activity to ISF 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

McDowall, R.M. "Family Percidae: Freshwater perches." In McDowall, R.M. (ed), 1996. *Freshwater Fishes of South-Eastern Australia*. Second edition. Sydney: Reed: 183-85.

Inland Fisheries Service, 2007. *Fact Sheet for Redfin Perch*. URL: <www.ifs.tas.gov.au/ifs/IFSDatabaseManager/SpeciesDatabase/redfin>



GOLDFISH

Carassius auratus

(Ornamental goldfish, wild goldfish, crucian carp, Prussian carp)

Plump, moderately compressed fish (20–40 cm long, up to 3 kg); distinguished from carp by lack of barbels around mouth. About 30 large scales along lateral line; long-based dorsal fin high at front; dorsal and anal fins have serrated spines. Wild fish revert to olive green or deep bronze colouring, darker on back; silver-white on belly.

JUVENILE



ADULT



CAPTURED WILD GOLDFISH

FISH

GOLDFISH

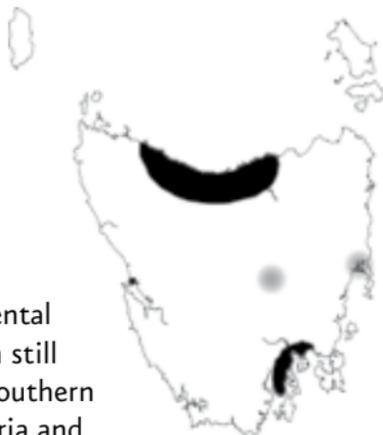
NOTE Member of Cyprinidae, the carp family. Australia has no native cyprinids.

ORIGIN Eastern Asia.

HISTORY AND DISTRIBUTION

First imported for its ornamental value in 1860s. Now exists in still and slow-flowing waters in southern Queensland, NSW, ACT, Victoria and eastern SA; also in coastal drainages and inland Murray-Darling and Cooper Creek systems. In Tasmania, scattered populations in southeast and north, but abundant in farm dams throughout state.

KNOWN IMPACTS Hardy fish that tolerates high water temperatures, high salinity and low oxygen concentrations, with high reproductive rate (reaches maturity in 12 months; large females may produce several hundred thousand eggs) and flexible omnivorous diet of algae and other plant material, organic detritus, aquatic insects, crustaceans and molluscs. Goldfish may outcompete native fish for



food and breeding sites; may spread disease and parasites.

CURRENT MANAGEMENT 'Acclimatised' fish, difficult to eradicate; preventing spread beyond present distribution considered high priority by IFS. Management consists of occasional spot eradications. The *Inland Fisheries Act 1995* prohibits the importation of live goldfish into Tasmania.

Anglers should dispose of unwanted fish on land. Do not transfer fish between inland waters, including private dams, use live fish as bait, or dump unwanted aquarium animals into toilets, sewers or waterways. Large fines apply under the Act. (For advice on responsible disposal, contact IFS.) Buy aquarium fish from registered dealers. Report unusual fish captures or suspicious activity to IFS 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

Brumley, A.R. "Family Cyprinidae: Carps, minnows, etc." In McDowall, R.M. (ed), 1996. *Freshwater Fishes of South-Eastern Australia*. Second edition. Sydney: Reed: 99-101.

Inland Fisheries Service, 2007. *Fact Sheet for Goldfish*. URL: <www.ifs.tas.gov.au/ifs/IFSDatabaseManager/SpeciesDatabase/goldfish>



CARP

Cyprinus carpio
(European carp, common carp, koi)



CARP IN
GILL NET

Large-scaled fish (30–40 cm long; 4–5 kg); distinguished from goldfish and tench by two barbels at each corner of mouth. ‘Mirror’ carp have just a few very large scales in patches or lines. Low, long-based dorsal fin and anal fin have serrated spines. Colour varies from dark bronze to olive-grey above, paling to light bronze on belly; juvenile silver. Fins olive-brown, often with reddish tips.



ELECTROFISHING FOR CARP

FISH

CARP

NOTE A female can produce 1.5 million eggs per year.

ORIGIN China.

HISTORY AND DISTRIBUTION

Ornamental fish introduced in NSW around 1858 and 1876; aquaculture fish escaped in Victoria in 1964. Hybrid of latter two introductions now the most abundant large freshwater fish in Murray-Darling Basin; spread throughout southeastern waterways into SA; also in southwest WA. Populations discovered in farm dams in northwest Tasmania in 1975 and 1980 were poisoned. Found in lakes Crescent and Sorell in 1995.

KNOWN IMPACTS Favours slow-moving waters; tolerates low oxygen levels, high salinity and temperatures from 4–35° C. Strains invertebrates and detritus from sediment, also eats insect larvae and seeds. Implicated in destruction of aquatic vegetation; increased water turbidity; nutrient enrichment causing algal blooms; damage to stream banks and irrigation channels; competition with native species



for food and spawning sites; and spread of parasites and diseases. In Tasmania, increase in carp population could threaten the endangered native galaxias.

CURRENT MANAGEMENT A 'Controlled Fish' under *Inland Fisheries Act 1995*. The importation, possession, transfer or release of carp into inland waters, including an aquarium or private dam, is prohibited; large fines apply under the Act. Use as bait also illegal. IFS management program integrates containment and eradication techniques, including screens on lake outflows, barriers to block spawning sites, and radio tracking, trapping, netting and electrofishing to catch fish.

The community, particularly anglers and aquarists, should be on high alert for this species. (Ornamental koi are subject to same laws and fines.) Report sightings to IFS 1300 463 474. Take unusual catches to your local IFS inspector as soon as possible for identification.

FURTHER INFORMATION

Inland Fisheries Service, 2007. *Carp Management Program*. URL: <www.ifs.tas.gov.au/ifs/fisherymanagement/pestfish/carp-management-program>



TENCH

Tinca tinca

Moderately thick-bodied fish (30–70 cm long; up to 3 kg); distinguished from carp by one barbel at each corner of mouth. About 100 very small scales along lateral line; short-based dorsal fin high and rounded. Dark olive to pale gold colouring; usually greenish-olive with green-gold iridescence on cheeks, gill covers and sides.

JUVENILE



ADULT



FISH

TENCH

NOTE Member of the carp family, Cyprinidae. Australia has no native cyprinids.

ORIGIN Europe.

