

Exploring the Relationship Between Conservation Agencies and Schools

Jonathon Leigh Howard

Charles Sturt University, Albury



Introduction

A number of broadscale quantitative surveys have been undertaken to assess how environmental education is implemented within schools in Australia (e.g. Phipps 1991, Boston 1994, NSW Department of School Education 1995, Skamp 1996, Ross & Dingle 1996). These studies generally show environmental education is largely taught within the science and social science curriculums and factors such as availability of resources and a teacher's interest influence its implementation.

While research overseas also suggests that schools implement environmental education largely through the sciences and social sciences (Jacobson 1999), some studies indicate that some resources seem to monopolise a subject area and that conservation agencies play a critical role in providing these resources. For example biology teachers in the United States tend to use *Project Wild* and *Project Learning Tree* to teach children about the environment (Adams *et al.* 1985). Chipman and Brody (1993) found an important resource for teachers in Maine was a magazine published by the Maine Department of Fish and Wildlife. Many schools in Ontario make extensive use of the outdoors through field centres, private camps and conservation authorities (Eagles & Richardson 1992).

In Australia, the role played by conservation agencies in providing school environmental education resources remains largely unexplored. Some research suggests conservation agencies strongly influence the nature of environmental education in schools. For example a 1995 survey by the NSW Department of School Education found about two thirds of all teachers used environmental education resources from state conservation agencies. However this provision appears to be either 'famine or feast' - a dearth of materials in some areas while other areas are swamped with materials of various qualities (NSW Department of School Education 1995, Lenzen & Smith 2000). The relative balance in education 'about', 'in' and 'for' the environment remains largely unknown. This study provides information about successful government sector programs in school environmental education and in doing so explores the role of conservation agencies in schools.

A B S T R A C T

This study's primary aim was to address the lack of accessible information about successful government sector programs in environmental education. In doing so it also explored the role of conservation agencies in schools by quantifying the environmental education resources used and preferred by teachers, and by determining the factors that influenced conservation agencies in the developing these preferred resources. Eighty seven percent of teachers stated they used resources from conservation agencies and sixty three percent of these were from government conservation agencies. Teachers were highly selective of the resources used. Interviews with people involved in developing and implementing the programs most often preferred showed a high level of expertise involved developing such programs. However responses also raised questions about the role of conservation agencies in agenda setting, whether conflicts occur between corporatisation and environmental education, and the degree of fragmentation and territoriality between agencies. It is concluded there are limits to the role conservation agencies can play in school environmental education and that there needs to be greater cooperation in providing school environmental education resources.

The relationship between conservation agencies and school education

School education in Australia is largely a State or territory government responsibility. In the NSW, a Board of Studies is responsible for the development of the K-12 curriculum. The curriculum has six Key Learning Areas (KLAs) common to primary and secondary schools: English, Maths, Science and Technology, Creative and Practical Arts, Human Society and its Environment (HSIE), and Personal Development, Health and Physical Education (PDHPE). Each of the KLAs is further divided into various stages from Kindergarten to Year 12. In NSW Environmental Education is mandatory for all government schools and implemented across the curriculum. At the time of this study there were just over 1 million full-time students attending 3053 government and non-government schools in NSW (Ministerial Council on Education, Employment, Training and Youth Affairs 1997).

In implementing the environmental education curriculum, teachers are not expected to be experts on environmental issues, but they should identify those who are and make use of their expertise. Resources used may come from a range of sources. For example, a video may be taped from a relevant mainstream program, purchased from a private company, or obtained from an interest group or agency with a particular agenda to promote. As some syllabuses such as HSIE have outcomes specific to the environment, while others such as Maths that do not have specific environmental education outcomes the availability of environmental education resources remains patchy (NSW Department of Education and Training 2000).

Another reason why the provision of environmental education is patchy is there are a number of groups, other than the Department of Education, with a legitimate interest in school environmental education (Table 1). The environmental education resources produced by these groups are both abundant and growing in number. For example in 1989, a Commonwealth audit found 765 environmental education resources nationwide, while eight years later another audit by the Hawkesbury-Nepean Catchment Management Trust found

over 1000 resources in NSW alone. The production of these resources is often limited to issues and topics within each group's mandate.

