The evolving intent and coverage of legislation to protect biodiversity in New South Wales

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ABSTRACT

In the mid to late 19th century, New South Wales passed laws protecting from over-hunting just a few native bird and mammal species, despite scientists having documented the disappearance and decline of once-common species. As public concern grew over the decline of useful or commercially exploited species, and as scientific societies lobbied for their increased protection, so more bird and mammal species, and from 1927 some native plant species, gained protection. Realisation of the detriment of broad-scale agriculture led to laws setting aside reserves where land-uses that threatened species could be excluded. Mid-20th century laws introduced professional administration of reserves and of biodiversity laws, and increased the range of protected taxa. From the 1990s, with conservation politically potent, modern laws sought to conserve all biodiversity, not just individual species, but also ecosystems and their intrinsic processes, and to manage threatening processes. Such laws affect other planning and land-use laws, at all jurisdictional levels; they are embedded in a nationally integrated set of laws and reflect international agreements to conserve biodiversity. Biodiversity laws have grown in complexity, coverage and importance. Science and society will contribute to their continuing change.

Key words: threatened species legislation, flora, fauna, laws

Introduction

Legislation to protect biodiversity is a major expression of community attitudes towards, and hopes for, the conservation of biodiversity in general and of threatened species in particular. The primary aim of this paper is to review the history of the intent and taxonomic coverage of legislation in New South Wales to protect native species, and to identify some of the influences upon legislation, including the sources of community concern. We have not tried to review the effectiveness of the laws or how they were applied, except where those affected the emergence of amended or additional laws.

Our secondary aim is to suggest that legislation reacts to changes in circumstances (e.g. species really do become rarer), in scientific and management understanding (as we learn more about species, or about our intentional or unintentional effects upon them), and in public perceptions (e.g. the balance of attitudes within the community may change). However, legislation may also lead the way, inducing changes in community attitudes.

Legislation to protect biodiversity in NSW has been diverse (Table 1). Since colonial days, there have been changes in the objectives of legislative protection (what the laws set out to achieve), the objects being protected by legislation (what taxa or ecological or human-influenced processes the laws control), and the kinds, and integration, of legislative protection. In parallel with these changes, our understanding of the need for conservation has changed, and the social pressures for laws affecting biota have grown and changed direction. Through a review of the history of the legislation, we explore each of these themes.

Historical analysis shows that conservation legislation has never been perfect, nor has it been static. Legislation will and should change, and scientists and managers alike can contribute directly or indirectly to those changes. If we are to contribute to future legislation, we should have some grasp of how legislation has tracked and responded to community attitudes and environmental realities in the past. We begin our review in the colonial era.

The Colonial Era: 19th Century

Governors' environmental edicts

Attempts to control the environmental impacts of European settlers in colonial Australia pre-date specific laws. The settlement at Sydney, trying to become quickly self-sufficient in materials and agricultural produce, was bound to change the environment. Yet some changes were avoidable and seen at the time to be detrimental. Cattle escaped and became feral within weeks of the arrival of the First Fleet in 1788. Over-cutting of trees and inappropriate clearing occurred so early that, in 1795, Governor Hunter forbad the destruction, on Crown or private land, of trees fit for ship-building. Within five years of settlement, regulations were promulgated to prevent the felling of trees along the Tank Stream, Sydney's water supply. However, the dumping of rubbish and effluent into the stream led Governor King, in 1802, to impose a fine of five pounds on anyone found polluting the stream. Particularly prescient was Governor King's edict of 1803 to halt the clearing of riparian vegetation along the Hawkesbury River, which was already seen as leading to bank erosion, silting of the stream and consequent flooding (Powell 1976).

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Table 1. Some NSW Acts relating to the hunting, control, protection or conservation of biodiversity, listed chronologically. Not all Acts are shown, most amending Acts being omitted.

Year	Reference	Title
1852	16 Victoria No. 44	*Native Dog Destruction Act*
1866	29 Victoria No. 22	*Game Protection Act*
1879	42 Victoria No. 10	*Animals Protection Act*
1880	44 Victoria No. 11	*Pastures and Stock Protection Act*
1881	45 Victoria No. 29	*Birds Protection Act*
1883	46 Victoria No. 14	*Rabbit Nuisance Act*
1890	54 Victoria No. 29	*Rabbit Act*
1893	56 Victoria No. 18	*Birds Protection Act*
1901	No. 26, 1901	*Birds Protection Act*
1903	No. 18, 1903	*Native Animals Protection Act*
1918	No. 21, 1918	*Birds and Animals Protection Act*
1922	No. 37, 1922	*Birds and Animals Protection (Amendment) Act*
1927	No. 2, 1927	*Wild Flowers and Native Plants Protection Act*
1930	No. 12, 1930	*Birds and Animals Protection Amendment Act*
1948	No. 47, 1948	*Fauna Protection Act*
1967	No. 35, 1967	*National Parks and Wildlife Act*
1974	No. 80, 1974	*National Parks and Wildlife Act*
1991	No. 66, 1991	*Endangered Fauna (Interim Protection) Act*
1994	No 38, 1994	*Fisheries Management Act*
1995	No. 101, 1995	*Threatened Species Conservation Act*
1997	No. 133, 1997	*Native Vegetation Conservation Act*
2002	No. 78, 2002	*Threatened Species Conservation Amendment Act*

These early edicts were local, often site-specific, in effect. Yet such early insight into the local environmental harm of uncontrolled land-uses did not forewarn all later governors and governments and was not generalised to other areas as settlement expanded. Instead, Australia has experienced 200 more years of environmental degradation (including the clearing of riparian vegetation) as part of the unresolved conflict between individual land-holders' rights to develop and longer-term community interest in sustainable land management, fully conserved biodiversity and functioning ecosystems.

The need to legislate for the management of biodiversity emerged piecemeal. Two kinds of laws relating to vertebrates were passed in the second half of the 19th century in New South Wales: laws that protected individuals of some species, usually so that there would be enough of them to hunt ('game laws'), and laws to encourage the killing of individuals of species seen as pests of agriculture.

Game laws

From about 1830 to 1860, pastoral settlement spread rapidly across the tablelands and onto the plains of NSW. Squatters took up huge stations (just 11 stations spanned the 200 km from Armidale to the present Queensland border); but the pastoral development of those stations was not intense, depending, for example, on natural watering points and on shepherding rather than fences to control stock. Many pioneering graziers quickly became rich from the productivity of cattle and sheep grazing native vegetation communities that had never had stock on them. With wealth and ownership of land came attitudes akin to those of contemporary landed gentry in England, including possessive attitudes towards the right to hunt (for sport) either native or introduced animals on their land. Some landowners introduced game birds and mammals from Europe and America to improve the sport to be had on their properties.

The first pieces of colonial legislation to protect biota were game laws, modelled on then-current English hunting laws and common law. The first in NSW, the *Game Protection Act 1866* (the next, the *Animals Protection Act 1879*, was similar) protected individuals of exotic and native game species by banning their hunting totally for an initial five years, and then imposing a 'closed season' (a non-hunting period), meant to match the breeding season. Game species were listed on schedules to the Act (see Appendix 1). The scheduled exotic game were pheasants, partridges, grouse, swans, Brown Hare *Lepus capensis*, deer and antelopes; but the schedule ends with the phrase "All birds not indigenous to Australia and their produce", so the Act was intended to be used to protect acclimatised birds in general. However, the Act was clearly premonitory in that very few exotic birds had been deliberately introduced to and released in NSW at the time of these Acts. The scheduled native game species predominantly were the equivalents of British game bird species: ducks, Black Swan *Cygnus atratus*, quail,

pigeons, plovers, Australian Bustard *Ardeotis australis*, Malleefowl *Leipoa ocellata*, Australian Brush-turkey *Alectura lathami*, Bush Stone-curlew *Burhinus grallarius* and rail species. The Emu *Dromaius novaehollandiae* was listed, as it had been hunted for food and sport since the First Fleet, often to the point of local extirpation. However, the Laughing Kookaburra *Dacelo novaeguineae* was included, apparently out of sentiment for its song. All other native species remained unprotected, i.e. they could be taken or killed at will.

The assumptions behind this form of legislated protection were that:

- Uncontrolled hunting would threaten game populations and reduce sport in future;
- Populations would survive as long as hunting did not target the breeding stock or occur during the breeding season.
- People who had invested to increase the public good by importing game species (in particular) should have their investment protected.

Thus direct human killing of too many individual animals, exotic or native, was seen as the only threat (conservation risk) to be controlled by legislation; without that killing, everything would be fine. The acts reflected the value the community placed upon these species, and protected the opportunity for people to hunt them for sport, except for the kookaburra, which was the first native animal species to be legally protected for aesthetic pleasure alone.

Game laws developed in complexity, limiting who could hunt the species listed in the Schedules of the various Acts, when they could be hunted, by what methods (permissible size of gun, no use of nets, dogs, snares, bird-lime, etc), where they could be hunted, and, eventually, how many individuals could be taken (bag limits). The *Birds Protection Act 1881* again encouraged the importation of exotic birds (not just for hunting, and most of the named species had not at that time been released or become established in NSW, even if they had been in Victoria (Long 1981)), but laid equal emphasis on protecting listed native birds in the breeding season. The listed native birds (see Appendix 1) included several "songbirds" (and included kookaburras), mostly seen as useful to agriculture because they ate insects. The Act also made possible the declaration of reserves for "preserving any of the scheduled birds". Thus began the reservation of areas where protected species could safely breed and find refuge from killing; the examples of reserved areas known to us were wetlands, apparently dedicated for breeding waterfowl.

The *Birds Protection Act 1893* gave similar protection to listed exotic birds (including many that had not been introduced to NSW Long 1981), and was the last NSW act specifically to protect introduced vertebrate species other than game fish (e.g. trout species). The list of non-game native birds protected under the act was greatly extended (see Appendix 1 for a full list) to include many more insectivores (whose eating of insect pests was seen to help horticulture) and also several birds that had been hunted for their plumage, such as Superb Lyrebird *Menura novaehollandiae*, Nankeen Night Herons *Nycticorax caledonicus*, Paradise Riflebird *Ptilorus paradiseus*, Dollarbird *Eurystomus orientalis* and kingfishers, for whom protection was seen as urgently needed: "if we wait…there will be nothing done. Birds, like the rifle and lyre birds, which are shot for their plumage for the decoration of dresses, will be destroyed wholesale, and snared right and left" (W.R. Campbell, moving the Birds Protection Act, NSW Parliamentary Debates Session 1893, 1st series, Volume 63, p.4563). Thus this Act extended protection in two ways: addressing threats from killing for trade rather than sport, and protecting birds thought to be useful for agriculture.