HISTORY AND DISTRIBUTION

Introduced for angling on mainland in 1876; now in Murray-Darling system and coastal drainages in Victoria and SA. Introduced in Tasmania in 1858 and well established by the 1880s; usually found in slow-flowing or still waters, often among dense vegetation or in sheltered holes.

KNOWN IMPACTS Hardy fish, tolerant of low oxygen levels, high salinity and temperatures up to 32°C. Female produces between 300,000 and 900,000 eggs, which may be poisonous to predators. Diet of aquatic insects (mayfly and dragonfly larvae), crustaceans and some molluscs overlaps with that of native species. Foraging behaviour may also increase water turbidity and damage stream beds. May form dense populations in degraded systems.



CURRENT MANAGEMENT 'Acclimatised' fish, difficult to eradicate; preventing spread beyond present distribution considered high priority by IFS. Not actively managed. The *Inland Fisheries Act 1995* prohibits the importation of live fish into Tasmania.

Although not favoured as a sporting or table fish by local anglers, tench is good eating, albeit with many fine bones; IFS Recreational Angling licence is required. Anglers should dispose of unwanted fish on land. Do not transfer fish between inland waters, including private dams, or use live fish as bait; large fines apply under the Act. Report unusual fish captures or suspicious activity to IFS 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

Brumley, A.R. "Family Cyprinidae: Carps, minnows, etc." In McDowall, R.M. (ed), 1996. *Freshwater Fishes of South-Eastern Australia*. Second edition. Sydney: Reed: 104-05.

Inland Fisheries Service, 2007. *Fact Sheet for Tench*. URL: <www.ifs.tas.gov.au/ifs/IFSDatabaseManager/SpeciesDatabase/tench>



ATLANTIC SALMON

Salmo salar

(European Atlantic salmon)

Powerful fish (landlocked or broodstock fish 3–15 kg; sea cage escapees to 10 kg); resembles brown trout but has smaller mouth, shorter anal fin and more deeply forked tail; tail base longer and more slender. About 110–125 small scales along lateral line. Back silver-blue to olive-brown, sides silver, belly silvery-white, fins grey. Fewer dark spots than brown trout; spots lack pale ‘halo’; no red spots.



ATLANTIC SALMON

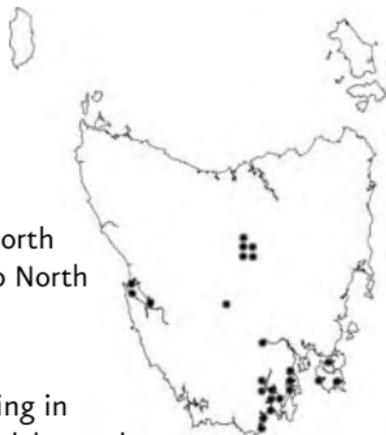
NOTE No self-sustaining wild populations currently recorded in Australia.

ORIGIN Cold European and North American rivers draining into North Atlantic.

HISTORY AND DISTRIBUTION

Introduced 1864–70 for angling in cool Tasmanian and Victorian lakes and streams but failed to establish wild populations. Current populations in Lake Jindabyne and Burrinjuck Dam (NSW) and Rubicon and Latrobe Rivers (Victoria) re-stocked annually with hatchery-reared fingerlings. In Tasmania, young reared in hatcheries and transferred to sea cages; aquaculture escapees occur in several bays and estuaries in south and west; ex-broodstock released periodically into lakes.

KNOWN IMPACTS Preys on insects, insect larvae, crustaceans and small fishes. May possibly compete for food and/or habitat with some species of native galaxiid. Four of Tasmania's eleven galaxiid species are endangered,



five are vulnerable and one is extinct in the wild; all are protected under state and federal legislation.

CURRENT MANAGEMENT Ex-broodstock fish donated by hatcheries are released into inland lakes by the IFS; stocking is regulated by the IFS. To promote conservation of native galaxiids, salmon are released only in certain areas. It is illegal to undertake unauthorised stocking and/or unauthorised translocation.

IFS Recreational Angling licence is required for this species. Do not transfer fish between inland waters, including private dams, rivers or lakes; large fines apply under the *Inland Fisheries Act 1995*. Report unusual fish captures or suspicious activity to IFS 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

Davies, P.E. and McDowall, R.M. "Family Salmonidae: Salmons, trouts and chars." In McDowall, R.M. (ed), 1996. *Freshwater Fishes of South-Eastern Australia*. Second edition. Sydney: Reed: 85.

Inland Fisheries Service, 2007. *Fact Sheet for Atlantic Salmon*. URL: <www.ifs.tas.gov.au/ifs/IFSDatabaseManager/SpeciesDatabase/atlantic-salmon>



GAMBUSIA

Gambusia holbrooki
(Eastern gambusia,
mosquito fish, plague
minnow)

Tiny fish (female to 4 cm long, male to 2.5 cm in Tasmania) with pale olive back, blue-grey sides, silvery belly. Dorsally flattened head, short-based dorsal fin and rounded tail; female has deeply rounded belly, often with black mark above vent; male has long, modified anal fin. Prefers warm shallow waters with submerged vegetation; unlike native fish, it moves slowly into deeper water when disturbed.



FEMALE

MALE



CHEMICALLY TREATING AN INFESTED DAM

FISH

GAMBUSIA

NOTE Implicated in decline or local extinction of at least 35 species worldwide.

ORIGIN Rivers draining into Gulf of Mexico.

HISTORY AND DISTRIBUTION

Introduced to Sydney in 1925 to control mosquitoes; now found in all states and territories; especially prevalent in southeastern Australia (i.e. Murray-Darling Basin). Fish from Queensland discovered in Tamar Estuary in 1992.

KNOWN IMPACTS Hardy fish, tolerates poor water quality and temperature extremes (1–44° C). Matures at 7 weeks of age; female bears 50–100 live young 8–9 times a year; exponential population growth means a single female can produce up to one million fish a year. Highly aggressive; injures or eats native fish or outcompetes them; harasses tadpoles; devours crustaceans, eggs and insects (although mosquito larvae comprise a tiny percentage of diet). Threatens numerous Tasmanian species including the



vulnerable green and gold frog; competes strongly with local galaxiid population. Impacts could unbalance food chain and contribute to toxic algal blooms.

CURRENT MANAGEMENT 'Controlled Fish' under *Inland Fisheries Act 1995*. The importation, possession, transfer or release of gambusia into inland waters, including an aquarium or private dam, is prohibited; use as live bait also illegal. Large fines apply under the Act. Extremely difficult to eradicate once established; preventing spread beyond present range a priority. Eradication efforts concentrated on areas of high conservation significance. Closed water systems are drained and treated with lime or the fish poison Rotenone. Natural seasonal drying of ephemeral wetlands also effective; mesh screens on interconnecting culverts prevent fish re-entering when water flow returns. Traps will be trialled in 2008.

