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Strategic Vertebrate Pest Management Training

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ABSTRACT: Training in vertebrate pest management is in a parlous state worldwide. The level of retained corporate knowledge is continually declining as many senior pest managers leave the workforce and take the skills gained through years of experience with them, leaving a vacuum of appropriate skills in vertebrate pest management. There is a serious lack of training in vertebrate pest management at undergraduate or postgraduate level, and even less that is based on current best practice. In 2008, the Diploma in Conservation and Land Management (Vertebrate Pests) was developed in consultation with state government pest agencies to provide field officers with the skills needed to develop and implement strategic pest management plans. The course is based on the principles of the Australian Pest Animal Strategy and uses case studies from successfully operating programs to explain strategic management of pests. The course is offered through flexible on-line delivery supported by workshops, allowing students to study remotely without having to regularly attend a classroom. In 2010, the Graduate Certificate in Wildlife Management (Invasive Animals) was developed through the University of Canberra. It provides mid and upper level land managers with the skills to identify pest animal problems and develop and implement effective pest management strategies based on best practice. This course is offered through flexible on-line delivery and encourages students to incorporate pest animal management problems faced in their workplace into their studies. For land managers wishing to extend their qualifications in wildlife or pest management past the graduate certificate stage, the University of Canberra is developing graduate diploma and Masters level courses. These higher level qualifications will be designed following input from industry and should be able to be tailored to the individual needs of students.

KEY WORDS: Australia, best practice, capacity building, competency skills, education, pest management, strategic approach, training

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INTRODUCTION

Training in vertebrate pest management is in a parlous state worldwide. The level of retained corporate knowledge is continually declining as many senior pest managers leave the workforce and take the skills gained through years of experience with them, leaving a vacuum of appropriate skills in vertebrate pest management. There is a serious lack of training in vertebrate pest management at undergraduate or postgraduate level, and even less that is based on current best practice. In this paper, we use the situation in Australia to illustrate the steps we have undertaken to help alleviate the skills shortage in vertebrate pest management.

In 2008, the technical Diploma in Conservation and Land Management (specialising in Vertebrate Pests) was developed in consultation with state government pest agencies. It aims to provide field officers with the skills needed to develop and implement strategic pest management plans. The course is based on the principles of the Australian Pest Animal Strategy and uses case studies from successful programs to explain best practice management of pests. The course is offered through flexible on-line delivery supported by workshops, allowing students to study remotely without having to regularly attend a classroom.

In 2010, the Graduate Certificate in Wildlife Management (Invasive Animals) was developed through the University of Canberra. It provides mid and upper level land managers with the skills to identify pest animal problems and develop and implement effective pest management strategies based on best practice. This

course also is offered through flexible on-line delivery and encourages students to incorporate pest animal management problems faced in their workplace into their studies.

For land managers wishing to extend their qualifications in wildlife or pest management past the graduate certificate stage, the University of Canberra is developing graduate diploma and Masters level courses. Industry input has helped to develop these higher level qualifications that can be tailored to the individual needs of students.

Educational resources have been developed for both primary and secondary school students that comply with the state and Federal science Curricula. These resources include lesson plans and background notes for teachers, and they are available in either a classroom format or as an online activity conducted by the student using the schools computer facilities or their home computers.

BACKGROUND

Historically, training in pest management in Australia has been relatively *ad hoc* and usually undertaken “in-house” by the authorities responsible for managing pests. Training for private land holders seeking to manage vertebrate pest on their land was even less formalised, with most of the training having been either passed down from parent to siblings, learned by assisting in pest management programs on neighbouring farms or, less commonly, by attending workshops run by state based agricultural agencies. A notable exception to this was the South Australian Vertebrate Pest Control Authority, who started a pest management course in the 1970s and which

has subsequently morphed into a course being taught through the University of Adelaide (Brown and Munckton 2010).

Most of the training in pest animal management concentrated on the pest, its biology, and techniques for removing as many as possible, rather than long-term, strategic approaches that focussed on reducing damage due to pests. This has continued through into the last decade, despite a review of pest management training in the 1980s by the Bureau of Rural Sciences (Braysher 1993), which changed the focus of pest animal management from the pest itself to the damage that the pest was causing.

By 2009, many of the experienced pest managers in Australia had either retired or were approaching retirement age. There has also been a shift toward more community involvement in pest management through the establishment of 56 Natural Resource Management Boards, which receive substantial government funding to manage pests. Consequently, there has been a significant decline in the level of retained corporate knowledge on pest management. This has been exacerbated by the wide gap between the skills and theory that are taught at most tertiary institutions, rather than the practical application of skills and theory that is required by the workforce (Muir and Schwartz 2009). Also, there were few undergraduate courses that specialised in vertebrate pest management. Indeed, vertebrate pest management training for university undergraduates generally consists of a single lecture or short module within a biodiversity or biosecurity unit of study (Smith et al. 2011).