The *Bird Protection Act 1901* consolidated the series of 'game laws' of the 19th century and was more prescriptive of the weapons and methods allowable in hunting; it relied mostly on closed seasons for protection. The attitude still prevailed that over-kill was the only substantial threat, but the Act recognised a wider range of reasons why birds were being killed and hence a longer list of species needing legal protection.

These Acts stirred considerable passion, some legislators fearing that they would "reproduce in this colony the accursed game laws of England. I know that those laws have caused a vast amount of bloodshed. Do not issue licences for shooting game, but protect the birds in any other way you like" (Poole, debate on the second reading of the Animals Protection Bill 25th November 1881, NSW Parliamentary Debates, Session 1881, 1st Series Volume 6, p. 2199; see also Melville p. 2200 and Poole and Jacob, p 2201). Legislators were wary of protecting bird species merely because they had been introduced at someone's personal expense, citing, as examples of protected birds that had become pests, House Sparrow *Passer domesticus* and Indian Mynah *Acridotheres tristis* (Norton, NSW Parliamentary Debates, Session 1893, Volume 63, p. 4568).

'Pest' control

Pastoralists, especially those raising sheep, were beset by mammals and birds that, they believed, ate their stock or their pasture and crops.

Some native and increasing numbers of introduced animal species were seen as threats to pastoral and cropping agriculture. Normally, individual landholders dealt with pests, but landholders called for more organised action against pests on uncontrolled properties. The first NSW attempt at legislation to coordinate vertebrate pest control was the *Native Dog Destruction Act 1852* (see Appendix 1), which tried to ensure that neighbours at least contributed to the cost of strychnine baiting of Dingoes *Canis lupus dingo* and wild Dogs *Canis lupus familiaris*.

Similar Acts aimed to co-ordinate and consolidate destruction of the European Rabbit *Oryctolagus cuniculus*. Under the first, the *Rabbit Nuisance Act 1883*, any animal could be declared and then protected as "a natural enemy of the rabbit"; and possession of a live rabbit or interstate importation of rabbit scalps could attract a fine of up to one hundred pounds or 6-months imprisonment (severe penalties for the time). The *Rabbit Act 1890* facilitated the co-ordinated building of rabbit-proof fences to stop the spread of rabbits.

From the 1860s to the early 20th century, public pressure for 'closer settlement' saw the original vast stations subdivided into smaller holdings, usually fenced and with well-distributed artificial watering points. Graziers were trying to support themselves on more intensively stocked acreages, with native pastures depleted by several decades of the impact of stock. Dingoes, Wedge-tailed Eagles *Aquila audax* and grazing macropods were seen as threats to livelihood.

In 1878, graziers, faced with what they saw as a plague of kangaroos, petitioned the NSW Legislative Assembly for special legislation to "check the rapid increase of the marsupials and so prevent threatened ruin to pastures and crops" (NSW Votes & Proceedings of the Legislative Assembly 1878-79, Vol.VII, pp. 889, 891 and 893). A Marsupials Destruction Bill, tabled but lapsed in 1879, led to the *Pastures and Stock Protection Act 1880*, which initiated 50 years of organised, co-ordinated scalp bounties on pests. Under the Act, landholders, through Pastures Protection Boards, could apply to the Governor to have any species declared a pest, with a defined bounty on its scalp. The original Act referred to "Rabbits Native Dogs and Marsupials" (the last meaning "Any kangaroo wallaroo wallaby or paddamelon"), but district bounty lists expanded, to include feral pigs *Sus scrofa*, hares, Red Foxes *Vulpes vulpes*, Common Wombats *Vombatus ursinus*, bandicoots, Greater Bilbies *Macrotis lagotis*, bettongs, Black-striped Wallabies *Macropus dorsalis*, Bridled Nailtail Wallabies *Onychogalea fraenata* and Brush-tailed Rock-wallabies *Petrogale penicillata* (Jarman and Johnson 1978; Short 1998).

Several of the bountied species are now extinct in NSW, but not because of bounties alone. The Act reflected the current attitudes that gave agricultural interests precedence over wildlife on pastoral lands (in debate on the Birds Protection Act Amending Bill, February 1893, De Salis was understood to say: "Whilst we had such enemies in the country as rabbits, hares and foxes interfering with the wealth of the colony, we ought to give our attention to them, and not such ridiculous trifles as the protection of a few birds." NSW Parliamentary Debates, Session 1893, 1st Series, Volume 63, p. 4569). The Act condoned the unlimited killing of individuals of any species labelled a pest. However, the validity of labelling was soon questioned, and many Boards quickly removed some species from their pest lists; but bountying remained common practice until the 1910s or 1920s in many Pastures Protection Board Districts.

19th Century knowledge

From the 1780s to about 1810, knowledge of the biota of New South Wales came from British (and French) explorers, and then from Sir Joseph Banks' collectors, including Brown, Bauer and Cayley, who sent material back to Britain (Gilbert 1981). Knowledge of Australia's biota expanded rapidly from the 1820s, thanks to Australia-based naturalists, collectors and explorers (e.g. Allan Cunningham, John Oxley, Alexander Macleay, Thomas Mitchell, Richard Cunningham) and the early stimulus of the Philosophical Society of Australasia (Hoare 1981; Gilbert 1981; Finney 1993; Hutton and Connors 1999). At the same time, the Agricultural and Horticultural Society of NSW began to develop a scientific understanding of the colony's agricultural lands.

The widespread impacts of settlement were reported quite early (Jarman 1994). Darwin (1845) in his brief visit to Australia in 1836 blamed the decline of kangaroos and emus on the southern Tablelands of NSW on settlers' greyhounds, and predicted the extinction of those species. In the 6th edition of *The Origin of Species*, among cases of introduced species displacing endemic species, Darwin reported: "In Australia the imported hive-bee is rapidly exterminating the small, stingless native bee" (Darwin 1872, Chapter 3, p. 59).

Gould (1863), from his experiences in Australia from 1838 to 1840, noted the decline of Red Kangaroos *Macropus rufus* confronted by pastoral expansion, predicting the species' "entire extirpation, unless some law be enacted for its preservation". Gould appealed for legal protection for this and other species, without which "a few years will see them expunged from the fauna of Australia" (Gould 1863).

Gerhard Krefft, collecting around the junction of the Murray and Darling Rivers in 1856 and 1857, noted the decline since stock arrived, less than 20 years earlier, of Red Kangaroo, Burrowing Bettong *Bettongia lesueur*, Greater Bilby and Pig-footed Bandicoot *Chaeropus ecaudatus*. Long-nosed Bandicoot *Perameles nasuta*, Eastern Barred Bandicoot *P. gunnii*, Southern Brown Bandicoots *Isoodon obesulus* and Eastern Hare-wallaby *Lagorchestes leporides* were still common; and Bridled Nailtail Wallaby were the commonest of the small macropods (Krefft 1866). Krefft linked the declines in abundance of marsupials unequivocally to cattle-based pastoralism.

George Bennett (1860) noted the scarcity and disappearance of some native mammals and birds. "Even in our own time, several have been exterminated; and unless the hand of man be stayed from their destruction, the Ornithorhynchus and the Echidna, the Emeu [sic] and the Megapodius….will shortly exist only in the pages of the naturalist" (Bennett 1860, Preface).

Thus, by 1865, several eminent scientists had published their view that expanding settlement was threatening the survival of some native mammals and birds. Some had publicly urged legislation to stop the killing of endangered native species; some felt that the threats comprised a suite of impacts that came with pastoral land-use.

19th Century Acclimatisation and Scientific Societies

In the 1850s and 1860s numerous plant, mammal and bird species were brought to Australia at the private expense of wealthy land-owners keen to introduce and "acclimatise" the useful plants and animals of other regions to "improve" Australia. Acclimatisation societies, established in most states from 1861 (in Victoria), encouraged further introductions, and pressed for legal protection of populations already introduced, despite the evident damage caused by some pre-Acclimatisation-Society introductions (hares and rabbits to Tasmania, and to Victoria, for example).

Acclimatisation matched the pioneering belief that the environment could be improved and that individuals should be encouraged to join in the task. This attitude under-pinned all the bird and animal protections acts up to 1903, and was reflected in the opening statement in the *Game Protection Act 1866* that: "certain persons have imported and may import from parts beyond the seas at considerable expense for the benefit of the Colony game not previously existing therein and it is expedient that encouragement should be given to such importations of game by protecting it and its progeny as also that native game should during the breeding season have a similar protection."

Many scientists strongly supported acclimatisation. Australia's most eminent 19th century botanist, Ferdinand von Mueller, first Government Botanist of Victoria (from 1853 until his death in 1896) and first Director of the Melbourne Botanic Gardens, vehemently advocated acclimatisation. Indeed, Mueller advocated the purposeful spread of blackberries in Australia until the year before his death, despite blackberries by then being declared a noxious weed in parts of Victoria (Parsons 1981; Hutton and Connors 1999).

The first scientific society in Australia was the Sydney-based Philosophical Society of Australasia, founded in 1821; this transformed into the Australian Philosophical Society in 1850, and into the Royal Society of New South Wales in 1866. The first specifically biological societies in NSW were the Linnean Society and the Zoological Society, both formed in 1879. The Natural History Association existed from 1887 to 1890, and the Field Naturalists' Society from 1890 to 1894. The Zoological Society (later renamed the Royal Zoological Society of New South Wales) was formed for "the introduction and acclimatisation of song birds and game" (as a result of dissatisfaction with the existing acclimatisation society), and lobbied for legislation to protect imported species (e.g. McLaughlin: "The Bill was introduced at the request of the Zoological Society, who had a number of imported birds which they could not let loose because they were not protected by law." Animals Protection Bill In Committee, NSW Parliamentary Debates, Session 1881, 1st Series, Volume 6, p. 2776). The Society gained its more scientific bent later (Strahan 1992). In the 19th century, none of these biological societies was dedicated to conservation, to which they turned early in the 20th century.