The community, particularly farmers and anglers, should be on high alert for this species. Check your dam and local waterways; report sightings to IFS 1300 463 474.

FURTHER INFORMATION

Milner, R., 2006. *Gambusia holbrooki: A Management Guide and Workbook*. Launceston: Natural Heritage Trust.



TROUTS

Thick-bodied fish with adipose fin, lateral line, small scales, large mouth; mature spawning males have hooked lower jaw. Tasmanian species grow 25–55 cm long; 0.3–2 kg.

Silvery to olive-brown, dark spots with or without 'halo'; brook and some brown trout have red spots; rainbow has spotted tail. Brook has 'ripple' patterning along back and white stripe on pelvic, pectoral and anal fins; rainbow has rosy flush on sides and gill covers.

Salmo trutta
(brown trout, sea trout);
Salvelinus fontinalis
(brook trout, brook char);
Oncorhynchus mykiss
(rainbow trout)



BROWN TROUT



BROOK TROUT



RAINBOW TROUT

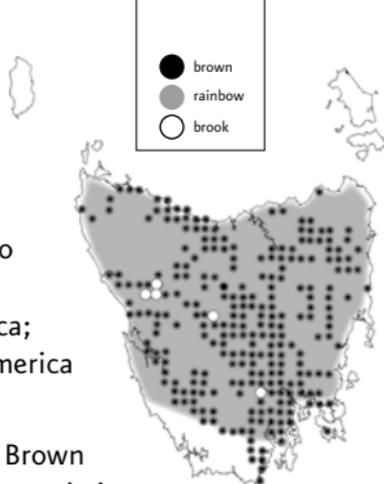
TROUTS

NOTE Linked to the decline of certain native galaxiids.

ORIGIN Brown trout native to coastal North Atlantic; brook to east coast of North America; rainbow to western North America and eastern Siberia.

HISTORY AND DISTRIBUTION Brown trout first introduced into Tasmania in 1864; now established in most rivers and lakes, including TWWHA; populations bolstered by release of hatchery-reared fingerlings. Rainbow trout introduced in 1898; brook trout established in 1962. Brown trout introduced on mainland in 1860s; rainbow in 1890s; both species now widespread from northeast NSW to Adelaide; also in southwest WA. Brook introduced in 1970s; scattered populations in NSW and SA.

KNOWN IMPACTS Trout predate and/or compete for food and habitat with many native species, such as the Swan and saddled galaxias. They have probably contributed to the decline of the Pedder galaxias, and potentially



contributed to the decline of the Swan and Clarence galaxias and the western and Arthurs paragalaxias. Also prey on aquatic and terrestrial insects, insect larvae, worms, molluscs and crustaceans.

CURRENT MANAGEMENT Stocking regulated by IFS; unauthorised stocking and/or unauthorised translocation is illegal. The IFS does not stock trout-free waters. Control methods include removal of trout from illegally stocked lakes and prevention of trout from establishing in areas containing threatened native fish.

IFS Recreational Angling licence is required for trout. Do not transfer fish between inland waters, including private dams, rivers or lakes; large fines apply under the *Inland Fisheries Act 1995*. Report unusual fish captures or suspicious activity to IFS 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

Jackson, J.E., 2004. *Tasmanian Galaxiidae Recovery Plan 2004-2008*. Hobart: Inland Fisheries Service.

Davies, P.E. and McDowall, R.M. "Family Salmonidae: Salmon, trouts and chars." In McDowall, R.M. (ed), 1996. *Freshwater Fishes of South-Eastern Australia*. Second edition. Sydney: Reed: 81-84, 86-89.



LONG-NECKED TURTLE

Chelodina longicollis

(Eastern snake-necked turtle, stinker)*

Rich brown to black carapace up to 26 cm long, often disguised by algae. Plastron scutes white or cream-yellow, edged in black. Hatchlings can have bright orange or red plastron. Neck about half the length of carapace and covered with tubercles; small head with short snout; distinct ankle joints and clawed, webbed feet; short tail. May eject a foul-smelling secretion when disturbed.



*Since the term 'tortoise' is now restricted to purely land-dwelling species, Australia has no tortoises. All freshwater chelonians are termed 'turtles'.

REPTILES

LONG-NECKED TURTLE

NOTE Tasmania has no native freshwater turtles. Any freshwater turtle spotted in this state will be feral.

ORIGIN Native to mainland Australia.

HISTORY AND DISTRIBUTION

Common from eastern Queensland to southeastern SA; prefers slow-moving waterways, lakes and swamps. Possibly introduced to Tasmania to control yabby infestations, and through the dumping of illegally imported animals; sightings in farm dams around Low Head, possibly Fern Glade, near Burnie, and Brighton/Old Beach.

KNOWN IMPACTS Impacts could be analogous to those of the feral red-eared slider in Queensland and ACT. Turtle can travel up to 2 km overland, particularly after rain, to new feeding or nesting sites. Warming climate will aid its establishment; once in waterways it will spread quickly and be difficult to eradicate. Diet of molluscs, crustaceans, tadpoles and small fishes may devastate local species,



defenceless against this new predator, including endangered galaxiids and the vulnerable green and gold frog. May also outcompete other local species for food sources. Digging of nests and aestivation burrows in sand or soft sediments may affect water quality and stability of stream banks and dam walls. May transmit disease to local herpetofauna.

CURRENT MANAGEMENT Importation of this Controlled Animal is illegal without a permit under legislation including the *Nature Conservation Act 2002*; permits strictly limited to wildlife parks and registered wildlife educators and may soon be phased out. It is illegal to keep turtles as pets. Trapping will be conducted by DPIW in 2008.

The community, particularly farmers, anglers and aquarists, should be on high alert for this species. Report all sightings, captures and suspicious activity, such as the dumping of unwanted turtles, to DPIW 1300 368 550, IFS 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

Australian Museum Online, 2007. *Eastern Snake-Necked Turtle, Long-Necked Tortoise Fact File*. URL: <www.faunanet.gov.au/wos/factfile.cfm?Fact_ID=287>



REDCLAW CRAYFISH

Cherax quadricarinatus

(Redclaw yabby, tropical blue crayfish, Queensland red claw, north Queensland freshwater crayfish)

Smooth, lustrous, brown to blue-green crayfish (carapace 9–20 cm long, 300–600 g); mature males and occasional female have red patch on their large claws; juveniles lack red patch; female's claws slender compared with other *Cherax* species. Four ridges on back of cephalothorax: two extending backwards from rostrum; two extending from behind the eyes.