Table 1: Some key State government and Non-government conservation agencies in NSW, their role and their interest in Environmental Education*

| Organisation | Role | Stated Interest in Environmental Education |
|---|---|---|
| National Parks and Wildlife Service | Developing and maintaining the parks and reserve system, and conserving natural and cultural heritage. | Promoting community awareness, understanding and appreciation of the conservation of nature and our cultural heritage. |
| Department of Fisheries | Conserving the aquatic environment and managing fisheries resources. | Promoting ecologically sustainable development, including the conservation of biological diversity. |
| Environment Protection Authority | Protecting, restoring and enhancing the quality of the environment in NSW, having regard to the need to maintain ecologically sustainable development. | The EPA recognise that both the community and the EPA 'own' environmental problems and they provide solutions by guiding community actions with a strong commitment to education. |
| Sydney Water | Provide drinking water, wastewater services, and some stormwater services to the communities of Sydney, the Blue Mountains and the Illawarra. | No stated objective but they do state that water is a precious resource and the best way to encourage people to share our view is through education. |
| Murray-Darling Commission | Advising a State/Federal Ministerial Council on matters related to the use of the water, land and other environmental resources of the Murray-Darling Basin. | Promoting and co-ordinating equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin. |
| Gould League | The Gould League is Australia's leading non-profit environmental education organisation. | The Gould League offers fun-filled activity-based student programs and professional development for teachers. |
| NSW Agriculture | Agricultural research, extension, education and regulation and providing practical farm production solutions for profitable agriculture and for a better environment. | The broader community adopting practices and policies that improve the State's environmental sustainability and the health of its natural resource base. |
| Department of Land and Water Conservation | To help the community to obtain the maximum benefit from its limited, and sometimes fragile, natural resources. | Raise awareness of the sustainable management of our resources encourage the community to take responsibility. |
| State Forests NSW | Manage the forests under its care to provide the widest range of benefits to the present and future generations of people in NSW. | None in corporate plan. |

* This is an abbreviated list. For a complete list see EPA (1996) and NSW Council on Environmental Education (2001) available at <http://www.epa.nsw.gov.au/ceec/documents.htm>.

Resources from such groups now appear to dictate the success or otherwise of programs in NSW schools (Department of School Education 1995). When groups whose primary role is not education are in this position it raises a number of critical issues. First Peel *et al.* (1998) suggest that interest groups, such as the timber lobby or mining groups, may seize the opportunity to promote their own agenda. Second, groups such as government conservation agencies may find environmental education clashes with a corporate approach to management. Environmental education may not be seen as core business or emphasis may be on achieving a specific outcome rather than develop a process within the community (Howard 1997). Third programs developed by groups such as government agencies may be limited by issues associated with bureaucracy such as fragmentation, territoriality, lack of coordination between portfolios and governments, and a lack of clear responsibilities and mandates (May 1992).

Method

This study's primary aim was to address the lack of accessible

information about successful government sector programs in environmental education. My previous employment in several local and regional governments influenced the overall direction of the research. The research therefore had a practical emphasis which sought, firstly, to quantify the resources used and preferred teachers and, secondly, to explore the factors that influenced the development of resources by conservation agencies. Such information may prevent duplication, assist resource development, and improve cooperation between agencies.

The first phase of this research involved a quantitative survey sent to stratified random sample of 494 schools selected from the NSW Department of Education's 1996 registration of State Schools. Conducted in 1998, this survey sought to determine the extent to which teachers used resources produced by conservation agencies. The survey was mailed to the teacher in charge of a particular Key Learning Area at each school. The methodology for the survey followed that advocated by Dillman (1978), in that the survey was initially sent out with a cover letter briefly describing the study and asking the teacher to take the time to fill out and return the survey form. A follow up reminder notice was then sent approximately two weeks later, and then final follow up reminder notice and survey were sent another two weeks later to all non-respondents.

The survey contained open-ended questions and was divided into three parts. The first part asked respondents to record the print and electronic resources being used for environmental education. The second part asked about excursion sites as well as the use of playground for environmental education. The third part asked about specific events, competitions or works undertaken by the schools. Open responses were generally grouped into broad categories for analysis.