To help address this deficiency in pest training, the Invasive Animals Cooperative Research Centre commissioned a scoping study into the level of training available across all states in Australia (Brown and Munckton 2010). The authors contacted each state agency responsible for the management of vertebrate pests and educational institutions to determine the status and level of training available.

Brown and Munckton (2010) found that there was a low level of suitable and appropriate training in vertebrate pest management across Australia. This situation is potentially reflected worldwide and may well have arisen from a lack of trainers with both the necessary experience and qualifications to teach in the area of vertebrate pest management. There was also a large variation in the level of vertebrate pest training between the individual states. Training packages existed for vertebrate pest training at the Vocational Education and Training (VET) level (similar to the Career and Technical Education (CTE) scheme in the United States), yet these were not regularly taught as part of the Diploma in Conservation and Land Management (CLM) package. As an example, only 2 of 7 VET campuses in South Australia offer vertebrate pest training as part of their CLM Diploma. This is predominantly due to a lack of experienced staff to teach the subject.

In line with the new pest management strategies that shift the focus of pest management from the pest to managing the damage done by the pest (Braysher 1993, Olsen 1998, Braysher and Saunders 2003a, Fleming et al. *In Press*), Brown and Munckton (2010) recommended that training in vertebrate pest management focus on strategic management rather than on the pest itself. They

also recommended that rather than the current state-based approach to training, there should be a national strategy focussing on training through the VET system, and that this training should use mixed mode delivery rather than totally relying on the mainly face to face approach that is now used. The VET-based training should also allow articulation into the university system, therefore allowing progression to undergraduate degrees and graduate studies by people involved in pest management. However, while there is a low level of training currently available both at the VET and graduate level, Brown and Munckton (2010) identified an increasing demand for graduate level training in vertebrate pest management.

HOW IS THIS BEING OVERCOME?

In 2006, the Invasive Animals Cooperative Research Centre recognized the need for standardized pest management training at the VET level and, in conjunction with the University of Canberra College, developed the Diploma in Conservation and Land Management (Pest Management). This course was offered for the first time in 2007 and covered all aspect of vertebrate pest management including:

- i. Principles of strategic pest management
- ii. Monitoring and evaluation of pest management programs
- iii. Implementation and funding of programs, and
- iv. A major project in vertebrate pest management.

The course utilizes a mixed mode of delivery, where students are primarily taught through the University of Canberra's on-line delivery system (Moodle) that allows student to undertake the course remotely including within their workplace. The on-line delivery is supported by prompt feedback for submitted assessments, and by an on-line forum that allows the students to interact with both fellow students and teachers. The on-line teaching is enhanced by several short residentials, where the students can attend the University of Canberra for intensive face-to-face teaching and presentation of their work to other students.

The course is taught by staff with appropriate qualifications and extensive experience in strategic pest management, and it integrates current pest management programs as teaching examples and current pest management problems as learning outcomes. Students are encouraged to use workplace pest issues to answer some assignments. They also undertake a major project where they design and potentially implement a strategic pest management program for a pest problem that they face in the workplace. While the focus of the course is on vertebrate pests, the principles involved are similar for other types of pests such as plants and invertebrates, and many of the students have undertaken their major projects on plant (for example, Pattersons curse – *Echium plantagineum*) or invertebrate species (for example, feral honey bees – *Apis mellifera*).

As recommended in the report on training deficiencies by Brown and Munckton (2010), the course is articulated into the undergraduate Bachelor of Applied Science degree at the University of Canberra. This allows students that have successfully completed the Diploma to have

advanced standing for at least a Minor of study for that degree.

Graduate Program

In 2010, the Australian Bureau of Agriculture and Resource Economics and Science (ABARES) and the Invasive Animals Cooperative Research Centre (IACRC) supported the development of a graduate program in strategic pest management through the University of Canberra. This comprised three levels of graduate training: Graduate Certificate, Graduate Diploma, and a Masters program. Each of the three levels will be taught in a manner similar to the VET level diploma using multi-modal delivery, with the majority being delivered on-line, allowing participants to undertake their studies at home or within their workplace. This approach also allows international students to undertake the courses without needing to attend classes in Australia. On-line forums help participants to interact with each other and the lecturers in each subject.

A modular approach has been adopted for the courses with each of the lower levels of study fully subsumable into the higher level. This allows a student to undertake the 12 units of study for the Graduate Certificate and then, at a later stage, undertake the Graduate Diploma (normally a 24 unit course) and receive full credit for the 12 units they have already completed. Similarly, a person who has successfully completed the Graduate Diploma will receive credit for 24 units of study for the Masters course, which is usually 36 units of study.