Changing attitudes to land uses and native vegetation

Most agricultural land in NSW east of the Darling River was taken up between the 1830s and 1860, and west of the Darling between 1850 and 1890. Many pioneers noted rapid changes in vegetation and in animals within the first decade of agricultural development. While at first tolerated or even a condition of leases, the tree destruction that accompanied pastoral expansion was publicly deplored by such as von Mueller, and the risks from ring-barking and clearing were clearly recognised by the 1890s (Hutton and Connors 1999).

Compared with agricultural produce, native plants and timber were under-valued. The Colony had no legislation for payment of royalties on timber until 1889 (and then royalties were largely ignored), and proper silviculture was not practised until 1890-3 (Walker 1991). Forestry practices became more standardised and more thoroughly administered after passage of the *Forestry Acts* of 1909 and 1916. A NSW branch of the Australian Forest League was established in 1915 to improve professional practice. Flora Reserves were established in State Forests early in the 20th Century. Since 1868, Fisheries Acts in NSW had aimed to minimise wasteful harvesting of fish and shellfish (e.g. oysters) (Hutton and Connors 1999), exemplifying attempts to protect commercial, marine biodiversity.

Some popular cut flowers, such as Christmas Bush *Ceratopetalum gummiferum* and Christmas bells *Blandfordia* spp, were protected from over-harvesting by landowners or local regulations. Bills to protect native flora, tabled in 1895 and 1897, arose from concern at the loss of native species in Central Cumberland, through commercial taking of wild flowers and their copious use in wild flower shows (Farnell, 21st August 1895, NSW Parliamentary Debates Vol 79, p 244). However, the bills were respectively declared a waste of parliamentary and public time (by Haynes and Edden, 21st August 1895, NSW Parliamentary Debates Vol 79, pp 246 & 251), and a "paltry emanation of a circumscribed intelligence" (Watson, 23rd November 1897, NSW Parliamentary Debates Volume 91, p. 4993), and lapsed. Opponents claimed that the bills would destroy the wildflower industry, that "we have millions of acres which will remain unoccupied for the next thousand years on which these flowers will grow" (Haynes, NSW Parliamentary Debates Volume 79, p. 246), that "it is impossible that the wild flowers in our bush can be exhausted for several centuries to come (Waddell, NSW Parliamentary Debates Volume 79, p. 247), and that the (Royal) National Park and Ku-ring-gai Chase should provide enough protection for native flora. The problem was thought to be confined to urbanised Sydney and inconsequential because the same flora was assumed to occur abundantly in the untouched, everlasting wilderness of the rest of NSW. Legislative protection of native flora had to wait until 1927.

In 1864, the American G.P. Marsh published *Man and Nature* (Marsh 1864), the first major work suggesting that human land-uses affected not only vegetation but also soils, water and climate. The ideas were taken up in Australia (warmly advocated by von Mueller (Powell 1976)), and led particularly to suggestions that the Australian climate would be altered by tree-clearing (e.g. Clarke 1876). South Australian Surveyor-General G.W. Goyder, in the 1860s and 1870s, encouraged preservation of tree cover and planned forestry plantations and drainage schemes, based on scientific data of the time; Goyder is best known for defining zones of climate suitable for cropping agriculture and his hurried 1865 survey to demarcate limits of drought relief (Heathcote 1981). In the 1880s, science was increasingly used to solve problems of agricultural land-use, soil, water supply and insect pests (including biological control of pests), but was not yet focused on conservation of biodiversity.

General 19th century attitudes

Walker (1991 p.18) commented that, in the 19th century, "conservation was never an important political issue"; all the NSW game, animal and native flora protection bills up to 1897 were proposed by private members, not government. The public generally supported opening up and development of the land at least to the 1880s. However, NSW experienced difficult agricultural years in the late 1880s and 1890s, including prolonged droughts and invasion by rabbits, and stock numbers fell precipitately in the 1890s. The realities of over-stocking, the detrimental consequences of tree clearing, disappearance of native vegetation and ground cover, soil erosion, siltation of streams and waterbodies, plagues of vertebrate and invertebrate pests, and the disappearance of native species all became widely apparent. Testimony to the Royal Commission into the condition of farmers in the Western Division of NSW in 1901 makes stark reading still (see Lunney 1994). By the end of the 19th century, it was clear to some that land-use practices in many regions were unsustainable, and that native biota were suffering as a result. Some late-19th century authors strove to make rapidly growing scientific knowledge of native flora and fauna available to school children and the public. For example, *The Insectivorous Birds of Victoria with chapters on birds more or less useful* (Hall 1900) opens with the words: "The purpose of this handbook is to foster an interest in the insectivorous birds of our colony, and to aid in the protection of them." Such increased public understanding, education and purpose paved the way for the escalation in legislation for conservation in the 20th century.

20th Century: NSW Acts pre World War II

The schedules of the *Birds Protection Act 1901* listed mainly 'game' birds for hunting. However, the *Native Animals Protection Act 1903* at last recognised that some mammal species had declined greatly (including Red Kangaroo and Common Wallaroo *Macropus robustus*, heavily bountied under the *Pasture and Stock Protection Act*). A dozen mammal species (see Appendix 1) were given absolute protection for 14 months, and then at least periodic protection from hunting. The aim of the Act was still to limit direct killing of individuals, still the only admitted threat. Ever since the *Birds Protection Act 1881*, the Zoological Society had been granted half the fines imposed for offences; the 1903 Act was the last under which that occurred.

The *Birds and Animals Protection Act 1918* was novel in listing the birds and mammals that could be hunted (24 bird species and 21 mammal species, including several now threatened or extinct in NSW; see Appendix 1). All unlisted species were protected; however, rodents were specifically excluded from protection, as were reptiles (and, of course, frogs and invertebrates). The increasing list of protected species was still limited to birds and mammals. In the *Birds and Animals Protection (Amendment) Act 1922*, most of the previously listed native mammals were removed from the unprotected list (Walker 1991).

International pressure against trade in birds' plumes influenced that 1918 Act. Australia was not a big source of plumes, but many people had profited out of selling plumes, which often meant killing the birds in the nesting season. The Royal Australasian Ornithologists' Union (RAOU), founded at the turn of the century for "the advancement and popularisation of ornithology and … the protection of economic and ornamental native birds" (Ryan 1907, pp. 95-6), actively lobbied for laws protecting native birds. In his President's Address, Ryan (1907, p. 96) foresaw "that each State will have to carry out its own domestic legislation regarding proper bird protection – at present, at least. It has been said that Australia is an over-governed country. So far as bird protection is concerned it is hardly governed enough." Ryan countered accusations that bird protection was a matter of sentiment with arguments for the agricultural and horticultural value of insectivorous birds and the value of birds for sport hunting. He also urged that Australia and New Zealand should not be seen to lag behind the "rest of civilised nations in matters pertaining to bird protection", arguing for the first time for Australia to match international standards in conservation laws (Ryan 1907, p. 97).

Ryan (1907) illustrated the context for the early-20th century legislation. He felt that State Game Acts should be made more effective through education, "fostering a national sentiment, and by urging the authorities to enforce the law" (Ryan 1907, p.101). Ryan recommended that schedules of protected species be made uniform between states (a new idea at that time), to prevent species being protected in one state but still vulnerable in another. He emphasised the value of creating reserves, on both Crown and private land, and the necessity of paying Wardens to manage reserves. His vision for bird conservation was in advance of Australian practice at the time, but drew upon current practice and discussion in the United States of America. The 1908 RAOU Vice-Presidential address took lessons for Australia from international agreements on the protection of birds in Europe (Campbell 1908).

The RAOU's conservation awareness was matched by the Wild Life Preservation Society of Australia (WLPSA), formed in 1909 specifically to foster conservation (Walker 1991). The WLPSA's members included senior government and university zoologists. From 1912, the Association lobbied for better protective legislation, producing their own draft of a Bill that led to the 1918 Act, and becoming the first public conservation society successfully to lobby for conservation legislation. The 1918 Act did not achieve everything advocated by the WLPSA and RAOU, but it reflected a substantial shift in public, and hence government, attitude towards conservation.

The 1918 Act for the first time allowed for the employment of rangers, and the appointment of honorary rangers; all police became rangers by virtue of their office. With government-appointed protectors, the Zoological Society no longer received half of all fines.

By 1925, after the further intensification of pastoral and cropping agriculture (e.g. in soldier-settler schemes) and the beginnings of mechanised forestry and forest

clearance, biologists knew that Australia's biodiversity was being eroded by myriad, human-induced, broad-scale threats. In his introduction to the book *Save Australia. A Plea for the Right Use of Our Flora and Fauna*, Barrett (1925) listed these as settlement, the clearing of forests, introduction of exotic plants, effects of foxes and rabbits, hunting for the skin trade, 'sport' shooting, hunting for museum collections (being urgently pursued in the 1920s as Australia's wildlife was seen to be fast disappearing), and human population growth. Le Souef (1925) also identified, among the major threats to native mammals, predation by the Cat *Felis catus* and disease. He called for "preservation" through placing endangered species in reserves (preferably on islands) and a Zoological Survey, or at least rangers' reports, to counter poor information and advice to the Minister. This was one of the first suggestions for targeted research to provide a scientific basis for understanding what was happening to biodiversity, and an example of the widespread contemporary thinking that island sanctuaries should be used to preserve endangered species.

Barrett (1925, pp.14-15) gives an early example of Commonwealth control of exports being used to aid conservation: "The Minister of Trade and Customs for the Commonwealth … has appointed Committees of Advice in the various States to assist his department in preventing export of animals and birds, dead or alive, except under license." Nicholls (1925) recognised that "the animals of Australia belong to the Commonwealth, and the Commonwealth Government should exercise its prerogative, and see that they are properly cared for" (p. 98), and called for Commonwealth or State Governments to "levy a small tax upon every skin leaving Australia, and apply all the money so collected to the establishment of a Department of Economic Biology", which would "control the fur export trade, dictate the policy of the total or partial protection of the various species, and, by scientific research, show the economic relationship that exists between animals, birds, and agriculture." Such public advocates of conservation put much faith in science.

In 1927, the *Wild Flowers and Native Plants Protection Act*, the first general law protecting native vascular plants, allowed the Minister to proclaim any native NSW plants protected in specified areas and for specified times. Again, this only protected them against picking and harvesting; it did not protect their habitat. But, notably, the *Forestry Act 1916* could not over-ride the Act, which applied on Crown land, State Forests, public land and private land unless the owner of that private land had given permission for plants to be destroyed. Protected plants could not be sold unless they had been picked from private land with the owner's permission (a wide-open loophole for flower-cutters).