A total of 292 mail survey responses were obtained indicating a return rate of 59%. The majority of responses were from those addressed to the teachers in the Key Learning Areas of Science and Technology and HSIE. Data were coded and analysed using the Statistical Package for Social Sciences. Chi-square contingency analysis was used to determine disproportionate use of resources, sites, etc. between key variables. The Mann-Whitney U test was used to test resource use on factors such as in-service training and membership to key professional groups. While this response is high compared to similar studies (e.g. Ross & Dingle 1996), non-response bias may mean the data reported here is a more favourable representation of the use of resources by schools.

The second phase of this research involved sixteen individual semi-structured interviews with environmental educators who were employees/ past-employees of government agencies. The interviews were conducted during 2000-2001 and participants were selected on the basis they that they had previous or present involvement with most popular resources and programs indicated by the mail survey.

Interviews were the chosen method as there was a need to

encourage flexibility, explore interviewee's ideas, and to provide opportunities for clarification. The key questions were open-ended and sought to establish how the processes in developing programs and what they thought were key elements in creating successful environmental education programs. Each interview was between forty minutes to an hour long.

Interviews were tape-recorded and transcribed. The contents of these interviews were coded by contrasting and comparing comments. By assigning codes it was then possible to identify re-occurring themes or key concepts from the data. Such methods are inevitably subjective to varying degrees and open to many interpretations. Accordingly, Miles and Huberman (1994) call upon researchers to be as explicit as possible in documenting their analysis. For this reason much of the data presented here is in the form of direct quotes from the interviewees. Some words have been deleted for brevity and to ensure respondents remain anonymous.

Results

Print and Electronic Resources

Mail Survey

Eighty seven percent of teachers stated they used resources such as video kits, CD-roms, booklets, etc from conservation agencies. Sixty three percent were from government conservation agencies (Table 2). A total of 271 different resources were listed. Teachers listing on average 3.4 (+/-2.5) resources, with one teacher using 14 different resources.

Table 2: Background to some Environmental Education Resources reported by teachers

| Resource | Agency responsible | Description |
|-----------------------------|--|---|
| Streamwatch | Sydney Water and the Department of Land and Water Conservation | A national volunteer water quality monitoring and education program that helps people to get together to discuss the water quality issues in their catchments and to develop strategies to deal with these issues. |
| Murder Under the Microscope | Department of Land and Water Conservation | Students become detective groups investigating potential environmental "victims", "villains" and "crime sites" over a three-week period each year via the latest technology. Clues are beamed into the classroom via satellite, SBS TV and Internet Broadcasts. |
| Sydney Water Kits | Sydney Water | A range of resource kits with various themes. For example 'Water Wonderland Adventure Camp' is a teaching and learning resource package for K-2 containing books, a teacher's manual, an audio cassette, black-line drawings and activity sheets and stickers. |
| Environmental Trusts | Environment Protection Authority | A grant program for individual educational projects which involve developing or widening the community's knowledge, skills and commitment to protecting the environment. |
| Murray Darling Basin Kits | Murray-Darling Basin Commission | A range of resource kits. For example "Managing Our Natural Resources" includes in broadsheets, resource sheets and worksheets. |
| Special Forever | Murray-Darling Basin | This Commission program provides the opportunity for the personal involvement of primary school students in thinking and writing about what is important to them in the Basin, and to express their views and values. |
| Saving Hieronymus | Department of Primary Industry & (Queensland) | An educational kit for school students on saving energy and the greenhouse effect. |
| Gould League Publications | Gould league | A series of booklets with various themes and activities. For example "Outdoor Environmental Games" is a series of games to develop positive attitudes and values towards the environment. |

Teachers' preference for resource kits varied significantly between grade levels (Table 3). Sydney Water produced the most widely used materials (52% of responses), with their resource kits popular in primary schools and secondary schools. Publications by the Gould League were used by teachers in 33% of all primary schools levels, but rarely used in secondary schools.