ADVANCED
JUVENILE



MALE



FEMALE

INVERTEBRATES

REDCLAW CRAYFISH

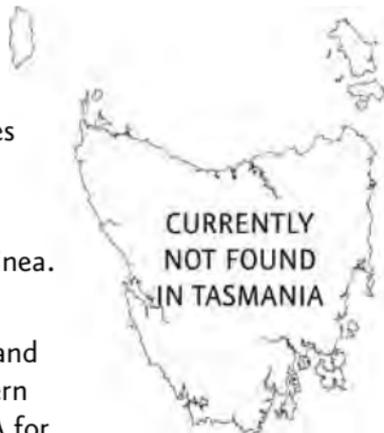
NOTE Tropical crustacean that can survive temperatures as low as 5° C.

ORIGIN Native to mainland Australia and Papua New Guinea.

HISTORY AND DISTRIBUTION

Common in tropical Queensland and NT; has spread to southern Queensland and northern WA for aquaculture. Tolerates variety of habitats, from shallow, fast-flowing streams to deep, turbid billabongs and dams; prefers shelter under abundant aquatic vegetation.

KNOWN IMPACTS Robust; tolerates degraded waters with low oxygen concentrations. Reaches maturity in less than 12 months; large females can produce more than 1,000 eggs per spawning, 3–5 times a year. This gregarious non-burrowing crayfish may possibly compete for food and habitat with native species, including the vulnerable giant freshwater crayfish (in Queensland, a shrimp species was eliminated from a wetland colonised by redclaw).



May alter plant communities. May introduce diseases and parasites including *Thelohania* ('white tail'). Also susceptible to contracting and transmitting 'crayfish plague' of northern hemisphere; Australian crayfish have no immunity to this devastating fungus.

CURRENT MANAGEMENT A 'Controlled Fish' under *Inland Fisheries Act 1995*. Importation, possession, transfer or release of any *Cherax* species into inland waters, including an aquarium or private dam, is prohibited; large fines apply under the Act. Use as bait also illegal. A declared noxious species in Victoria.

The community, particularly farmers, anglers and aquarists, should be on high alert for this species. Report sightings or suspicious activity to IFS 1300 463 474; DPIW 1300 368 550; or Bushwatch 1800 333 000.

FURTHER INFORMATION

Galli, L., 2007. *Fisheries Notes (FN0177): Declared Noxious Aquatic Species – Marron and Red Claw Crayfish*. Melbourne: State of Victoria, Department of Primary Industries.

Holdich, D.M. (ed), 2002. *Biology of Freshwater Crayfish*. Oxford: Blackwell Science.



YABBY

Cherax destructor

(smooth yabby, dam yabby, mainland yabby, freshwater crayfish)

Smooth, coffee-brown to black crayfish (carapace 13–25 cm long, males to 220 g) with red joints and large, mottled blue-green claws featuring distinctive mats of fine hair. Aquarium animals can turn bright green or blue. Two ridges extending behind the eyes; short, smooth, spineless rostrum.

DAM SPECIMEN



AQUARIUM SPECIMEN



INVERTEBRATES

YABBY

NOTE Named *destructor* because its burrows damage dam walls.

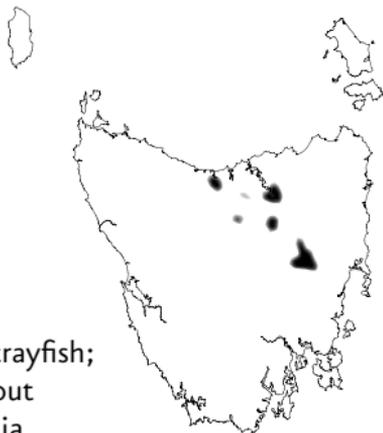
ORIGIN Native of mainland Australia.

HISTORY AND DISTRIBUTION

Australia's most widespread crayfish; natural distribution throughout southeast and central Australia.

Habitats include desert springs, alpine streams, swamps and irrigation channels. Farmed in NSW, Victoria and SA. Introduced to Tasmania in 1968; occurs mostly in farm dams, but some natural habitats also infested.

KNOWN IMPACTS Hardy; tolerates poor water quality; burrows to avoid drought conditions. Matures in less than 12 months; female can produce up to 450 eggs per spawning, 2–4 times a year. Burrowing activity increases water turbidity, encourages algal blooms, erodes stream banks and facilitates further invasion of natural waterways. May reduce or destroy aquatic vegetation. Habitat



alteration and competition for resources may displace endangered native burrowing crayfishes. Carries diseases and parasites; susceptible to 'crayfish plague' of northern hemisphere.

CURRENT MANAGEMENT A 'Controlled Fish' under *Inland Fisheries Act 1995*. The importation, possession, transfer or release of any *Cherax* species into inland waters, including an aquarium or private dam, is prohibited; large fines apply under the Act. Use as bait also illegal. IFS conducts spot eradications in contained waters (dams), in critical areas or at landowners' request.

Public acceptance of yabbies and resentment toward regulatory measures have stymied eradication attempts; yabbies are often re-introduced to areas after 'eradication'! Help prevent ecological and agricultural damage: obey the law and report infestations or suspicious activity to IFS 1300 463 474 or Bushwatch 1800 333 000.

FURTHER INFORMATION

Elvey, W., Chilcott, S.J. and Sanger A.C., 1996. *The Distribution and Potential Ecological Impact of the Introduced Yabby, Cherax destructor Clark 1936, in Tasmania*. Prepared for Australian Nature Conservation Agency Feral Pests Program Project Number FPP 71.



BUMBLEBEE

Bombus terrestris

(Large earth bumblebee, buff-tailed bumblebee)

Large bee (queen 25–35 mm long, worker 8–22 mm, drone to 22 mm); hairier and more heavily built than honeybee or European wasp. Black with yellow bands across thorax and abdomen; abdomen tipped cream or white. Buzzes loudly during flight. Nests usually in small cavity (i.e. woodpiles, compost heaps, old rodent nests, old stuffed chairs, under concrete paths) or about 10 cm under soil surface.