The *Birds and Animals Protection Amendment Act 1930* encouraged the declaration of sanctuaries, both on private land at the owner's request and on public land, such as within a mile of every State school (to encourage children to appreciate animals; although sparrows, silvereyes, starlings, bulbuls, crows, ravens, rabbits, hares, foxes, dingoes and fruit-bats were specifically not protected in such school sanctuaries) (Walker 1991). In introducing the Bill, Captain Chaffey said: "Today there is not sufficient protection of birds against trafficking. Some of the cruellest things that could be imagined are done by hawkers of birds, who cage them under the most objectionable conditions" (NSW Parliamentary Debates, 2nd Series, Session 1929-30, Volume 121, p. 3650). Prevention of cruelty to individual animals appears to have been a major stimulus for the Act, which increased penalties for possessing protected animals, and proscribed more means of taking animals. More public servants automatically became rangers (e.g. teachers, foresters, stock inspectors, fisheries inspectors), "to establish a protective system from one end of the State to the other" (p. 3651). People could obtain licences to trade in legally taken animals.

Since 1901, the NSW laws had become more complex, reflecting a growing public regard for and awareness of the usefulness of native biota. No longer were the attitudes of sportsmen and farmers paramount; indeed, land-owners were increasingly encouraged to establish reserves or sanctuaries. Protection of wildlife was part of State education; and the decline of native mammals and birds was recognised. The first professional rangers were being paid, although they were greatly outnumbered by honorary and ex-officio rangers. In debating the 1930 Bill, several proponents hoped it would "bring the law of New South Wales regarding birds and animals into line with that of the other Australian States" (NSW Parliamentary Debates, 2nd Series, Session 1929-30, Volume 121,Tonge, p. 3651; Marks, p. 3653-4) and keep pace with conservation measures and practices in Britain, Germany and the United States of America (Tonge & Marks, pp. 3652-3). NSW legislators clearly knew of progress in conservation in other Australian states and overseas, and their awareness was affecting State legislation.

20th Century: NSW Acts post World War II

In the second half of the 20th century, land uses in NSW intensified greatly. After World War II, further soldier-settler schemes occurred and irrigation schemes (e.g. in the Riverina and Murrumbidgee Irrigation Area) pushed intensive agriculture far onto the western riverine plains. Mechanical techniques for distributing superphosphate fertilisers and seeds of exotic pasture plants, for transporting stock and crops, for clearing trees and scrub, for ploughing hitherto unploughed soils, for draining wetlands, for sinking bores and digging dams, and for extracting timber or clear-felling coupes for short-rotation forestry or plantations: all these induced rapid change in intensity and extent of modification of natural communities and set the context for the expansion of parks and reserves that characterised conservation in this period.

Up to World War II, the list of birds and mammals legally protected from being killed by humans had grown steadily (Figure 1). However, the legislation had been weakly enforced, by a handful of paid and honorary rangers, and had not recognised the full diversity of threats to, or threatened status of, biota. The *Fauna Protection Act 1948*, the first real, purpose-built conservation Act in NSW (albeit for some birds and mammals only), expressed an emerging government commitment to conservation.

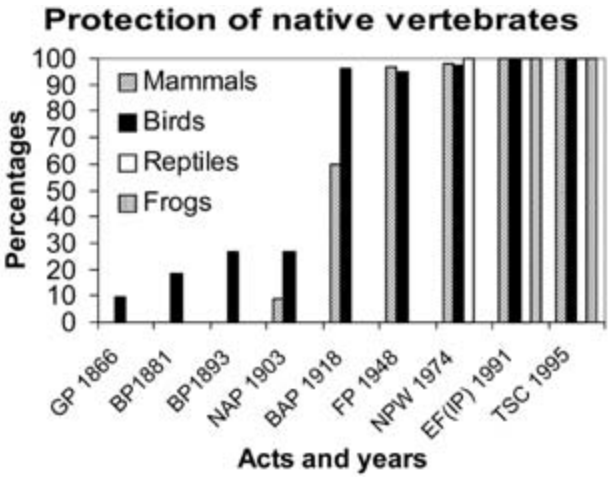

Figure 1. Changes through time in the proportions of native mammal, bird, reptile and frog species in New South Wales protected by legislation. Mammals refers to terrestrial species only. The Acts referred to by abbreviations are: GP 1866, Game Protection Act 1866; BP 1881, Birds Protection Act 1881; BP 1893, Birds Protection Act 1893; NAP 1903, Native Animals Protection Act 1903; BAP 1918, Birds and Animals Protection Act 1918; FP 1948, Fauna Protection Act 1948; NPW 1974, National Parks & Wildlife Act 1974; EF(IP) 1991, Endangered Fauna (Interim Protection) Act 1991; TSC 1995, Threatened Species Conservation Act 1995.

This Act required the appointment of a senior government administrator, the Chief Guardian of Fauna, and established a 13-member Fauna Protection Panel drawn from government departments, university, farmers, and societies constituted for "the preservation, conservation, protection or scientific investigation of fauna". The Panel was appointed to: "advise the Minister; educate …to awaken and maintain an appreciation of the value of bird and animal life; have the care and control and management of faunal reserves; …generally co-operate with any … persons or bodies in the care and development of reserves for fauna; form … local faunal societies; (and) conduct scientific and biological research in connection with the protection and care of fauna". The Act was the first to appoint a senior public servant and a committee to implement education and research for conservation.

The Act provided for the dedication, on the recommendation of the Panel, of "any Crown land as faunal reserves for … the protection and care of fauna, the propagation of fauna and the promotion of the study of fauna." Such reserves could be revoked only by act of parliament. The Panel had to draw up a "written scheme of operations" for each reserve, which, if approved by the Minister, became the working plan for the reserve. On reserves, timber was protected, miners' rights or leases were suppressed, and any travelling stock reserve included in them could be used only with the Panel's permission. Thus the Act began to protect habitat by managing land uses, but only within Reserves on Crown land and only for fauna (often for specific species).

The Fauna Protection Act's first schedule defined *unprotected* fauna (which included both native and exotic birds and mammals) that could be killed or taken either throughout NSW or in specified localities. This schedule contained the same exotic birds as previously (and added the bulbul), the same cormorants, corvids, and mostly the same cockatoos and parrots; but added several raptors and, in some parishes, rallids were listed as unprotected (see Appendix 1). The mammals that were unprotected in the whole state were: Dingo, Ferret *Mustela putorius furo*, Red Fox, Grey-headed Flying-fox *Pteropus poliocephalus* and Little Red Flying-fox *P. scapulatus*, Brown Hare and European Rabbit; the Common Wombat was unprotected in many districts over most of its range in NSW.

The Act also specified as "protected fauna", and the property of the Crown, all mammals and birds other than those listed in schedules as unprotected. For the first time, the Governor could also declare any protected fauna to be *rare* fauna, taking of which could incur a penalty of a 50-pound fine (as for unprotected fauna) or imprisonment for up to 6 months or both. This was the first time imprisonment was set as a penalty for killing wildlife in NSW. However, the Governor could also license people to kill "any fauna found on his land which may be destroying or injuring or be likely to become injurious to his property", thus allowing for licensed control of protected species regarded locally as pests. People could also be licensed to deal in fauna or skins of unprotected species and of kangaroos, wallaroos, wallabies and possums taken under licence and on payment of royalties. The Act also ended acclimatisation, imposing penalties on: "Any person who liberates any fauna imported into New South Wales, except under .. a permit granted by the Minister." Trout continued to be liberated, fish not being subject to this Act.

The 1948 Act established the framework for late-20th century government conservation effort, centred on the reservation of land for conservation (even if expressed as the conservation of individual species). Its advisory panel represented government, scientific, land-holder and conservation-group concerns. The Act reflected growing public interest in the environment and biodiversity. For the first time it brought together under one act almost all the then-current threads of management of native birds and mammals: protection of species, control of pests, provision of reserves to protect habitat, and regulation of trade in animals and their products. Nevertheless, it still lacked a professional conservation service to implement its intentions.

A state government conservation agency: the National Parks and Wildlife Acts

When post-war (World War II) expansion and intensification of agriculture made it increasingly obvious that many species of fauna and flora, even if protected from direct killing, could not survive on land dedicated to other uses, the declaration of National Parks and other reserves became a major tool in the growing conservation effort. This reflected four things: an acceptance that production land-uses could be detrimental to at least some fauna and flora; recognition by government that dedicating Crown land for conservation was politically easier than curbing land-holders' management of private

land; the urban public's growing interest in recreational uses of natural bush; and the first ecological insights (ecology having emerged as a quantitative scientific discipline in the 1930s) into a population's requirements for habitat and resources.

The 1967 and 1974 *National Parks and Wildlife Acts* both centred on establishing the NPWS as the State's conservation authority. The 1967 Act consolidated, without immediately expanding, the taxonomic coverage of the *Fauna Protection Act 1948* and the *Wild Flowers and Native Plants Protection Act 1927*, listed the pre-existing12 National and seven State Parks, and re-named pre-existing faunal reserves as Nature Reserves. Most importantly, the *National Parks and Wildlife Act 1967* established a framework for a government agency, the NSW National Parks and Wildlife Service, charged with conserving both fauna and flora. The Fauna Protection Panel and office of Chief Guardian of Fauna, established under the *Fauna Protection Act 1948*, were abolished and their functions transferred to the new National Parks and Wildlife Service. Similar Acts were passed in the early 1970s in most other Australian States and Territories, and a Commonwealth Act brought about an Australian National Parks and Wildlife Service.

The *National Parks and Wildlife Act 1974* listed *unprotected* fauna including, for the first time, deer and antelope, which had been specifically protected a century earlier by the *Game Protection Act 1866*. Rusa Deer *Cervus timorensis* was specifically excluded from the unprotected list, showing that sentiment could still selectively over-ride the principle of listing as unprotected all exotic, free-ranging vertebrates. However, their continued protection may have helped prevent poaching in Royal National Park (the only home of free-ranging Rusa Deer in NSW). The unprotected species included two native mammal species (Grey-headed and Little Red Flying-foxes) and 13 native bird species (four cormorants, three corvids, Pied Currawong *Strepera graculina*, Galah *Cacatua roseicapilla*, Sulphur-crested Cockatoo *C. galerita*, Crimson Rosella *Platycercus elegans*, Eastern Rosella *P. eximius* and Silvereye *Zosterops lateralis*) (see Appendix 1 for the full list). Thus the unprotected schedule was still used to allow the killing of native vertebrates seen as pests.