Graduate Certificate

In 2010, the VET Diploma in Conservation and Land Management was enhanced and upgraded to a graduate level and the first of the graduate level courses, the Graduate Certificate in Wildlife Management (Invasive Species), was made available. The Graduate Certificate uses a similar teaching pattern to the CLM Diploma. However, participants are given a more in-depth exposure to the methods and strategies that comprise best practice strategic management of pests. Case studies based on current pest management programs are used to teach the units. These are supplemented by several examples prepared using Scenario Based Learning Interactive (SBLi) software (<http://www.sblinteractive.org>; SBLInteractive®, Brisbane, Queensland, Australia). Students are provided with the same background information that the managers in the example had. They use that to determine the appropriate steps in defining the pest problem and to develop a plan to manage the damage due to pests. A number of different choices are presented to the participants, who then decide which is the most appropriate. In most of the scenarios, if a participant selects a wrong choice, they are advised why the decision they made is wrong and are then able to make alternate choices and continue with the exercise. In some scenarios, however, the eventual outcome of the scenario will be based solely on the choices and decisions made by the students as they progress. This will give participants experience in both making decisions based on their own knowledge and training and the potential ramifications of a poor or hastily-made decision.

Graduate Diploma and Masters

The Graduate Diploma flows from the Graduate Certificate and will focus on many of the management techniques and strategies that managers need to apply best practice management of pests. Techniques and strategies include project management, policy development, conflict resolution, and a sound understanding of the principles and approach to effective monitoring and evaluation of programs. Graduates with these skills can be almost immediately effective within the workforce without the need for extensive on-the-job training. For students that want to complete a Masters level degree, there is a unit on planning and undertaking high level, original research and another on research techniques within the Graduate Diploma.

The Masters program flows from the Graduate Diploma. Students are required to complete an intensive research project and submit a thesis based on their research. The Australian Qualifications Framework now requires Masters students to undertake a substantial research project comprising 33 - 50% of the program. Successful Masters students can later move on to a PhD.

Short Courses

A major deficiency in Australian pest management training is the lack of targeted short courses. Full VET diploma or graduate courses are not always appropriate. Short courses tailored to the specific training needs of an organisation can help give staff the necessary understanding and skills to undertake their duties in pest management. This can reduce both the time and expense by training staff to the required level for their role.

Students that undertake the short course receive a Statement of Achievement on completion of the course. This can then be used as credit towards the completion of a Diploma or Certificate level VET course, should they wish to undertake further training vertebrate pest management.

Primary and Secondary School Programs

An assessment of topics in the Australian primary and secondary school systems showed that there were few lessons on pests and their management. To address this, the University of Canberra developed on-line education packages for primary and secondary school teachers. These are ready to use resources complete with lesson plans, activities, and learning outcomes for the students. These packages are linked to relevant curricula at the state and territory level.

The training packages are free and available through the Feral Animal website (www.feral.org.au). They comprise of both teacher led classroom activities and online interactive scenarios that use the SBLi software. Students can undertake the exercises either using the school's computer facilities or at home. The education resources can be undertaken progressively by students or teachers, or students can select from individual activities within the package that can be undertaken as stand-alone lessons. Teachers and students are encouraged to talk about pest management issues both in the classroom and at home, thereby increasing the awareness of the broader community about pests and what can and should be done to manage them.

“Pest Tales” (<http://www.pestales.org.au/default.htm>) is a range of primary school education resources targeting students in years 5 and 6 (ages 9 - 11 years old). They aim to give students a basic but accurate understanding of common pest issues that they see every day and knowledge on how pest can impact on their lives both at home and at school. The SBLi interactive scenarios allow students to make choices about how they would manage pests, based on real pest programs. Should a student made an incorrect decision, they are guided through the process to the making correct decisions.

“Feral Focus” (<http://www.feralfocus.org.au/>) education resources were designed for secondary school students in years 8, 9, and 10 (ages 13-15 years old). Students are given more complex pest management problems to resolve. They include the concept that the pest status of an animal is determined by humans: that what might be a pest to one person might be a resource to others, and that native animals can sometimes be pests. Also, the difficulty in eradicating pests is discussed, as is the reason for focussing on managing the damage due to pests, not just killing them. Interactive SBLi scenarios help students make their own decisions about pests and how best to manage them in any given situation.

CONCLUSION

Pest management training is in a parlous state both in Australia and worldwide. There is a lack of suitably trained educators to deliver the few training packages that are available, while many of the relatively few experienced pest managers are approaching retirement, resulting in a serious loss of corporate knowledge. To overcome this, the University of Canberra in conjunction with the Invasive Animals Cooperative Research Centre and with support from several government agencies, has developed a range of training packages. These packages aim to both train participants in best practice pest management and to increase the capacity of the participants to be able to train other staff when they return to their own organisations.

Participant feedback on the VET Diploma course and anecdotal evidence has been very positive. Many students have commented on the value of the course and how they have been able to apply the skills and understanding to tackle their own pest management problems. It will be a long process before the deficiencies in pest training are addressed so that best practice management becomes the norm, but the current courses are an important first step.

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