BEE
NESTING
IN URBAN
GARDEN



INVERTEBRATES

BUMBLEBEE

NOTE Population may have originated from bees accidentally introduced from New Zealand.

ORIGIN Europe.

HISTORY AND DISTRIBUTION First identified in Tasmania in 1992; now abundant throughout state (except Bass Strait islands). Permanent colonies currently not on mainland.

KNOWN IMPACTS Feeds from at least 150 plant species, including native blue gum, black gum and *Epacris*; can forage at lower temperatures than most other insects. May disrupt pollination of native plants. Pollination of exotic weeds may increase seed output, facilitating weed spread. May compete for nectar and pollen with native bees and birds, including the endangered swift parrot. Could colonise southeast and southwest of mainland, possibly competing with the endangered regent honeyeater and black-eared miner. Can sting repeatedly if handled; venom can cause severe allergic reactions.



CURRENT MANAGEMENT Introduction and spread listed as a 'Key Threatening Process' under NSW legislation and a 'Potentially Threatening Process' under Victorian legislation; importation to mainland is illegal. Nevertheless, the federal government has received a submission from the Australian Hydroponic and Greenhouse Association seeking approval for the importation of bumblebees.

Only careful vigilance will prevent invasion of mainland, either via deliberate introduction, migration across islands, or as stowaways. Bees spotted on Bass Strait islands must be eradicated; report sightings to DPIW 1300 368 550. Check all vehicles, equipment, agricultural produce, etc. before transportation to mainland; report sightings to Quarantine Tasmania 1800 084 881 or 0418 125 634 after hours or AQIS 1800 020 504; Devonport ferry terminal 6421 7622.

FURTHER INFORMATION

Hingston, A.B. and McQuillan, P.B., 1998. "Does the recently introduced bumblebee *Bombus terrestris* (Apidae) threaten Australian ecosystems?" *Australian Journal of Ecology* 23(6): 539-49.



INTRODUCED WASPS

Vespula germanica (European wasp);
Vespula vulgaris (English wasp, common wasp,
yellow jacket)

Vividly-coloured wasps (queen to 20 mm long, worker 10–17 mm); bodies less hairy than bees'; antennae longer and thicker. Yellow with black stripes and spots; legs mostly yellow. Fly with legs held close to body. Nests papery; can grow to the size of a filing cabinet. Normally only a small entrance hole visible; built underground or in a concealed cavity in a wall or roof, unused machinery, rockeries, rubbish heaps, logs, etc.



ENGLISH WASP



EUROPEAN WASP

FIRST ABDOMEN MARKING
TAPERS TO A POINT

STRAIGHT
'SHOULDER' BAND

FIRST
ABDOMEN
MARKING
ARROW-LIKE

CROOKED 'SHOULDER' BAND

EUROPEAN
WASP NEST



INTRODUCED WASPS

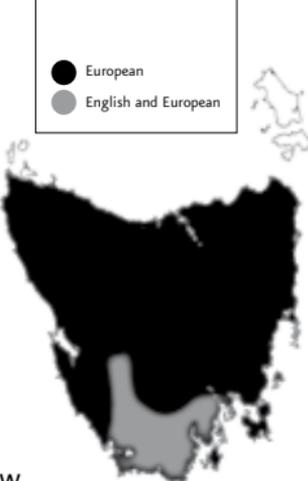
NOTE Spread facilitated by stowaways in air and sea transport.

ORIGIN Europe, North Africa, temperate Asia.

HISTORY AND DISTRIBUTION

European wasp introduced into Tasmania in 1959, possibly via packing cases or furniture from New Zealand. First mainland sighting in Melbourne, 1977; now found throughout southern Australia. English wasp established in Melbourne by 1961; in southern Tasmania since about 1995.

KNOWN IMPACTS Larvae diet (insects and other meats) overlaps with that of insectivorous birds; in Tasmania, wasp predation implicated in decline of threatened Ptunnarra brown butterfly. Workers also kill nestling birds, attack foraging honeybees and rob bee hive nuclei. Workers eat sugary foods; may disrupt pollination of native plants; may compete for nectar with native bees and birds; in New Zealand, implicated in decline



● European
● English and European

of endangered kaka. Possible indirect impacts on nutrient cycling and soil chemistry. Also a nuisance to humans; can cause economic loss and problems in commercial orchards; can drive tourists away from popular destinations; painful stings can cause allergic reactions.

CURRENT MANAGEMENT Primary producers and licensed pest controllers can obtain free fipronil meat baits from DPIW offices in New Town and Launceston; for more information call 1300 358 550.

Avoid spreading wasps: check all vehicles, equipment, agricultural produce, etc. before transportation to mainland. Contact a pest controller to destroy nests; if nest is on government land, call your local council.

FURTHER INFORMATION

Museum Victoria, 2007. *European Wasps*. URL: <<http://museumvictoria.com.au/wasps/index.asp>>

Matthews, R.W., Goodisman, M.A., Austin, A.D. and Bashford, R., 2000. The introduced English wasp *Vespula vulgaris* (L.) (Hymenoptera: Vespidae) newly recorded invading native forests in Tasmania. *Australian Journal of Entomology*, 39(3): 177-79.



FERRET

Mustela furo
(Polecat)

Thick-furred mammal (45–65 cm long, including tail; average female 600 g, male 1.2 kg) with elongated body, short legs and bushy tail. Coat black, dark brown and cinnamon to silver and albino; undercoat creamy white to gold. Ears rounded and flattened; face usually has 'mask' across eyes and nose. Walks with body low to ground; runs with back arched. Largely nocturnal; often shelters in burrows.



FERRETS
DEVASTATE
NEW ZEALAND'S
BIRDLIFE



MAMMALS

FERRET

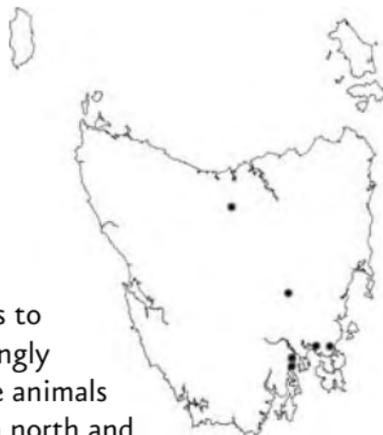
NOTE Domesticated race of European polecat.

ORIGIN Western Europe to Mongolia.

HISTORY AND DISTRIBUTION

Brought to Australia in 1880s to control rabbits; now increasingly popular pet. In Tasmania, live animals caught or road kill sighted in north and southeast; population at South Arm in 1999–2000 was eradicated by DPIW.