The Act also listed (in its Schedule 12) eight native mammal and 28 bird species as *endangered*. Some of these had previously been subjected to legally sanctioned sport-hunting or pest control (Bridled Nailtail Wallaby, Grey Falcon *Falco hypoleucos*), although others had intermittently received protection since the *Game Protection Act 1866* (e.g. Brolga *Grus rubicundus*, bustard, Malleefowl). Now they were protected because of concerns about their status, although the criteria by which they were judged to be endangered was not spelled out in the Act. The *National Parks and Wildlife Act 1974* also for the first time in NSW protected reptiles and included a reptile (Broad-headed Snake *Hoplocephalus bungaroides*) among the listed endangered species. All other snakes received protection unless they were thought to be endangering people, such as when a venomous snake was seen under a back step or in a school yard.

The schedule of protected native plant species was still intended to prevent over-harvesting of commercially valuable species. Thus it specified sphagnum moss, many ferns, several palms, all orchids, all *Telopea*, *Pandanus*, *Doryanthes*, *Eriostemon*, *Crowea*, *Blandfordia* and *Boronia* species, and a number of species commonly sold as cut flowers (e.g. Flannel Flower *Actinotus helianthi*, Christmas Bush *Ceratopetalum gummiferum*, and Sturt's Desert Pea *Clianthus formosus*). However, while a few species (e.g. *Grevillea asplenifolia*, *G. caleyi*, *G. longifolia*) may have been listed because of their rarity, rarity was not a common reason for listing a plant species for protection.

The conservation tools available under the 1974 Act remained the relatively crude ones of protecting a species from being directly killed or harvested (including regulation of trade, display and captive keeping), and of declaring and managing parks and reserves. Many native bird and mammal species were still unprotected because of their assumed damage to agriculture, horticulture or fisheries. Other species could be declared pests in specific circumstances, although their consequent treatment often ignored the context of damage (e.g. the kangaroo management program did little to ensure that kangaroo culling targeted site-specific problems). To a great extent, the 1974 Act still reflected the premise that threatened species could be conserved if only the law could stop people killing them. However, the numbers of parks and reserves rapidly increased under the Act, reflecting, in part, a feeling that habitat modification was a threat most easily countered by reserving government-managed land for conservation. Private land and its management remained largely beyond the reach of the Act. Although NSW governments through the 1970s and early 1980s (and again in the mid- to late-1990s) seized opportunities to convert other Crown lands into National Parks and Nature Reserves, the emerging conserved estate was not necessarily "comprehensive, adequate and representative" (to quote the catch-cry of the times) (Pressey 1990). Despite effective laws, this opportunistic creation of parks, ignoring the best science, came at a longer-term cost to conservation (Whitehouse 1990; Pressey *et al.* 1993). Whitehouse (1990) attributed the "success of the reserve expansion programme in New South Wales" to "the interaction and co-operation between the National Parks and Wildlife Service and the non-government conservation movement". All later conservation legislation has included mechanisms to facilitate such co-operation.

The growing belief that destruction of habitat and resources threatened endangered species was tested in the Land and Environment Court (Corkill v Forestry Commission of New South Wales (1991) 73 LGR 126). The judgment, that logging would have put at risk a number of endangered and protected fauna species, meant that the Act could be invoked to prevent, not just direct killing or harvesting, but also indirect threat through habitat and resource destruction. This triumph for the North East Forest Alliance exemplifies the ability of community groups to affect the interpretation and implementation of conservation law. Extension of provisions under the existing National Parks and Wildlife Act to protect habitat of endangered species outside parks and reserves matched

growing public sentiment and scientific understanding of what was needed for conservation. But it required the State's conservation agency to impose its will in areas such as planning, and upon other land-uses, such as forestry. The Act's inappropriateness for that, and the developing views about conservation, led to new legislation.

Modern Australian threatened-species legislation

Starting with the Victorian *Flora and Fauna Guarantee Act 1988* and continuing through the 1990s, most States, Territories and the Commonwealth introduced modern Acts to conserve threatened biodiversity. In NSW, the *Endangered Fauna (Interim Protection) Act* (EF(IP) Act) *1991* was rushed through a hostile parliament by a combination of the Labor opposition and independents, partly in response to the outcome of Corkhill v. Forestry Commission of New South Wales (1991) and the consequent need to license logging in State Forests. The objects of the Act included: "to provide urgently an objective scientific evaluation of the conservation status of fauna in New South Wales" (mammals, birds, reptiles and, for the first time, frogs; but still not invertebrates and flora), "to divide species of fauna into endangered, protected and unprotected species", and "to ensure endangered species of fauna are only harmed with the informed consent of the Director of National Parks and Wildlife", but to allow 'harming' of protected fauna if approved under the Environmental Planning and Assessment Act 1979 and if the impact upon the protected fauna had been examined. (The concept of minimising impacts of developments upon wildlife in general had been in place since the government's 1972 Environmental Impact Policy, and the NSW *Environmental Planning and Assessment Act 1979*.) The three-person Scientific Committee under the EF(IP) Act was the first in NSW to apply criteria, as set out in the EF(IP) Act, by which to judge the endangered status of fauna, and their lists became entrenched in the schedules of the subsequent *Threatened Species Conservation Act 1995* (Lunney *et al*. 2004).

The EF(IP) Act was replaced by the *Threatened Species Conservation Act 1995* (TSC Act) for 'non marine' organisms. The *Fisheries Management Act 1994* (FM Act) similarly protects 'marine' organisms and together these two Acts cover NSW biota. At a national scale, the *Endangered Species Protection Act 1992* (ESP Act) first covered all biota and was superseded by the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The TSC Act and its cohort of contemporary Acts have common objectives, namely to:

- Conserve biological diversity in all its forms;
- Prevent extinction and promote recovery of endangered species, populations and ecological communities;
- Eliminate or manage threatening processes;
- Ensure proper assessment of the impact of actions affecting threatened taxa and communities; and
- Encourage conservation of threatened species, populations and ecological communities.

In NSW, the TSC Act and FM Act covered a much greater range of taxa than the 1974 NPW Act, including, not just all vertebrates, but also invertebrate animals, and vascular and non-vascular plants. Any species could, if a review of its status warranted it, be listed as "threatened" at one of several levels. The intent of these Acts was to include all biota. The long initial (January 1996) lists of threatened species under the TSC Act included all the vertebrates placed on the schedules in 1992 under the *Endangered Fauna (Interim Protection) Act 1991*, and a few more species added when it passed through parliament in December 1995. In 1992, there were 40 vertebrate species listed as extinct, 37 as endangered, and 156 as vulnerable; by December 2000, these numbers had expanded slightly to 40 extinct, 52 endangered and 155 vulnerable (Lunney *et al.* 2000). In January 1996, there were 41 plant species presumed extinct; 213 plant species listed as endangered and 196 as vulnerable; the lists have been extended greatly since then.

Moreover, the TSC Act considered for listing as threatened, not just whole species, but also separately identified *populations* of species, and whole *ecological communities*. It recognised the need to conserve *critical habitat* and, for the first time, it recognised *key threatening processes*. Furthermore, anyone could propose (to the Scientific Committee; see below) any species, population or ecological community for listing as threatened, or any process as a threatening process, and the public was invited to comment on the preliminary determinations that arose from such proposals. The initial lists under the *Endangered Fauna (Interim Protection) Act 1991* were opened for public comment after the public promulgation in March 1992. Similarly, the public could nominate for listing under the *Fisheries Management Act* threatened 'marine' species, and the nomination would be considered by the Fisheries Scientific Committee. (That terrestrial and aquatic biota should be conserved under separate legislation is an anomaly that reflects the evolution of State laws, rather than rational choice by conservation legislators.) This accessibility has facilitated individuals and community groups contributing to listing of threatened 'taxa' and threatening processes.

The process of proposal, consideration and listing was made transparent, and, for the listing of species not in the schedules when the TSC Act passed through parliament in December 1995, used internationally accepted criteria (e.g. the IUCN Red List Categories. IUCN 1994). However, the listing of threatened ecological communities and key threatening processes relied largely upon criteria drawn up first for the Victorian *Flora and Fauna Guarantee Act* and Commonwealth ESP Act and modified for the NSW Acts. Australia, which at the start of the 20th century had been urged not to fall behind the developed world in its protective legislation (Ryan 1907), broke new ground in formulating legally workable definitions of threatened ecosystems and threatening processes. Achieving these workable definitions was difficult because laws more easily handle concrete objects (like individual animals) or classes of objects (species) than they do dynamic ecosystems that are, to an important extent, characterised by the processes of interaction between objects or classes of objects.

Decisions (not just recommendations) to list under the TSC Act were made, on the best available evidence, by the Scientific Committee, whose membership was drawn largely from outside the NPWS conservation agency. This power of decision gave a greater independence (from the Minister responsible for conservation) in the process of determining threats and conservation status for non-marine biota in NSW than in other States or the Commonwealth or for marine species in NSW under the FM Act. The effect of listing was to require the government to plan, and implement the plan, to manage the threatened taxon, ecological community or threatening process. Thus, listing (in theory) compelled the government to take conservation action.

Recognition of *the need to manage ecological processes* was perhaps the most novel legal feature of the TSC Act and its counterparts in other jurisdictions. It marked a maturing of scientific and public understanding, moving beyond belief that direct killing is the only threat to endangered species, and that conservation reserves alone would ensure the long-term security of widely distributed species. A system of disjunct reserves, separated by inhospitable matrix, is unlikely to preserve the ecological and evolutionary integrity of metapopulations of endangered species whose survival and continuing evolution depend upon landscape-scale dispersal. Maintaining opportunities for evolution is a key feature of the Commonwealth's National Strategy for the Conservation of Australia's Biological Diversity (Department of Environment, Sport and Territories 1996) and is reflected in the various current State and Commonwealth Acts. Achieving that objective for an artificially fragmented population may require active management of its gene flow, for example.

The TSC Act, recognising that government-owned conserved areas are not enough, sought "to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management" (TSC Act 1995, page 2, section 3, Objects of Act (f)) presumably with private land-owners. Specific means were not spelled out and this remains a pious hope rather than positive action. However, provision was made for NPWS to enter into joint management agreements with other public authorities to manage actions that might jeopardise "the survival of a threatened species, population or ecological community" (TSC Act 1995, page 64, section 121).