Table 3: The Environmental Education Resource Kits by Schools

| K-2 (N=102) | 3-4 (n=127) | 5-6 (n=154) | 7-8 (n=92) | 9-10 (n=138) | 11-12 (n=123) |
|--|---------------------------------|---------------------------------|--------------------------------|-------------------------|----------------------------|
| Gould League Publications (33%) | Gould League Publications (34%) | Gould League Publications (28%) | Sydney Water kits (25%) | Sydney Water kits (24%) | Sydney Water kits (23%) |
| Sydney Water kits (21%) | Sydney Water kits (18%) | water/stream watch (25%) | water/stream watch (15%) | water/stream (21%) | water/stream (17%) |
| Environmental Education Centre Newsletters (10%) | Murray-Darling Basin Kits (8%) | Saving Hieronymus (12%) | Gould League Publications (7%) | ABC Broadcasts (13%) | Forestry publications (8%) |

Rural teachers use of print and electronic resources differed significantly to that of teachers in metropolitan regions ($\chi^2=43$, d.f=5, $p \leq 0.001$). The most commonly listed print/electronic resources for teachers in rural schools (n=56) were from the Murray-Darling Basin Commission (36% of rural schools), the Department of Land and Water Conservation (25%) and the Australian Broadcasting Commission (15%). In metropolitan areas (n=135), resources from Sydney Water (73% of metropolitan schools), and the Gould League (27%) were common. This pattern partially reflects the administrative boundaries of these different government conservation agencies.

In the Key Learning Areas (KLA) of Creative Arts (n=42), PDHPE (n=19), and English (n=22), no particular print or electronic resource was common. Many teachers in these KLAs stated they used no resource. For example of the twenty-two responses obtained from English teachers, eighteen listed no resource. By contrast HSIE teachers (n=65) often stated they used resources from Sydney Water (36% of responses).

Fifty four percent of all teachers responding to the survey stated they also used periodicals or newspapers for environmental education purposes. The most popular periodicals were the *Gould Leaguer* (20%), *Bush Telegraph* (8%) and *Australian Geographic* (6%). The *Gould Leaguer* was the most popular periodical in primary school while newspapers were the most popular in secondary schools (Table 4). Teachers often used periodicals in Years 5-6 (48%), Years 3-4 (31%), and in Years 11-12 (25%). Other commonly listed magazines included *The New Scientist*, *National Geographic*, *Australian Geo*, *Habitat*, *Double Helix*, *Geography Teachers Bulletin* and the various Environmental Education Centre newsletters. Teachers in metropolitan areas tended to report using cheaper media such as the newspapers and the *Bush Telegraph*. Creative Arts teachers listed the widest diversity of resources including pamphlets, posters, calendars and the popular monthlies (e.g. *Women's Weekly*).

Interviews

The people involved in developing and implementing these (as well as the other) resources emphasised three key

processes: creating partnerships with teachers, evaluating throughout the design and development phases, and providing ongoing support once material was produced. For example, interviewees stated “I guess it was done through a range of talking, even before we developed the kit, talking with the user groups and going through that process, as well as at the end when the kit was developed, in fact, we even road tested a couple of them before they actually became finalised”. And “We had always said the development of the product was the beginning, it wasn’t the end - you have to have that ongoing support”. Superimposed on this process was the identification of a particular issue and fitting this into a KLA: “You identified where specific issues might fit into existing education syllabus documents”. “We looked at each of the levels that we were designing these things for, so you know each one met the requirements in the curriculum at the level that we were trying to do, K-6 or 6-8 or whatever it might be”.

Table 4: The three most popular periodicals in various year levels

| Year | Periodical No. 1 | Periodical No. 2 | Periodical No. 3 |
|--------------|---|---|---|
| K-3 (n=36) | <i>Gould Leaguer</i> (36%) | <i>Australian Study Topic Series</i> (11%) | Field Study Centre Bulletins (8%) |
| 3-4 (n=46) | <i>Gould Leaguer</i> (39%) <i>Topic Series</i> (11%) | <i>Australian Study Bulletins</i> (8%) | Field Study Centre |
| 5-6 (n=63) | <i>Gould Leaguer</i> (31%) | <i>Australian Geographic</i> (8%) | <i>Australian Geol Double Helix</i> (6%) |
| 7-8 (n=28) | Newspapers (18%) | <i>Geography Teachers Bulletin</i> (10%) | <i>New Scientist/Australian Geographic</i> (7%) |
| 9-10 (n=33) | Newspapers (15%) | <i>Geography Teachers Bulletin/Bush Telegraph</i> (10%) | <i>New Scientist</i> (6%) |
| 11-12 (n=40) | Newspapers (15%) | <i>New Scientist</i> (10%) | <i>Geography Teachers Bulletin</i> (7.5%) |

