



Tribute to Professor Henry Allan Nix AO: pre-eminent biogeographer and ornithologist (8 July 1937–2 February 2022)

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Henry Nix was an engaging, gentle, generous, charming, principled man, and an excellent scientist. His distinctiveness was in his personal attributes, his vast knowledge, his lateral creative, critical thinking skills, and his outstanding mentoring and networking skills, both personal and scientific. He possessed extensive biographic knowledge, remarkable prescience, and was a great naturalist. On a road trip from Canberra to Darwin, he was able to anticipate and call every major creek and river, as well identify almost every tree and bird species on the way, and could always offer a plausible theory as to ‘why’ it was there. He was also known for his wicked sense of humour, and would use every opportunity to take, with great glee, the mickey out of unsuspecting listeners.

Henry was a proud Queenslander, who grew up in the city, but developed a love of nature, and birds in particular. At 13 years old, he joined the Royal Australasian Ornithologist Union (now BirdLife Australia), an association that continued until his death. He graduated from the Queensland Agricultural College at Gatton in 1956, and then from the University of Queensland (UQ) with a BAgSc in 1960. On graduating from UQ, his writing and communication skills gained him a position as a science writer in the Agricultural Research Liaison Section at CSIRO’s head office in Melbourne. He commenced his research career in CSIRO in 1964, taking up a position as an Experimental Officer (the lowest research rank in the organisation) with the Division of Land Research and Regional Survey. In 1973, he was reclassified as a Senior Research Scientist and, in 1975, Principal Research Scientist in what had become the Division of Water and Land Resources. In 1983, he was promoted to Senior Principal Research Scientist and made Leader of the Division’s Resource Management Program, a position he held until leaving CSIRO for the Australian National University (ANU) in 1986. This bald statement of Henry’s career positions demonstrates that, despite not having a PhD, his fine scientific mind and people skills saw him rise rapidly through CSIRO’s scientific ranks and from there, to academia (Fig. 1).

In 1986, Henry took up the position of Director of ANU’s Centre for Resource and Environmental Studies (CRES; now known as the Fenner School of Environment and Society), which fosters a cross-disciplinary approach to research and education on environmental issues. As Ross Cunningham experienced, Henry’s characteristic relaxed approach, warmth, and generous spirit, saw a comfortable, friendly, and cooperative culture develop at CRES. As well as supporting scholarly diversity, Henry naturally encouraged a strong sense of inclusivity, respect and fairness. This highly valued, healthy work culture soon became the envy of other departments and contributed to CRES’s outstanding achievement and performance.

While Director, Henry continued his research interests in computer-based methods for inventory, evaluation planning and management of land and water resources, and advised and mentored many researchers. In 1999, he resigned, staying on as an Emeritus Professor. Then, on retirement and return to Queensland, continuing his involvement as a Visiting Fellow.

In the early 1970s, when Henry was in his thirties and still with CSIRO, he pioneered the development of computer-based models of land resource inventory and evaluation, which have a wide range of applications including assessing: field and horticultural crops and pastures; forestry; hydrology; and nature conservation, particularly through species distribution models (SDM). As Trevor Booth (2018) describes, with the help of Michael Hutchinson (interpolation; CSIRO) and John Busby (coding; Bureau of Flora and Fauna),

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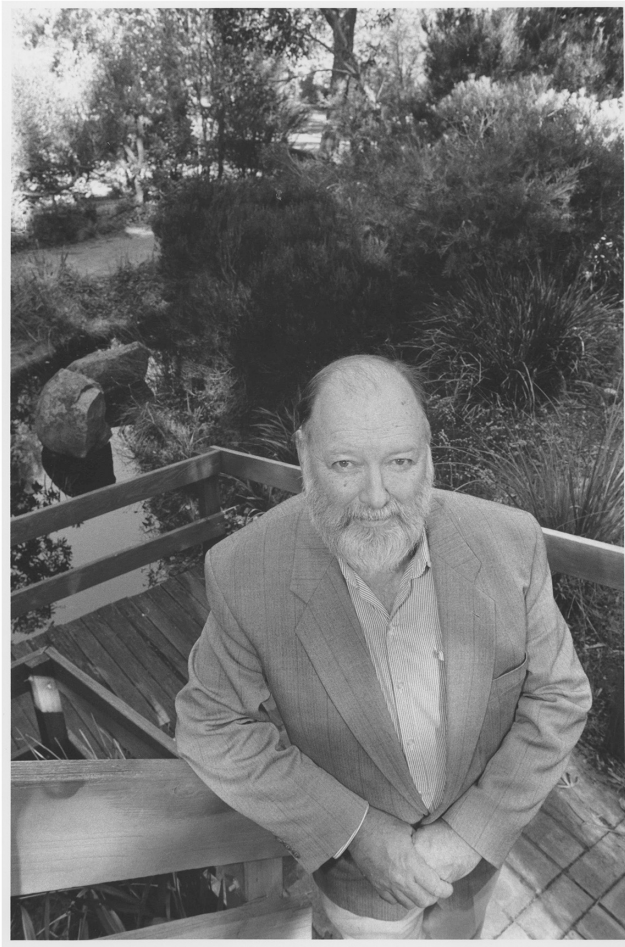