KNOWN IMPACTS Fierce, effective carnivore; preys mostly on ground-dwelling or ground-nesting animals and their young (including eggs). Could significantly impact species including penguins, ground parrots, small marsupials, native rodents, reptiles, amphibians and invertebrates. May compete with native predators; could partly occupy niche vacated by declining devil population. May displace species using burrows for shelter and breeding. Can transmit human and animal diseases including influenza, toxoplasmosis and canine distemper; in New Zealand,



transmits bovine tuberculosis to stock. Can inflict painful bite.

CURRENT MANAGEMENT Currently not permitted for live import into Australia. Also illegal to import and keep ferrets in the NT and Queensland. ACT ferret owners require a licence; some NSW and Victorian local councils apply restrictions. Incongruously, importation into Tasmania is legal with a permit under the *Animal Health Act 1995* and prior written permission from the Secretary of DPIW. No permit is required to keep ferrets; no limits on number that can be kept. There are no moves to ban ferrets in Tasmania.

The community should be on high alert for this species. Report sightings to DPIW 1300 368 550 or PWS 1300 135 513. Pets should be desexed, vaccinated and kept in a secure enclosure. It is illegal to release unwanted animals; large fines apply.

FURTHER INFORMATION

Olsen, P. and Jensz, K., 2005. *Draft Risk Assessment on the Import of Live Ferrets under the EPBC Act*. Latitude 42 Environmental Consultants Pty Ltd for Department of Environment and Heritage. URL: <www.deh.gov.au/biodiversity/trade-use/invitecomment/ferrets.html>



CAT

Felis catus

Feral cats are lean, muscular, slightly larger than average domestic cat; some males to 6 kg. Common coat colour is tabby, although (due to recruitment of dumped animals) ginger, black and tortoiseshell (pied) colours also sighted. Largely nocturnal and solitary with discrete territories, marked with glandular secretions, exposed faeces or urine sprays; in wilderness areas with fewer people cats are likely to be diurnal. Greater density around human settlements, including rubbish tips, due to availability of food sources.

FERAL CAT

DOMESTIC CATS ARE A SOURCE
OF FERAL ANIMALS AND ALSO
PREY ON WILDLIFE



MAMMALS

CAT

NOTE Can eat 600 g of protein a day.

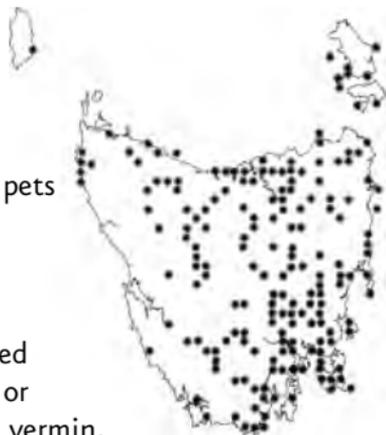
ORIGIN Brought as domestic pets by 18th-century settlers.

HISTORY AND DISTRIBUTION

About 18 million throughout Australia; the result of dumped or escaped domestic animals or deliberate releases to control vermin.

In Tasmania, logging roads and walking tracks may have facilitated spread into remoter areas, including TWWHA.

KNOWN IMPACTS Preys on some 50 native Tasmanian species (including 15 threatened species); small animals most at risk. Competes with native carnivores; numbers have increased in response to DFTD; could partly occupy niche vacated by declining devil population. Implicated in decline or extinction of some island and Australian mainland species, plus failure of recovery attempts for endangered species. Can transmit diseases including toxoplasmosis to humans, livestock and wildlife; disease



can be fatal to small marsupials, such as the eastern barred bandicoot.

CURRENT MANAGEMENT With the exception of offshore islands, eradication currently impossible due to expense, lack of effective large-scale techniques, lack of specific legislation and continual recruitment from domestic/semi-domestic/stray cat community. Some councils and community groups are conducting localised control measures; however, to be truly useful, trapping and desexing campaigns (on Flinders, King and Bruny islands, for example) require on-going commitment and resources. Effective, long-term suppression of cat numbers and impacts requires a change in public attitudes to pet ownership.

Desex and microchip your cat; keep it indoors (especially at night), or use an enclosed run; and fit it with a collar and bells. Dumping animals is illegal; take unwanted kittens to the Hobart Cat Centre or RSPCA. Report sightings outside of urban areas to DPIW 1300 368 550 or PWS 1300 135 513.

FURTHER INFORMATION

Parks and Wildlife Service Tasmania, 2007. *Threats: Feral Cats*. URL: <www.parks.tas.gov.au/factsheets/threats/FeralCat.pdf>



FALLOW DEER

Dama dama
(Deer, stag)

Doe 76 cm at shoulder, 40 kg; buck 90 cm at shoulder, 85 kg, antlers regrown annually. Rufous with white spots, black dorsal stripe, white belly and inside of legs; also black, cream and 'menil' (paler rufous) types. Often in herds of less than 20 animals. Cryptic behaviour; may emerge from cover at dawn and dusk to feed (favours pasture and native *Danthonia* and *Poa* species) or be diurnal.