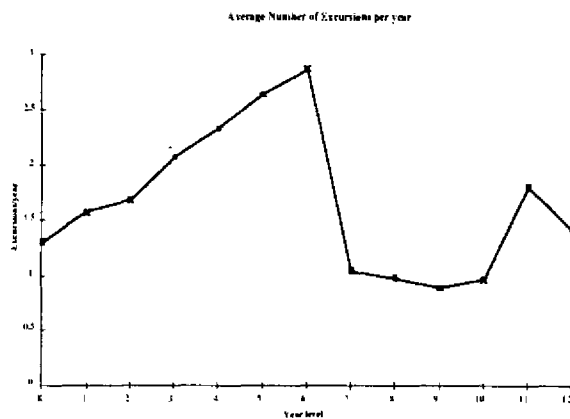
However these processes were influenced by management changes. “Suddenly there was a fairly large amount of money under this special environmental levy for education programs for schools”. “We had something like 35 people and when the new manager came in, I remember everyone had a long face because the first we had read about this was in paper and we’d be reduced to three people”. “It was corporatised in 1995, so 1994 really saw the end of it”. “Well we live in a corporate world and the bottom line rules, there no question if we could not communicate to the owners our relevance we would be cut”.

Excursions and Playgrounds

Mail survey

The survey found the number of environmental education excursions held by schools typically increases until year 6 when almost 3 excursions per year were reported (Figure 1). This decreased markedly in secondary schools with a second peak in year 11. This pattern was the same for metropolitan and rural schools although teachers in metropolitan areas generally reported more excursions than to rural teachers. Primary teachers reported significantly more environmental education excursions per year than secondary teachers ($\chi^2=11.6$, d.f=3, $p<0.005$). Most teachers in secondary English (45%) and Maths (30%) teachers stated did not participate in environmental education excursions.

Figure 1: The number of excursion held each year by schools



The most popular locations to visit were National Parks, environment education centres and coast/wetland areas. Primary and secondary school teachers showed significant differences in their choice of these venues (Mann-Whitney U, $z=-2.9$ $p<0.003$). Primary school teachers were more likely to visit sport and recreation camps, environmental education centres, and local parks, while secondary school teachers were more likely to visit National Parks and coast/wetland areas. Rural teachers tended to visit zoos and National Parks and inter-state more than metropolitan teachers, while metropolitan teachers tended to visit local parks and primary production areas (such as forests or farms) more than rural teachers.

Eighty two percent of teachers reported using their school grounds to teach environmental education. Primary school teachers reported on average eight activities per year whereas secondary school teachers reported three activities. The activities varied from rainforest regeneration to bush fun runs. Gardening/landscaping, environmental maths, ecological studies and water surveys were the activities commonly reported by secondary school teachers, whereas mini-beasts, recycling, gardening, and tree planting were most commonly reported by primary school teachers. Playgrounds were also used for a diversity of purposes such as trigonometry, mapping, bush-regeneration, bird watching, worm farming, and agriculture.

Interviews

A managerial/corporatist approach to environmental education was highlighted in interviews about excursions. “All our excursions start with the key message for the agency”. “This major review will reflect new legislation such as the Child Protection Act, Personal Privacy of Information Act, all sorts of legislation that has arrived in the last five years”. “Business responsibilities and pieces of legislation are the basis on which we take our responsibility so internal benchmarking and then benchmarking this against other states and internationally”. This approach is had some problems associated with performance based assessment: “It is about working up to 60 hours a week and only being paid for 2.5 days a week.” “You’ll never get anywhere with our agency. You’ve got to step outside the line if you’re going to be a success”.

Competitions and Action Research

Mail Survey

Fifty five percent of schools entered environmental education competitions or undertook action research programs. Secondary schools entered in to Streamwatch, Murder under the Microscope, or Special Forever, whereas the EPA awards and Special Forever were popular for primary schools. Twenty six percent of rural schools were involved in Special Forever. Local Government competitions also attracted support with 17% of schools stating they participated in mayoral awards or Local Council awards.

Interviews

Most people interviewed highlighted a fundamentally different approach towards environmental education that emphasised capacity building and the experimental nature of their programs. "It's having them engaged.... so that they change not only their behaviour but it becomes a beacon or ripple effect and start to influence the behaviours of those around them". "Engaging in a capacity building exercise. You may be getting some environment improvement what you are really getting is an enhancement in the capacity of teachers, schools, and the community". "The logic is that you are engaging in a capacity building exercise. You may be getting some environment improvement but in the first instance what you are really getting is an enhancement in the capacity of schools".