The TSC Act also reflected the increased importance of conservation in the life of the community. Sections of the Act attempted to deal pre-emptively with possible impacts that developments and other land-use activities might have upon protected wildlife or communities, and the possibility that such activities might constitute threatening processes. In this regard, it moved far beyond reserves being the only places where conservation of wildlife took priority, and established the principle that conservation of wildlife must be considered in every proposed environment-altering activity, almost everywhere.

The NSW *Threatened Species Conservation Act 1995* was amended by the *Threatened Species Conservation Amendment Act 2002*, partly in response to the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (see below). At the time of writing, the Threatened Species Conservation Amendment Act is itself undergoing review and amendment.

Conservation of threatened species and communities affects, and is affected by, actions under other laws relating to land-use, especially development planning, forestry, agriculture, fisheries, mining, provision of water, and other extensive industries. Thus, threatened-species legislation must be integrated with those Acts. For example, if a species is listed under the TSC Act, its wellbeing must be considered in planned actions under the *Environmental Planning and Assessment Act 1979*. The ability of land-uses to yield commercial products as well as conserve biodiversity is increasingly safeguarded by encompassing acts such as the *Native Vegetation Conservation Act 1997*. That Act also extends responsibility for conservation beyond the traditional government conservation agency, the former National Parks and Wildlife Service (incorporated into a Department of Environment and Conservation in September 2003), and into the Department of Infrastructure Planning and Natural Resources. Similarly, NSW State Forests and NSW Fisheries (from April 2004 both within a Department of Primary Industries) carry considerable responsibilities for conservation in areas under their control. This greater spread of responsibility for conservation has required integration between departments in their conservation approaches and actions. The increasing scope of threatened species legislation has also meant that threatened species must be considered by all levels of government, from Federal to Local.

Co-operation, integration and internationalisation: 1970s-2003

Commonwealth conservation legislation (other than control over the export of biota) only became effective in the 1970s, with passage of the *Environment Protection (Impact of Proposals) Act 1974*, the *National Parks and Wildlife Conservation Act 1975*, the *Great Barrier Reef Marine Park Act 1975* and the *Australian Heritage Commission Act 1975*. Despite some early conflict between Commonwealth and some States over use of these Acts, since the 1970s approaches to conservation have developed in parallel in all Australian States and Territories, and the Commonwealth has led the way in developing some aspects of conservation. In particular, the Commonwealth has fostered inter-state co-operation in the conservation of threatened species (while holding the purse-strings), and has signed a variety of international agreements and conventions pertaining to "off-shore" and international conservation: e.g. JAMBA (the *Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and Their Environment*; signed in 1974, in effect from 1981); the Ramsar Convention (*Convention on Wetlands of International Importance especially as Waterfowl Habitat*; signed in 1971); CITES (the

Convention on International Trade in Endangered Species of Wild Fauna and Flora; signed in 1973); the *Convention for the Protection of the World Cultural and Natural Heritage* (in effect from 1972); the *Convention on Biological Diversity* (in force from 1993). The Commonwealth has also put together its own *National Strategy for the Conservation of Australia's Biological Diversity* (Department of Environment, Sport and Territories 1996), reflected in its *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A major effect of these agreements has been to bring Australia's conservation into line with international procedures (as the RAOU President had hoped in 1907) and to allow the Commonwealth some influence on and between the States. For example, whereas in the 1970s each legislature in Australia had to define for itself what constituted a rare or endangered species, now all States and Territories and the Commonwealth accept (with minor variations) the internationally used definitions promoted by IUCN. This standardisation means that Australia's, and each State's, conservation efforts and the status of its biota can be monitored, audited and compared with those of any other State or country (although in practice the breadth and efficacy of taxonomic coverage still varies between States).

The Commonwealth-inspired co-operation between States and Territories has ensured that all states have a chance to contribute to the conservation of those threatened species whose ranges cross state borders. Changes in status of species in one State will now usually trigger a review of their listing by other range States and the Commonwealth. Conservation is better integrated and its legislation is more effectively complementary across Australia than at any time since European settlement.

Summary of changes

Changes in objectives of protection

The objectives of laws to protect biodiversity have changed through time (Tables 2 and 4). The objectives of the hunting laws were to ensure continued sport, by limiting the risk that hunters would overkill a population of a game animal. Laws limiting harvesting of plants had similar objectives: maintenance of the opportunity to harvest. Conservation of the species was a by-product. The objectives of the pest control acts were simply to facilitate suppression or eradication of pests, and many native vertebrate species were legally suppressed as pests. However, one objective of the *Rabbit Nuisance Act 1883* was to protect species that were natural enemies of rabbits, because they were useful rather than for their intrinsic value. Thus protection arose from people wanting to use the species, rather than as an end in its self.

The objectives of protective acts, like the *Fauna Protection Act 1948* and the *National Parks and Wildlife Act 1967*, were to prevent needless killing of species (of mammals or birds), and also to provide reserves where the habitat of native vertebrates and plants would be safe from direct human interference. The impact of indirect human effects was either not understood or was ignored. The objective of modern threatened species legislation is the mandatory and active conservation of species (or populations or ecological communities) identified as threatened. Such conservation may include intensive management of habitat and resources and ex-situ conservation. The objectives of the NSW *Threatened Species Conservation Act 1995* and its successors are far-reaching and far-sighted, seeking to prevent extinction and allow evolution of all native biodiversity to continue to occur, by ameliorating multiple, identified, general, threatening processes.

Table 2. The objectives of some NSW Acts relating to the protection or conservation of biodiversity, listed chronologically.

Year	Short Title	Objectives
1866	Game Protection Act	To encourage "importations of game by protecting it and its progeny" and also "native game" during the breeding season.
1881, 1893 and1901	Birds Protection Act	To "encourage the importation and breeding of certain Birds not indigenous to the Colony of New South Wales and also to prevent the destruction of certain Native Birds during the breeding season" (1881 Act)
1903	*Native Animals Protection Act*	To "protect native animals" by declaration of close seasons and absolute protection for scheduled marsupials and monotremes
1918	*Birds and Animals Protection Act*	To protect mammals and birds, except those on schedules of species seen as pests.
1927	*Wild Flower and Native Plants Protection Act*	To protect native plants from picking and selling; aimed at destructive commercial harvesting on Crown or private land.
1948	*Fauna Protection Act*	To "make provisions for the protection and preservation of fauna" (meaning birds and mammals, mostly but not exclusively native).
1967 and 1974	*National Parks and Wildlife Act*	To reserve parks, etc., to establish and run the National Parks and Wildlife Service, and to protect "certain fauna (and) native plants" (1974 Act).
1991	*Endangered Fauna (Interim Protection) Act*	To evaluate conservation status of fauna (mammals, birds, reptiles and amphibians) in NSW and divide fauna into endangered, protected and unprotected species; to protect endangered fauna; to include cane toad on unprotected list.
1995	*Threatened Species Conservation Act*	To "conserve threatened species, populations and ecological communities of animals and plants".
1997	*Native Vegetation Conservation Act*	To conserve and manage native vegetation on a regional basis; protect native vegetation of high conservation value; improve the condition of existing native vegetation and encourage revegetation and rehabilitation of land; and to prevent clearing of native vegetation.

Changes in the objects being protected

The objects (components) of biodiversity protected by law have also changed through time (Table 3; Figure 1). Game laws protected, for hunting, very short lists of birds and mammals, some native and some introduced. Those lists were then expanded to protect some species that were useful or valued for intrinsic qualities. After World War II, all native mammals and birds received protection unless they were listed as pests, and some species were singled out for special treatment because they were 'rare'. From 1974 onwards, (almost) no exotic vertebrates were any longer protected, but (almost) all native vertebrates were. All native vertebrates and vascular plants could also be listed as threatened, at one of a number of levels, and hence receive additional protection. Finally, from 1995 onwards, almost all native species of animals, vascular and non-vascular plants, and fungi can potentially be scheduled as threatened (although no unicellular organism has yet been listed), and hence receive conservation action. Moreover, for any taxon, a sub-population can be deemed in need of protection regardless of the status of the whole species.

In the first half of the 20th century, the need to protect habitat was recognised scientifically, but not legally except as part of a reserve. From 1974 'critical habitat' was legally recognised and protected and, under the 1995 Act, whole ecological communities could be listed as threatened and thus be protected.

Thus the taxonomic coverage of threatened species legislation has grown in extent (numbers of taxa potentially listed as threatened) and depth (levels from genetically defined sub-population conservation units up to ecological communities).

Changes in kinds and integration of legislative protection

Hunting, pest-control and early protective laws had to be authoritarian and punitive to stop (or to ensure, in the case of pest species) adverse things being done directly to individual animals. Once whole species were recognised as threatened by indirect and often general effects of broad-scale land-uses, legislation changed to become facilitative, to reserve pristine areas where government could dictate land-uses and hence protect native biota from harmful land-use effects.

With growth in understanding that isolated reserves were not enough to conserve metapopulations, it became clear that landholders across whole landscapes had to be engaged in conservation of threatened taxa and communities. Thus modern legislation is charged with encouraging conservation on and off reserves, through cooperative, community-based conservation in partnership with government. The laws supporting this approach are far less authoritarian and paternalistic, and better organised to attract community input. This modern generation of laws also makes it mandatory that the government plan and execute appropriate management for identified threatened taxa and threatening processes.

Table 3. The biota receiving legal protection under some NSW Acts relating to the protection or conservation of biodiversity, listed chronologically, and those biota listed as having special status (game, pest, protected, unprotected, or categories of threatened).

Year(s)	Protected Biota	Biota given special status
1866	None, except some native and many exotic bird and mammal 'game' species.	Game species
1881, 1883, 1893	As above, but also some useful or aesthetic native birds; plus 'natural enemies' of rabbits. (Some exotic and native mammals and birds bountied as pests.)	Game species. Pest species, at State or district level.
1901, 1903	Many exotic and some native bird species protected as game or as useful or aesthetic species; a few native mammal species (1903).	Schedules of protected bird and mammal species.
1918	Native and exotic birds and mammals (but not rodents or reptiles), unless scheduled as pests or under declared open season (game).	Schedule of unprotected mammal and bird pests.
1927	Proclaimed native plants (mainly commercial species).	Proclaimed native plants.
1948	Any mammal or bird species except specified unprotected (pest, native and exotic) species. Some mammal and bird species declared rare. Some exotics still protected.	Schedule of unprotected species. Declared Rare species.
1974	All native mammal, bird and reptile species, except listed unprotected species (native and exotic, plus snakes when threatening life); and a schedule of "protected native plants".	Schedules of: Unprotected fauna; Endangered fauna; and Protected native plants.
1991	All native mammal, bird, reptile and amphibian species.	Endangered fauna on schedule as threatened, vulnerable or rare.
1994-5	All biodiversity, but still bias to vertebrates and flowering plants; emphasis on threatened taxa (species, populations or ecological communities).	Threatened taxa as endangered, presumed extinct, or vulnerable.
1997	Native vegetation: indigenous "trees, understorey plants, groundcover (and) plants occurring in wetlands", but not mangroves, sea grasses, etc., which were covered by the *Fisheries Management Act* 1994.	