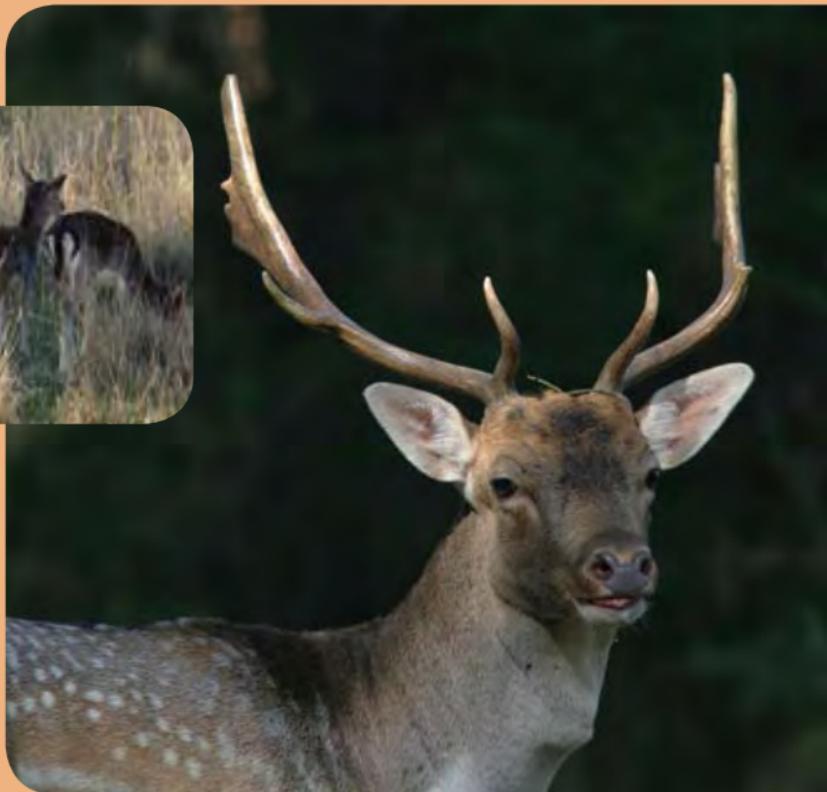
DOES

CAST ANTLER



TYPICAL HOOF PRINT

BUCK



FALLOW DEER

NOTE Tasmanian population largest in Australia; ranges over 2.1 million ha.

ORIGIN Mediterranean region to Iran.

HISTORY AND DISTRIBUTION

Released 1830s, now scattered herds in mixed woodland and grassland from southeast Queensland to southeast SA. Introduced to Tasmania from 1829 for sporting and aesthetic purposes; numbers supplemented by escaped farmed deer; present in eastern margins of TWWHA.

KNOWN IMPACTS Eats variety of vegetation; bucks also scrape ground and thrash/rub antlers against vegetation. In NSW, implicated in overgrazing, trampling, ringbarking and weed dispersal. In New Zealand, denudes forest understorey, slows regeneration and changes plant community composition. In Tasmania, implicated in decline of endangered Miena cider gum; may compete with native herbivores; may detract from TWWHA



wilderness values. Also damages crops, pastures and fences; can carry diseases and parasites of livestock; can pose traffic hazard.

CURRENT MANAGEMENT Impacts listed as threatening processes under NSW threatened species legislation. But in Tasmania, wild deer are a hunting resource partly protected under the Wildlife Regulations 1999 and *Nature Conservation Act 2002*. Hunters are encouraged to decrease harvest of young males and increase harvest of females, to reduce population while enhancing quality of trophy males. Landowners who have browsing damage can apply for culling permits.

Hunters, farmers, anglers and bushwalkers should report sightings or impacts outside of deer's current range to DPIW's Game Management Services Unit 6397 6591. DPIW can also assist landowners to develop property-based Wildlife Management Plans.

FURTHER INFORMATION

DPIW, 2007. *Species of Game: Deer*. URL: <www.dpiw.tas.gov.au/inter.nsf/WebPages/JCOK-68R49R?open>



EUROPEAN RED FOX

Reddish-brown to grey with white underside; black lower legs; 1 m long nose to tail; adults 4.5–8.3 kg. Newborn resembles grey kitten; month-old cub resembles kelpie/kitten cross. Prints similar to those of small dog. Intense, dazzling gold or silver eyeshine. Pungent-smelling scat, size of adult human finger with sharply pointed end. Largely nocturnal; shelters in enlarged rabbit or wombat burrow, hollow log, gorse thicket, etc.

Vulpes vulpes
(Red fox)



DOG



FOX



FOXES KILL UP TO 30%
OF LAMBS IN SOME
MAINLAND AREAS



FOX CUB

EUROPEAN RED FOX

NOTE Public vigilance is vital, especially at night when foxes are most active.

ORIGIN Europe, Asia, North America.

HISTORY AND DISTRIBUTION

Released in Victoria in 1871 for recreational hunting; found in Queensland by 1907 and WA by 1912. Now widespread outside tropics. Individuals reported in Tasmania in 1864, 1890, 1910 and 1972; escapee from container ship in Burnie in 1998 never located. Weight of evidence collected in Tasmania since 2001 indicates current fox presence.

KNOWN IMPACTS Many Tasmanian native species defenceless against this devastating predator, implicated in decline or extinction of several mainland species. Kills prey up to 5.5 kg; could hunt more than 80 local species (including 12 threatened species); at least 5 species could become extinct. Could compete with native carnivores and occupy niche vacated by declining devil population;



could prevent devil from re-establishing should DFTD be eliminated; will disrupt ecosystem function. Threatens agriculture and ecotourism; carries diseases dangerous to humans and other animals.

CURRENT MANAGEMENT DPIW Fox Eradication Program monitors fox presence with strategic searches for scats, footprints and dens; spotlight surveys; camera monitoring; scat collection surveys; and scat detector dogs. Guided by evidence and sighting reports, a large-scale 1080 baiting campaign is underway in areas of likely fox habitat and presence. Baits are widely spaced, buried at depth to reduce take by native carnivores, and removed after 28 days.

Report all sightings and any possible evidence immediately to 24-hour Fox Hotline 1300 369 688. Don't approach suspected dens; foxes will move if threatened. *Vermin Control Act 2000* permits hunting by licensed shooters at any time. If a fox is shot or carcass is found, do not move body; call Fox Hotline so carcass can be examined *in situ* before removal for further analysis.

FURTHER INFORMATION

DPIW Fox Eradication Branch, 2007. *Foxes in Tasmania*. URL: <www.dpiw.tas.gov.au/fox>

Robust, adaptable omnivore with brown, black or mottled coat. Adult boar 75–115 kg, sow to 75 kg; in cooler, wetter areas boars 175–200 kg. Snout specially adapted for uprooting ground. Presence indicated by churned or trampled soil, grassland or leaf litter, particularly around drainage channels, moist gullies, waterways and swamps; and ‘tusking’ or rubbing of trees.



PIG

Sus scrofa
(Boar, razorback)



TYPICAL HOOF PRINT



FERAL PIGS
TRAMPLE
WETLANDS

PIG

NOTE In good conditions, pigs have reproductive rate similar to that of rabbits.

ORIGIN Europe.

HISTORY AND DISTRIBUTION

Introduced to Australia by settlers in 1700s; now 3.5 million–23.5 million pigs covering about 38% of mainland; numbers fluctuate in response to environmental conditions. On Flinders Island, pigs released by sealers or castaway from 1877 shipwreck; numbers supplemented in 1970s by escaped or released animals.