Many of these educators also used action research or adaptive management approaches to develop their programs. For example Sydney Water's Streamwatch works closely with schools to develop long term (4-5 year) on-going partnerships and these schools are then involved in the redesigning of kits, training and programs or the development of new programs. Each year Special Forever is developed from grass roots regional networks of teachers and other members of the community who later become involved implementing the program. This approach had the advantage of gaining considerable community support: "it looked like it was going to be chopped off but I mean I guess at the end of the day it had established such a good record that they really weren't game enough to do it, they weren't quite sure you know, it was like cutting off your arm".

They also clearly new there were limitations to the programs that they could run "success is always measured against the objectives of the organisation". "We have a more specific role too, in terms of our vision, we are just trying to come up with programs that are really a means to an end- they're all just tools". "Murder and Streamwatch are all just means part of a continuity between awareness and action and my aim is to look at the whole of NSW make my unit link with others in the organisation so we achieve our vision".

Other environmental education programs Reported by Teachers

The mail survey also found a range of special days was celebrated by sixty eight percent of schools. Schools commonly reported participating in Clean Up Australia Day,

World Environment Day, Arbour Day, and Streamwatch catchment snapshots. Clean Up Australia Day (44%), Arbour Day (22%), and World Environment Day (17%) were the most commonly participated in primary school, while Clean Up Australia Day (35%), Streamwatch events such as the bug survey (20%) and World Environment Day (12%) were commonly reported by secondary school teachers.

The average number of guest speakers invited to come to the school was just under one per year. This number did not differ between rural or metropolitan schools, KLAs, or primary or secondary schools ($p>0.05$). The most popular topics for discussion were recycling (from the local Council), indigenous society and talks about the local environment from Landcare groups (20% of responses each $n=233$). Talks from the Mineral Council were also common for metropolitan schools.

Most schools (78%) recycled material and had a person specifically responsible for environmental education (58%). Many schools had a shade/green house (44%), an environmental education plan (42%) or an energy plan/policy (36%). There were no significant difference in this pattern between primary and secondary schools, however, rural schools were significantly less likely to recycle material than metropolitan schools ($\chi^2=8.72$ d.f.=1 $p\leq 0.05$).

Other Issues in implementing environmental education programs produced by conservation agencies

The mail survey found teachers who had had some level of in-service training were more likely to spend a greater percentage of their time teaching environmental education (Mann-Whitney U, $z=-2.71$, $p\leq 0.007$). However training needed to be by a government conservation agency (Mann-Whitney U, $z=-2.84$, $p\leq 0.005$) rather than from the Department of Education ($p>0.05$) or within the school ($p>0.05$). Those teachers that had received this in-service training in the last year were also more likely to spend more time doing environmental education in schools (Mann-Whitney U, $z=-2.8$, $p\leq 0.005$). People who were members of environmental education groups such as the Gould League or Marine Education Society of Australasia (MESA), etc. were more also more likely to teach more environmental education (Mann-Whitney U, $z=-3.17$, $p\leq 0.002$). The reasons Maths, Arts and English teachers stated they were not using more material from government conservation agencies was that it wasn't appropriate to their KLA ($\chi^2=14.7$ d.f.= 5 $p\leq 0.01$) while HSIE and Science teachers said they were using the best ones available ($\chi^2=18.5$ d.f.= 5 $p\leq 0.002$).

Teachers' open-ended comments in the mail survey also indicated quality of some resources was an issue. For example, "Information outlining resources arrives in haphazard manner with- no coherent statement outlining avail/content level etc", another said "Poor quality, don't work in practice in many cases, written by people who couldn't have had any school experience". Finally "They generally develop a resource without analysing the market and how a teacher would use it".