Table 4. Time-lines for actions made possible under NSW legislation. A tick indicates that an action was facilitated by legislation introduced or in force in the decade ending in the year at the head of the column. Relevant Acts are listed in Table 1. The subscripts to the ticks refer to the explanatory footnotes, where the abbreviations for the Acts follow those given in Figure 1, with the addition of WFNP 1927 for the *Wild Flowers and Native Plants Protection Act* 1927 and NV 1997 for the *Native Vegetation Act* 1997. "List" indicates that the protected or unprotected species or species-groups are named in the legislation.

	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Encourage import & release of exotic fauna & flora		✓	✓												
Ban import & release of exotic fauna & flora										✓10	✓10	✓10	✓10	✓10	✓10
Control hunting; e.g. close or open seasons		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Suppress animal pest species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
List protected exotic fauna species		✓1	✓1	✓2	✓2	✓2	✓3	✓3	✓3	✓3	✓3	✓3	✓3	✓3	✓3
List unprotected exotic fauna species							✓	✓	✓	✓	✓	✓	✓	✓	✓
List protected native fauna species		✓1	✓1	✓2	✓2	✓2,4	✓5	✓5	✓5	✓6		✓13	✓		✓14
List unprotected native fauna species							✓	✓	✓	✓	✓	✓	✓7	✓	
Control commercial taking of native fauna													✓	✓	✓
Control commercial taking of native flora													✓	✓	✓
List protected native flora species								✓8	✓8	✓8	✓8	✓12	✓	✓	✓
Control vegetation clearance & habitat alteration															✓15
Declare species threatened										✓9	✓9	✓11	✓	✓	✓
Declare populations threatened															✓
Declare ecological communities threatened															✓
Declare threatening processes															✓
Consider threatened species, etc. in planning consent													✓17	✓	✓
Facilitate government conservation reserves				✓16	✓16	✓16		✓	✓	✓	✓	✓	✓	✓	✓
Encourage private/community conservation reserves				✓16	✓16	✓16		✓	✓	✓	✓	✓	✓	✓	✓
Appoint government Rangers							✓	✓	✓	✓	✓	✓	✓	✓	✓
Appoint Chief Guardian of Fauna										✓	✓				
Appoint Director and form NPWS											✓	✓	✓	✓	✓
Establish Scientific Committee or equivalent										✓	✓	✓	✓	✓	✓

1 Lists of 'game' birds; protection from hunting in close season only GP 1866, 1886
2 Game birds, but also some aesthetic bird species, protected in close season BP 1881
3 Only Rusa deer (Royal National Park) protected BAP 1918 onwards
4 Some marsupial species protected under NAP 1903
5 All mammal & bird species protected except rodents and listed unprotected species BAP 1918
6 All mammal & bird species protected except listed unprotected species FP 1948
7 Only two flying-fox species NPW 1974
8 Protected named plant species against harvesting on Crown land WFNP 1927
9 Native mammal & bird species listed as threatened FP 1948 onwards
10 Except trout species
11 Reptile species listed as threatened NPW 1967 onwards
12 Some native plant species listed because of rarity NPW 1967 onwards
13 Included reptiles NPW 1967 onwards
14 Included frogs EF(IP) 1991, then all native biota TSC 1995
15 Habitat of threatened spp protected EF(IP) 1991; more general protection NV 1997
16 Reserves for hunting, rather than conservation in a modern sense BP 1881, 1893, 1901
17 Only through Environmental Planning and Assessment Act 1979

Early hunting, pest-control and protection laws were only lightly integrated with other NSW laws. They often imitated similar laws in other States, but without overt integration across state boundaries. Integration with Commonwealth legislation (and hence with some international conventions and agreements) has become increasingly necessary since the 1970s. NSW conservation legislation is now integrated with and embedded in a nation-wide set of laws and supporting practices that facilitate effective national management of biodiversity.

Changes in public perceptions

People's general awareness of our biodiversity has changed greatly through time, encouraged by enlightened educators and those who saw education and publicised information as keys to progress in conservation (e.g. Ryan 1907; Barrett 1925). Since World War II, public interest in and education about biodiversity has grown rapidly. Since 1960, biodiversity has gone from being politically ignorable to being an occasionally potent vote-catcher. Moreover, the public, as it has become better informed, has become more discriminating and has engaged in conservation at all levels, from local to international organizations. Modern legislation has allowed for more direct community in-put to conservation decision-making, and the decline (at least temporarily) of paternalism in government-directed conservation.

The Future

Given the history of threatened species legislation, we can expect such laws to keep changing, as our understanding changes, as species' populations change, as ecological communities change, and as ecological processes change under the effects of an increasing human population.

The increased taxonomic scope of threatened-species legislation arises from our modern perception that conservation objectives should apply to all native taxa. In practice, however, the application of the laws is still taxonomically uneven, with the large and charismatic biota getting most attention. A re-emerging utilitarian view ("ecosystem services") may see the balance redressed, with invertebrates, lower plants and microbes gaining more attention. However, that attention is likely to focus on the ecosystem processes in which these biota are involved, rather than on the biota themselves as separable components.

Modern predictive ecology emerged only in the 1930s, although environmental planners and decision-makers, or those who wanted to influence them, used ecological explanations of systems processes at least by the 1850s. Modern threatened-species legislation partly relies upon ecological understanding, particularly of population processes. Our grasp of processes in community ecology is under-used in conservation, but the identification of 'key threatening processes' is an excellent example of its potential. Our understanding of community processes might more often be applied in future, for example, to devising process-related (rather than component-related) criteria for initiating management actions or evaluating their outcomes.

In current NSW legislation, an ecological community is defined as an assemblage of species; but does this serve conservation well? The ecological processes, not just the component species, might better identify an ecologically meaningful community. For example, the effective presence of top carnivores limiting the population densities of preferred prey species, or the occurrence of fires at appropriate intervals, may be critical determinants of the persistence of particular communities. Good monitoring of the status of threatened ecological communities also requires better ways to evaluate ecosystem processes, not just their outcomes. We also envisage the need for legislation that allows for the identification, not just of first-order threatening processes, but also of the synergies between threats (for example, the synergy between clearing vegetation and exposure of ground-nesting birds and critical-weight-range mammals to exotic predators).

Evolutionary understanding lags even further behind in its application to conservation, although genetics was quick off the mark in setting guidelines for conservation action. Increasing concern for preserving the opportunity for evolution and better understanding of population genetics may require that genetically defined conservation units be incorporated more firmly in legislation (as Evolutionarily Significant Units), a further increase in the depth of the legislation. Ecological and evolutionary genetics are sure to play increasing parts in future implementation of threatened species legislation.

Finally, we expect that current legislation will need to be modified as we find better ways (including financial rewards) to engage all landholders and other interested groups in broad-scale conservation. The emphasis of current laws upon conserving threatened species has been criticised for diverting attention and funding from the conservation of whole communities (for example, Lunney *et al.* 2003); and the laws may need modification to redress this imbalance. Any legislation is only as good as its application. Since the earliest NSW laws to preserve biota (the game laws), people have complained that their application fell short of their intent. For example, the Hon. G. Thornton in debate on the Birds Protection Act Amending Bill, 23rd February 1893: "The act of 1881 is…almost a dead letter. It is a notorious fact that in many parts of the country, although wild duck are prohibited from being shot during the close season, they are nevertheless shot indiscriminately in hundreds and thousands" (NSW Parliamentary Debates Session 1893, 1st Series Volume 63, p. 4566). Failure to apply the law fully is still an impediment to effective conservation; see, for example, Tsamenyi, Rose and Castle (2003) on the defects of implementation in Australia of the full intent of international Conventions affecting conservation. Laws may need modification to make them more readily applicable.

Threatened-species legislation in NSW and Australia has changed in purpose, scope and function as society's knowledge about and attitudes towards biodiversity have developed and changed. We foresee that such legislation will continue to evolve, reflecting changing societal needs and perceptions. Scientists, managers and informed lay-people, as well as legislators, will be involved in bringing about those changes. They can contribute most effectively if they understand how legislation has been crafted to complement scientific understanding of biodiversity.

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APPENDIX 1

Appendix 1. Species listed as protected or unprotected under the original NSW Acts pertaining to biodiversity, 1866 to 1974

a. Species listed for protection under the original *Game Protection Act 1866*. The First Schedule is of imported species, and the Second is of native bird species. The names are given as published.

The First Schedule

"Pheasants, Partridges, Grouse, Hares, Deer, Swans, Antelope, All birds not indigenous to Australia and their produce".

The Second Schedule

"Wild ducks of any species, Teal, Emu, Native Companions, Wild Turkey or Bustard, Black Swans, Wild Geese, Bronze-winged and other wild Pigeons, Mallee Hen, Quail, Land Rail, Curlew, Tallegalla or Brush Turkey, Plover of any species, Great Kingfisher commonly known as the Laughing Jackass."

b. Species listed for protection under the original *Birds Protection Act 1881*. The First Schedule is of "Imported Game" species, the Second is of "Native Game" species, and the Third is of "Song Birds – Native and Imported". The names are given as published.

The First Schedule

"Pheasant, Partridge, Grouse, California Quail, Chinese Quail, White Swan".

The Second Schedule

"Wild Duck of any species, Teal, Emu, Native Companion, Wild Turkey or Bustard, Black Swan, Wild Geese, Mallee Hen, Lyre Bird, Quail, Land Rail, Tallegalla or Brush Turkey, Plover Spur-wing, Bronze-winged and other Wild Pigeons and Doves."