Fig. 1. Professor Henry Nix AO in the garden of his Canberra home, which he and wife Katherine developed into a haven for resident and transient birds (photograph from ANU archives).

Henry's concept was developed into BIOCLIM, the first modern SDM, incorporating a range of biophysical and climatic variables. In 1984 it incorporated 12 variables, and by 1999 this had increased to 35, including interpolation relationships for solar radiation and Class-A pan evaporation.

Although more sophisticated SDMs have been developed since Henry's pioneering work, most have been built using a set of 19 variables developed for BIOCLIM. BIOCLIM is still used for teaching and comparative purposes: quantifying the environmental envelope of species; identifying areas where a species may become invasive; assisting conservation planning; and assessing the likely impacts of climate change in species distribution. For example, CSIRO Division of Entomology's dung beetle research program drew on BIOCLIM to determine where particular species of dung beetle could be released reliably to ensure their survival and ecological efficacy.

In the late 1960s and early 1970s, Denis Saunders was working on the ecology and behaviour of Carnaby's

cockatoo (*Zanda latirostris*). At the 16th International Ornithological Congress held in Canberra in 1974, he heard Henry give a presentation on his environmental modelling. The presentation was titled 'Environmental control of breeding, post-breeding dispersal and migration of birds in the Australian region' (Nix 1976), which Denis realised, explained the seasonal movements of Carnaby's cockatoo. To Penny Olsen, that same presentation was a stand-out, helped turn her towards ornithology, and later made sense of the movements of Australian raptors.

Henry's BIOCLIM-based paper on birds was tucked away in the relatively inaccessible proceedings of the conference, lessening and delaying its impact (Robin 2000). His later biogeographic analysis of the distribution of elapid snakes in Australia (Nix 1986), based on early BIOCLIM, also appeared outside the mainstream scientific literature. Over time, the latter publication has been cited 1222 times (Google Scholar, accessed 6 February 2022), an extraordinary impact. Regardless, as Trevor Booth has documented (Booth 2018), this groundbreaking, globally applicable approach to understanding faunal and faunal distributions and changes therein, has not received the attention it deserves. Despite SDM being 'one of the most active areas of global ecology', it remains a concern that 'virtually all current SDM studies owe something to Henry and his collaborators' pioneering BIOCLIM work, but this is rarely acknowledged (Booth 2018).

History will show that although Henry did not have the extensive, top-journal publication list of many scientists, what he did publish and encourage others to work on and publish made him one of the most influential ecologists of his time. He did not have a ResearchGate profile. However, ResearchGate provides a publication list of those of Henry's collaborative publications with scientists who do have profiles. Henry is a co-author on 53 publications that have been cited 4723 times (as of 6 February 2022). The senior authors are colleagues or students who have worked with BIOCLIM, the species distribution model he developed, or who drew on his great intellect in developing their own ideas.

Henry was a great communicator, developing, and maintaining networks of scientists as well as amateurs. His ideas and introductions often proved productive, sometimes in unexpected ways. For example, late in 1991, he discovered a fund supported by the governments of Australia, New Zealand and the United Kingdom to conduct tripartite workshops/symposia. Together with Matt McGlone (NZ Landcare Research), Henry organised a workshop, assembling 12 scientists from Australia, 12 from NZ and seven from UK. The 31 scientists, from universities and government research organisations, representing a range of ecological disciplines, gathered at ANU where they spent 2 days, before setting off with Henry on a tour of south-eastern New South Wales (Canberra–the Australian Alps–the south coast–Canberra), and then on to Christchurch for a tour of the South Island of NZ. The purpose of the workshop was to expose participants to different ideas and