By contrast interviewees suggested more co-operation and partnerships between programs run by other government conservation agencies was needed. *"One thing that hit home in our evaluation was a huge number of other programs did not know of this program. The students are also doing Waterwatch. That gives them the connection with the environment and can provide the stimulus for our program.... I could write a unit of work about water quality- great! but if teachers got the ingenuity to use the other program to get them out there – beauty! Let's use it. It will create a much better program for us". "Sometime I get a feeling from people if they have got something good and they hold it close to them that in fact they will keep it and it will get better. When I think my belief is that the opposite is true. If you actually have something good that you really believe in, then you open it up and see if you can get it out to everybody and what happens, there is a huge synergy that occurs... which in fact increases the outcomes and knowledge of the program.*

Discussion

Although the results from the mail survey are derived from perhaps a more favourable representation of environmental education in NSW schools, the results support the contention of the NSW Department of School Education Quality Assurance survey (1995) that conservation agencies play a key role in provision of resources. For example, the results suggest that NSW government schools conduct over 28,000 excursions each year and many of these are to National Park areas. Others programs such as Special Forever, Streamwatch, the EPA Environmental Trusts, and Murder under the Microscope have widespread usage within schools.

The results from the mail survey are also consistent with findings of other studies of school environmental education in Australia (eg. Ross and Dingle 1996, Skamp 1996), in that it found differences between schools located in metropolitan or rural areas. It also re-enforces findings that in-service training and support is important, some teachers find some resources are of poor quality, and that the availability of environmental education materials across the curriculum is uneven.

While these findings may not be new, they provide a benchmark for the new Environmental Education policy for schools in NSW (NSW Department of Education and Training 2000). The revised policy comprises three main areas: curriculum, management of resources, and management of school grounds. This study shows just prior to the new policy 87% of teachers used resources such as videos to help teach the curriculum, 78% of schools had recycling programs, and 82% of schools used the school grounds.

Additionally, the mail survey provides a new insight into the nature of resource use. It shows that programs or resources from particular agencies have widespread use amongst teachers. For example, Local Councils are important providers of local environmental awards and guest speakers. The NSW


National Parks and Wildlife Service provides important excursion venues. The Murray Darling Basin Commission provides environmental education in the English KLA, while the Department of Land and Water Conservation and Sydney Water are important providers in the HSIE and Science curriculums. If particular government conservation agencies are monopolising resource or service provision for a particular KLAs or topics, then it raises questions concerning agenda setting, differing priorities, and the impact of bureaucracy.

A group or conservation agency may try to set the agenda. In a comparison between the British and the Australian education system, Peel *et al.* (1998) suggest that various interest groups, such as the timber lobby or mining groups, may seize the opportunity to promote their own agenda in Australia. In terms of non-government conservation organisations, this study found groups such as the Gould League, Clean up Australia, MESA (Marine Education Society of Australia) and AAEE (Australian Association of Environmental Education), rather than particular lobby groups played an important role in encouraging teachers to implement environmental education. Yet it also found that the implementation of school education programs by government conservation agencies was not rational. For example, the Department of Minerals and State Forests were important providers of guest speakers and magazines in schools yet these agencies do not have education as a key objective. Conversely, the Department of Fisheries, NSW Agriculture, and the Department of Planning have key roles in education and ecologically sustainable development but were not important providers.

As a school environmental education program is only part of a conservation agency's agenda, programs may be influenced by the current particular management paradigm. The interviews showed conservation agencies had staff with considerable expertise in environmental education. These people were well aware of key design principles such as providing on-going support to teachers. All interviewees also recognised the need to match programs with organisational objectives. However, the method of assessing programs by management did not necessarily ensure that programs continued or were adequately supported. The resource kits developed by Sydney Water were not supported once they were no longer seen as part of core business. The NSW National Parks and Wildlife Service prides its excursion programs as being 'best practice' because of rigorous performance based monitoring, yet regional staff stated are struggling to deliver quality programs to schools. This shows that in some cases organisations that embrace performance measurement and program planning limit the nature of environmental education programs because they have a narrow view focused on specific outcomes rather than on processes.

Finally programs developed by groups such as government agencies may be restricted due to fragmentation, territoriality, lack of coordination between portfolios and governments, and a lack of clear responsibilities and mandates (May 1992). The mail survey identified gaps in the provision of resources, for

example, unlike Maine in the United States no agency produces a magazine that plays an important role in NSW schools. Interviewees also identified a lack of inter-agency partnerships and synergy between programs as an influence. In support of these opinions, the Ministerial Council on Environmental Education (2001) found organisations had a narrow interpretation of their responsibilities and suggested government agency providers need to consider the full range of interrelationships that might be relevant.