The Third Schedule

"Robin, Nightingale, Skylark, Linnet, Thrush, Starling, Blackbird, Goldfinch, Chaffinch, Blue Wren, Wagtail, Honeysucker, Diamond Sparrow, Flycatcher, Great Kingfisher – commonly known as the Laughing Jackass, Swift, Peewit, Reed Sparrow, Colonial Lark, Indian Minah, American Mocking Bird, Magpie other than the black Magpie, Curlew, Regent Bird, Rifle Bird".

c. Species listed for protection under the original *Birds Protection Act* 1893. The First Schedule is of species "absolutely protected for five years and after that during the Close Season", and lists "Foreign" and "Australian" birds separately; the Second is of "Australian Game Birds"; and the Third Schedule is of "Australian Birds other than game protected during the close season". The names (both colloquial and binomial) are given as published.

First Schedule

Foreign Birds. "Skylark Alauda arvensis, Chaffinch Fringilla coelebs, Goldfinch Carduelis elegans, Linnet Linaria cannabina, Starling Sturnus vulgaris, Thrush Turdus musicus, Blackbird Turdus merula, Nightingale Sylvia luscinea, Pheasant Phasianus colchicus, Grouse of every species Tetrao and Lagopus, Partridges of every species Perdix, White swans Cygnus, California Quail Callipepla Californica".

Australian Birds. Fish Hawks or Sea Eagles Haliaetus Haliastur and Pandion, Lyre Birds Menura, Regent Bird Sericulus melinus, Rifle Bird Ptilorus paradisea, Bell Bird Manorhina melanophrys, Black Cockatoos Calyptorhynchus, Native Companion Grus Australiensis, Nankin Crane Nycticorax Caledonicus, Laughing Jackass Dacelo gigas, Kingfishers Halcyon and alcyone, Emu Dromaius Novae Hollandiae, Seagulls of every description".

Second Schedule

Brush Turkey Talegallus Lathami, Mallee Hen Leipoa ocellata, Land Curlew Oedicnemus grallarius, Bittern Botaurus poicilopterus, Land Rail Hypotaenidia Phillipeusis, Black Swan Cygnus atratus, Bustard or Plains Turkey Eupodotis Australis, Wild ducks of every species, including Teal, Plovers of every species, Pigeons and doves of every species, Wild geese of every description, Quail of every species, including Turnix, Pedionomus, Coturnix, Synoïcus, and Excalfatoria".

Third Schedule

Dollar Bird Eurystomus pacificus, Wood Swallows Artamus, Magpies (other than the Black Magpie) Gymnorhina, Peewit or Magpie Lark, Grallina Australis, Thrush Collyriocincla harmonica, Wagtails Sauloprocta and Seisura, Jackey Winter Micraeca fascinans, Robins Petroeca, Yellow Robins Eopsaltria Australis, Blue Wrens Malurus cyaneus and Malurus Lamberti, Emu Wren Stipiturus malachurus, Lark Anthus Australis, Skylark or Nightingale Cinchloramphus, Diamond Sparrow Estrilda guttata, Gang Gang Cockatoo Callocephalon galeatum, Indian Minah Acridotheres tristis, Butcher Bird Cracticus torquatus, Coachwhip Bird Psophodes crepitans, Honeysucker Meliornis, Mocking Bird Anellobia mellivora, Swamp Pheasant, King Parrots Aprosmictus and Ptistes, Ibis Geronticus and Threskiornis, The bird commonly known as "The Happy Family," or "The Twelve Apostles"."

APPENDIX I

d. Species listed for protection under the original *Birds Protection Act 1901*. This Act contained only one Schedule, which combined, without alteration, all species listed in all three Schedules in the *Birds Protection Act* 1893.

e. Species listed for protection under the *Native Animals Protection Act 1903*. This Act contained one Schedule, as follows. The names (both colloquial and binomial) are given as published.

Macropus rufus Red Kangaroo; *Macropus robustus* Wallaroo; *Phascolarctus* [sic] *cinereus* Native Bear; *Phascolomys mitchelli*, *Phascolomys ursinus*, *Phascolomys latifrons* Wombats; *Ornithorhynchus anatinus* Platypus; *Tachyglossus aculeatus* Echidna or Native Porcupine; *Petaurus sciureus*, *Petaurus breviceps*, *Petaurus australis* Sugar Squirrels; *Petauroides volans* Flying Opossum".

f. Species listed as unprotected under the original *Birds and Animals Protection Act 1918*. All other bird and mammal species, with the specific exceptions of "domestic birds or animals" or reptiles or "rats or mice of any species", were protected. The First Schedule is of unprotected bird species, and the Second of unprotected mammal species.

First Schedule

"Sparrow *Passer domesticus*, Silver Eye *Zosterops coerulescens*, Black Cormorant or Shag *Phalacrocorax carbo*, White-breasted Cormorant *Phalacrocorax gouldi*, Pied Cormorant *Phalacrocorax hypoleucus*, Little Black Cormorant *Phalacrocorax sulcirostris*, Little Cormorant *Phalacrocorax melanoleucus*, Crow *Corvus coronoides*, Raven *Corone australis*, Friar-bird or Leatherhead *Tropidorhynchus corniculatus*, Yellow-throated Friar-bird *Philemon citreigularis*, Garrulous Honey Eater or Miner or Soldier Bird *Myzantha garrula*, Sulphur-crested or White Cockatoo *Cacatua galerita*, Rose-crested Cockatoo or Galah *Cacatua roseicapilla*, Lory *Platycercus elegans*, Rose Hill or Rosella Parrot *Platycercus eximius*, Blue-bellied Lorikeet or Blue Mountain Parrot *Trichoglossus novae-hollandiae*, Red-rumped Grass Parakeet *Psephotus haematonotus*, Wedge-tailed Eagle or Eagle Hawk *Uroaetus audax*, Every species of Snipe, Gill-bird, Starling, White-throated Falcon."

Second Schedule

"Rabbit *Lepus cuniculus*, Hare *Lepus europaeus*, Dingo *Canis dingo*, Fox *Vulpes alopex*, Fruit Bat or Flying Fox *Pteropus poliocephalus*, Tiger Cat *Dasyurus maculatus*, Native Cat *Dasyurus viverrinus*, Common Kangaroo Rat *Potorous tridactylus*, Brush-tailed Kangaroo Rat *Bettongia penicillata*, Gaimard's Kangaroo Rat *Bettongia gaimardi*, Rufous Kangaroo Rat *Aeprymnus rufescens*, Hare Wallaby *Lagorchestes leporoides*, Nail-tailed Wallaby *Onychogale frenata*, White-throated Wallaby *Macropus parma*, Paddymelon *Macropus thetidis*, Red-legged Wallaby *Macropus wilcoxi*, Black-striped Wallaby *Macropus dorsalis*, Wombat *Phascolomys mitchelli*, Long-nosed Bandicoot *Perameles nasuta*, Common Bandicoot *Perameles obesula*, Rabbit Bandicoot *Thylacomys lagotis*."

g. Species listed as unprotected under the original *Fauna Protection Act* 1948. The Schedule is of unprotected bird and mammal species, those marked with an asterisk being unprotected in named parishes only. All other bird and mammal species were protected.

The names (both colloquial and binomial) are given as published.

Birds

"Goldfinch Carduelis carduelis, Greenfinch Ligurinus chloris, Grey Butcher Bird Cracticus torquatus, Sparrow Passer domesticus, Silver Eye Zosterops lateralis, Black Cormorant or Shag Phalacrocorax carbo, White-breasted Cormorant Phalacrocorax fuscesens, Pied Cormorant Phalacrocorax varius, Little Black Cormorant Phalacrocorax ater, Little Cormorant Microcarbo melanoleucus, Crow Corvus Cecilae, Raven Corvus coronoides, Black Magpie or Currawong Strepera graculina, Friar-bird or Leatherhead Philemon corniculatus, Yellow-throated Friar-bird Philemon citreigularis, Sulphur-crested or White Cockatoo Kakatoe galerita, Rose-breasted Cockatoo or Galah Kakatoe roseicapilla, Lory or Crimson Rosella Platycercus elegans, Rose Hill or Rosella Parrot Platycercus eximius, Wedge-tailed Eagle or Eagle Hawk Uroaetus audax, Common Starling Sturnis vulgaris, Red-whiskered Bul Bul Otocompsa emeria, Little Falcon Falco longipennis, Black Falcon Falco subniger, Grey Falcon Falco hypoleucus, Peregrine or Black-cheeked Falcon Falco peregrinus, Grey Goshawk White Goshawk – Albino Form of Grey Goshawk Astur novae-hollandiae, Australian Goshawk Astur fasciatus, Bald Coot Porphyrio melanotus*, Coot Fulica atra*, Dusky Moorhen Gallinula tenebrosa*, Black-tailed Water Hen Tribonyx ventralis*.

APPENDIX I

Mammals

"Dingo Canis dingo, Ferret Mustela putorius, Fox Vulpes alopex, Fruit Bat or Flying Fox Pteropus poliocephalus and Pteropus scapulatus, Hare Lepus europaeus, Rabbit Oryctolagus cuniculus, Wombat Vombatus hirsutus*."

h. Species originally listed as unprotected under the *National Parks and Wildlife Act 1974*. These species appeared in Schedule 11 Unprotected Fauna. Names are as listed.

Mammals

"Carnivora other than Pinnipedia (Bears, lions, dogs, etc.); Insectivora (Moles, hedgehogs); Artiodactyla, other than *Cervus timorensis* (Javan Rusa deer) (Cloven hoofed animals); Perissodactyla (Horses, donkeys, etc.); Primates (Apes, monkeys); Subungulates (Elephants); *Pteropus policephalus* and *Pteropus scapulatus* (Fruit bat or flying fox); *Lepus europaeus* (Hare); *Oryctolagus cuniculus* (Rabbit); *Sciurus palmarum* (Indian Palm Squirrel)".

Birds

As for the 1948 list, with some up-dating of nomenclature, and the following amendments:

Grey Butcher Bird, White-breasted Cormorant, both Friarbird species, all raptors and all rallids omitted; and "Blackbird *Turdus merula*, Tree Sparrow *Passer montanus*, Indian Myna *Acridotheres tristis*, Indian Turtle Dove *Streptopelia chinensis*, Little Crow *Corvus bennetti*, Spice (nutmeg) Finch *Lonchura punctulata*, Black-headed Mannikin *Lonchura ferruginosa*, Mallard Duck *Anas platyrhynchos*" added.