environmental problems to foster collaboration in ecological research. There were no published workshop proceedings, and no attempt was made to evaluate what became known as 'Henry's junket.' However, the workshop had a major impact on some of the participants. Denis (then with CSIRO Wildlife and Ecology, Perth) and John Craig (Auckland University) met and subsequently worked together organising two international conferences. The first, held in Geraldton, WA in 1994, was on the role of networks in nature conservation (Saunders *et al.* 1995). The second, held in Taupo NZ in 1997, was on managing the matrix in production environments (Craig *et al.* 2000). The two are still in touch, bouncing ideas off each other. New Zealanders were amazed at the concept of rivers without water about as much as the Australians had difficulties considering field work where there is 5 m of rain each year. 'Henry's junket' expanded a lot of minds and advanced many life-long connections.

When Denis was an editor of *Biological Conservation*, he asked Henry to review a manuscript on the birds of Coomoboolaroo Station from 1873 to 1999. Henry's review was detailed, nearly as long as the manuscript he had reviewed, and improved the resulting publication by Woinarski and Catterall (2004). Perhaps dry scientific writing did not appeal, for otherwise Henry wrote as he spoke, fluidly, engagingly and with great intelligence and perception. When Penny was Editor of *Wingspan*, the quarterly magazine of Birds Australia, Henry's President of Birds Australia's column was always written at the very last minute, but came out fully formed; there was never need of a second draft.

Henry's work and leisure often melded. He was active in the Canberra Ornithologists Group, advising, filling various positions including President, and joining various activities; his talks were always well attended. As a life-long birdwatcher, he kept bird lists and could hold his own among even the most determined and devoted of twitchers, recalling where and when he had seen a particular species, and more often than not, explaining what that meant in terms of biogeography, land management, conservation, or similar.

Widely liked and highly regarded, Henry engaged with and was engaged by many organisations and authorities. These include: chairing the United Nations' Expert Committee on Climatic and Potential Physical Effects of Global Nuclear War (1988–1990); chairing the National Greenhouse Advisory Committee (1989–1993); chairing the Technical Advisory Committee of the Commonwealth Climate Impact Assessment and Management Program (1989–1994); chairing the Advisory Committee of the Australian Network for Plant Conservation (from 1993); member of council of the Royal Australasian Ornithological Union (later known as Birds Australia and then Birdlife Australia) from 1999 and President from 2001 to 2005; and member of the Wildlands Project Scientific Advisory Committee of the Wilderness Society Australia (2002–2007) (Fig. 2).

Among Henry's many accolades were: becoming a Fellow of the Australian Institute of Agricultural Science (1979);



Fig. 2. Members of the Wilderness Society's Wildlands Project Scientific Advisory Committee: (back row) Professor Harry Recher AM; Professor John Woinarski; Professor Brendan Mackey; Dr Jann Williams; Professor Henry Nix AO; Professor Michael Soulé; Dr Rob Lesslie; (front row) Virginia Young and Alec May, both of the Wilderness Society (photograph from the Wilderness Society).

Queensland Agriculture College Council's Gold Medal (1988); Urrbrae Memorial Award for outstanding contributions to Australian Agriculture (1988); Ecological Society of Australia's Gold Medal (1994); Australian Urban and Regional Information Systems Association Eminent Individual Award (1995); becoming a Fellow of Birds Australia (2006); and the Royal Geographical Society of Queensland's J. P Thomson Medal (2008). In 2000, Henry was made an Officer (AO) in the prestigious Order of Australia 'for service to the environment, particularly the conservation of natural resources, and to land management through the development and application of simulation models for ecologically sustainable land utilization'.

Henry's role in improving the lifestyle of many Australians is inestimable. For example, through his input to planning dung beetle release around Canberra, the city's inhabitants and visitors may now dine outside without being assailed by the squadrons of bush flies that formerly made outside activities unbearable. More profoundly, he chaired the United Nations' Expert Committee on Climatic and Potential Physical Effects of Global Nuclear War and was lead author on their 1988 report (Nix *et al.* 1988). The report concluded that the scientific evidence confirmed the unanticipated consequences of nuclear war, identified by Carl Sagan and others, were likely to be prolonged dust and smoke in the atmosphere, causing a drop in temperature and widespread crop failure and famine. As Henry remarked to Penny, this was possibly his greatest contribution to humankind; he had probably helped avert a nuclear winter.

Henry died peacefully in his sleep at his home in Yandina, Queensland. He is survived by his wife Katherine; sons Simon,

Garth and Jonathan; and seven grandchildren. His intellect, generosity and geniality will be greatly missed.

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