The new Environmental Education policy for schools in NSW (NSW Department of Education and Training 2000) expects teachers to identify people with expertise on environmental issues and make use of their expertise. By providing an overview of the school environmental education resources used and the factors that influence the development of environmental education resources by conservation agencies, this study has shown this approach has some limitations and weaknesses. Teachers need to be aware that conservation agencies have various agenda and that corporatisation and bureaucracy influence resource development and delivery. These issues may be addressed by a new three year plan produced by the NSW Council on Environmental Education because it aims to encourage the development and delivery of high quality environmental education programs through a coordinated and comprehensive approach (NSW Council of Environmental Education. 2001). Environmental educators in conservation agencies may help the Council achieve this aim by taking a more strategic and cooperative approach that takes into account the needs of teachers, the state of existing resource material, and the portfolios of the various conservation agencies. This may decrease duplication, assist resource development, improve linkages and thereby improve outcomes of environmental education programs in NSW schools. 

Acknowledgments

I would like to thank the NSW Department of School Education for giving permission to undertake the study. Jen Carmichael and Wayne Robinson helped with the statistical analysis. A more complete report of this study is available from the Johnstone Centre at Charles Sturt University.

References

- Adams, C., Charles, C., Green, J., and Swan, M. 1985, 'New designs in conservation/ecology education', *The American Biology Teacher*, vol. 47, no. 8, pp. 10–14.
- Boston, K. 1994, *Findings of the NSW Quality Assurance Review of Environmental Education*, Unpublished report, Ministerial Advisory Council on Environmental Education, Sydney, NSW.
- Chipman, E. & Brody, M. J. 1993, 'High school biology teachers' use of wildlife conservation magazines in the classroom', *Journal of Environmental Education*, vol. 24, no. 2, pp. 10-14.
- Department of Education and Training 2001, *Environmental Education Policy for schools*, Curriculum Support Directorate, NSW Department of Education and Training.
- Dillman, D. A. 1978, *Mail and Telephone Surveys: The Total Design Method*, Wiley & Sons, New York.
- Eagles, P. J. & Richardson, M. 1992, 'The status of environmental education at field centers of Ontario schools', *Journal of Environmental Education*, vol 23, no.4, pp. 9–14.
- Howard, J. L. (1997) 'Catchment Management Within Agencies—Where Bottom Up Meets Top Down', *Water*, Jan, pp. 78-91
- Jacobson, S. K. 1999, *Communication Skills for Conservation Professionals*, Island Press, Washington, D.C.
- Lenzen, M. & Smith, S. 2000, 'Teaching responsibility for climate change: three neglected issues', *Australian Journal of Environmental Education*, vols. 15/16, pp. 65-75.
- May, P. 1992, 'Policy learning and policy failure', *Journal of public policy*, vol 12, pp. 331-54.
- Miles, M. B. & Huberman, M. A. 1994, *Qualitative data analysis* (2nd ed), Sage, Beverly Hills, CA.
- Ministerial Council on Education, Employment, Training and Youth Affairs 1997, *National Report on schooling in Australia: 1997*, www.curriculum.edu.au/mceetya/public/pub323.
- NSW Council of Environmental Education 2001, *Environmental Education in NSW: Towards a Three-year Plan*, Working paper, NSW Council of Environmental Education.
- NSW Department of Education and Training 2000, *Environmental Education Policy for Schools*, NSW Department of Education and Training, Curriculum Support Directorate, Bankstown, NSW.
- NSW Department of School Education 1995, *A Review of Environmental Education in New South Wales Government Schools*, NSW Government Department of Education, Sydney.
- Peel, G., Robottom, I. & Walker, R. 1998, *Environmental Education and Self-interest*, Centre for studies in mathematics, Science and environmental education, Deakin University, Australia
- Phipps, S. L. 1991, *Towards Excellence in Environmental Education: An Investigation into Teacher Preparation as Environmental Educators*, Unpublished honours thesis, University of Wollongong, New South Wales.
- Ross, W. & Dingle, P. 1996, *Environmental Education in Secondary Schools: A Western Australian Perspective*, Environmental Science Paper 96/1, School of Biological and Environmental Sciences, Murdoch University, Perth.
- Skamp, K. 1996, 'Environmental education: Implementation in a NSW department of school education region', *Australian Journal of Environmental Education*, vol. 12, pp. 61-20.