KNOWN IMPACTS A known or perceived threat to at least 45 native plant and animal species on the mainland and at least 30 species on Flinders Island. Opportunistic omnivore, competes with many native animals; also preys on many species including eggs and young. Degrades habitat and biodiversity by destroying vegetation, retarding regeneration, altering soil structure, causing erosion, trampling bird and frog nesting sites, reducing



water quality and quantity, and spreading weeds, exotic invertebrates and root-rot fungus *Phytophthora cinnamomi*. Major agricultural pest; competes with livestock, destroys crops and fencing, fouls water sources and transmits disease. On Flinders Island, pigs present in areas containing threatened flora and fauna; also in wetlands (including a Ramsar site).

CURRENT MANAGEMENT Managed in accordance with *Feral Pig Management Plan Flinders Island (2002)*. Legally described as a feral animal; hunters do not need a permit and there is no bag limit. Landowners' permission must be obtained before hunting on private property. Hunting on game reserves is permitted, but hunting inside Strzelecki National Park is illegal. PWS will trial a controlled baiting program in 2008.

Hunters, farmers and bushwalkers should be on high alert for this species. Report sightings to PWS 1300 135 513, PWS Flinders Island 6359 2217 or DPIW 1300 368 550.

FURTHER INFORMATION

Commonwealth of Australia, 2005. *Threat Abatement Plan: Feral Pigs*. Canberra: Department of the Environment and Heritage.



EUROPEAN RABBIT

Oryctolagus cuniculus

Australia's most widespread and destructive environmental and agricultural vertebrate pest; familiar and easily recognised. Visible impacts include grazing down to ground level, destruction of root systems, ringbarking and erosion. In Tasmania, majority of rabbits live above ground if there is adequate shelter, although shallow burrows also used for protection from predators and climatic extremes; may also use burrows of native species.

BURROWS



FRONT FOOT TRACKS



HIND FOOT TRACKS



MAMMALS

EUROPEAN RABBIT

NOTE A pair of rabbits can produce 30–40 young annually.

ORIGIN Spain and France.

HISTORY AND DISTRIBUTION

Arrived with First Fleet, 1788.

Twenty-four rabbits released for sporting purposes near Geelong, 1859; had spread to WA and NT by 1900. Now throughout Australia,

south of tropics. Introduced to Tasmania in 1820s; present in TWWHA; released on Macquarie Island by sealers, island now densely populated.

KNOWN IMPACTS Competes with native species for food and shelter; changes plant community composition; degrades breeding habitat. Currently threatens more than 150 plant and animal species nation-wide; implicated in local extinctions on mainland. Indirectly impacts wildlife by supporting feral predators; these may 'prey switch' to native species when rabbit numbers crash due to disease or drought. Also competes with livestock; encourages weed invasion; jeopardises sustainability of land use.



CURRENT MANAGEMENT Myxomatosis and RHDV (calicivirus) losing effectiveness: rabbits have developed immunity (and myxoma virus no longer available); RHDV less successful in cool moist areas. Focus now on population suppression and/or eradication from conservation areas, i.e. myxomatosis, fencing and shooting used at Strathgordon in late 1990s. On Macquarie Island, aerial baiting will be combined with burrow fumigation, shooting and trapping, assisted by trained dogs. Urban ferals difficult to control due to public disapproval of baiting programs.

Vermin Control Act 2000 allows hunting at any time on Crown Land, State Forest and private land (with landowners' permission). Control options can be discussed with the Wild Animal Management Officer of DPIW 1300 368 550. Domestic animals should be desexed and kept enclosed; release of unwanted animals is illegal.

FURTHER INFORMATION

Commonwealth of Australia, 2007. *Draft Threat Abatement Plan for Competition and Land Degradation by Feral Rabbits*. Canberra: Department of the Environment and Water Resources.

Male to 58 kg; female to 44 kg; 114–162 cm long; both sexes have permanent horns. Coat shaggy or short; colours white, brown or black or combination. Occurs in small, isolated herds; prefers rugged, forested terrain. Targets native species including blackwood, drooping she-oak, native cherry, coffee berry, round-leaf riceflower, rough dogwood and forest germander.

TYPICAL 'BILLY' GOAT



GOAT

Capra hircus



TYPICAL HOOF PRINT

DAMAGED EUCALYPTUS
UNDERSTOREY,
MT WELLINGTON



MAMMALS

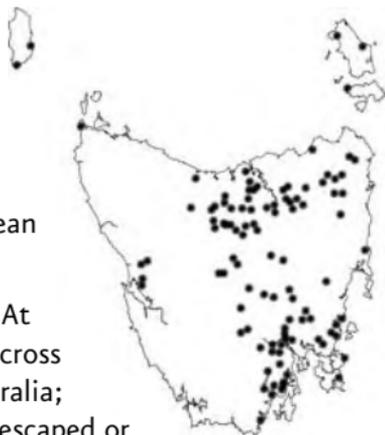
GOAT

NOTE Impacts listed as key threat to biodiversity values under EPBC Act.

ORIGIN Introduced by European settlers in 1788.

HISTORY AND DISTRIBUTION At least 2.6 million feral goats across about 1.2 million km² of Australia; populations descended from escaped or abandoned livestock, or animals released to provide emergency supplies. In Tasmania, more than 160 herds identified (and mostly eradicated) by DPIW since 1991 in various habitats, including rainforest; present in TWWHA.

KNOWN IMPACTS Hardy, generalist herbivore, sometimes aggressive. Female matures in 6 months; 2 breeding seasons per year; twins and triplets common; populations can increase by 50% annually. A threat to at least 57 species nation-wide, including 2 critically endangered plants. Competes with native fauna for food, water and shelter. Eats almost any vegetation; uproots, strips or browses



plants to ground level; breaks branches up to 3 m above ground; prevents regeneration; changes plant community composition; causes local extinctions. Herding behaviour increases intensity and impact of browsing. Causes erosion; fouls water sources; spreads weed seeds. Degrades pasture; competes with livestock; can transmit diseases and parasites; can damage forestry plantations.

CURRENT MANAGEMENT Management plan empowers DPIW to run a mostly ground-based shooting program, assisted by the use of radio-tagged 'Judas' goats.

The community, particularly farmers and bushwalkers, should be on high alert for this species. Report sightings to DPIW 1300 368 550 or PWS 1300 135 513. Unauthorised shooting could render a person subject to legal action and could also undermine eradication programs. Avoid tethering domestic goats; keep livestock securely fenced. Dispose of unwanted animals responsibly.

FURTHER INFORMATION

Commonwealth of Australia, 2007. *Background Document for the Threat Abatement Plan for Competition and Land Degradation by Feral Goats*. Canberra: Department of the Environment and Water Resources.