

211
60 1105



Western Australian Institute of Technology

School of Biology Bulletin Number 4

**Evaluation Study of the Jarrahdale Centre
for Environmental Education**

by J.M. Osborne

Published 1981

ISSN No 0158 3301

Editorial board:

Dr B.G. Collins, School of Biology, WAIT.

Dr D.J. Kitchener, Department of Mammals, W.A. Museum

Dr J.D. Majer, School of Biology, WAIT.

Mr A.G. Newland, School of Biology, WAIT.

CONTENTS

| | <u>Page</u> |
|---|-------------|
| Abstract | 5 |
| Introduction | 7 |
| Rationale for the Evaluation Study | 8 |
| Description of the Jarrahdale Centre for Environmental Education | 8 |
| Description of the Jarrahdale Centre In-service Course | 9 |
| Publicising the Jarrahdale Centre and the In-service Course | 10 |
| Method and Scope of the Evaluation Study | 10 |
| Audiences for the Study | 10 |
| Design of the Study | 11 |
| Instruments Used in the Study | 12 |
| (a) Observation | 12 |
| (b) Teacher Survey | 12 |
| (c) In-service Course Survey | 12 |
| (d) Student Surveys | 13 |
| (e) Materials Checklist | 13 |
| Useage of the Jarrahdale Centre for Environmental Education During 1979 | 14 |
| Survey of Teachers Utilising the Jarrahdale Centre During 1979 | 15 |
| Knowledge of the Centre's Existence | 16 |
| In-service Course Attendance | 17 |
| Facilities | 17 |
| Reasons for Choice of the Centre | 17 |
| Objectives | 18 |
| Ways in Which the Centre is Used | 18 |

| | <u>Page</u> |
|--|-------------|
| Use of Worksheets | 19 |
| Vacation Usage... .. | 20 |
| Other General Comments | 20 |
| Survey of Teachers Attending the 1979 In-service Courses | 20 |
| In-service Course Information | 21 |
| (a) Knowledge of the In-service Course ... | 21 |
| (b) 'Beneficial' and 'Irrelevant' Aspects of the In-service Course | 22 |
| (c) Assistance of the In-service Course in the Planning of Field-Studies | 23 |
| (d) Adequacy of the In-service Course and Suggested Improvements | 23 |
| (e) Duration of the In-service Course ... | 24 |
| (f) Compulsory Attendance of the In-service Course | 24 |
| (g) General Comment | 24 |
| General Information | 24 |
| Survey of Students Staying at the Jarrahdale Centre During 1979 | 26 |
| Instrument Choice | 26 |
| (a) Questionnaires | 26 |
| (b) Affective Scale | 27 |
| Survey Schools | 28 |
| (a) School A | 28 |
| (b) School B | 29 |
| (c) School C | 29 |
| (d) School D | 29 |
| Student Survey Data and Discussion | 30 |
| (a) General Information | 30 |
| (b) Student Perceptions | 31 |
| (c) Likert Scales | 33 |
| Review of Worksheets Provided at the Jarrahdale Centre | 37 |
| Acknowledgements | 39 |

**EVALUATION STUDY OF THE JARRAHDALÉ CENTRE
FOR ENVIRONMENTAL EDUCATION**

J.M. OSBORNE*

ABSTRACT

The Jarrahdale Centre for Environmental Education is one of two field-studies centres established jointly by the Education Department and the Forests Department of Western Australia. The Centre is located in the Jarrahdale township, 45 kilometres from Perth. Sleeping accommodation, toilet and washroom amenities and limited cooking facilities are available for up to 26 persons. Field worksheets and some field equipment are also made available. Provided that the supervising teachers have attended the related one day in-service course, student groups from any government or non-government school may stay at the Centre.

An evaluation study of the Jarrahdale Centre for Environmental Education was carried out between August and November, 1979. The evaluation study involved four separate surveys and an analysis of data available from school bookings for the Centre. Teachers and students who had visited the Centre in 1979, and participants in the 1979 in-service courses for teachers, replied to questionnaires. Experienced practising teachers commented specifically on the field worksheets provided at the Centre.

From March to November inclusive the Jarrahdale Centre was visited by 50 different student groups whose numbers ranged from 5 to 70. Thirty-four (34) groups were from secondary schools and 16 were from primary schools. Possibly more primary groups would use the Centre if there was more space with provision of additional bunks.

Seventy-three per cent (73%) of the teachers accompanying student groups to Jarrahdale during 1979 replied to a mailed questionnaire. These teachers had learnt of the Centre's existence from other teachers and (or) from the information brochure sent by the Environmental Education Officer. Some of the teachers had not attended the requisite in-service course. The majority of teachers commented favourably on the facilities available at Jarrahdale. It was however suggested that certain recreation facilities at the Centre could be improved.

Teachers had most often chosen this Centre because of its proximity to many and varied areas for field based studies. During 1979, teachers used the Centre as a base from which to participate in activities primarily involving biology, geography,

* School of Biology, Western Australian Institute of Technology,
Kent Street, South Bentley, Western Australia, 6102.

environmental studies, social studies and science. General appreciation was expressed for the provision of field worksheets. Some of the latter were widely used and these were regarded as quite adequate. The teachers hoped cognitive, social and affective outcomes would be attained by the students staying at the Centre. The multi-disciplinary use of the Centre was apparent and teachers indicated the time spent at the Jarrahdale Centre and its environs were of value in a teaching programme.

Ninety-two per cent (92%) of the participants in the 1979 in-service courses replied to a questionnaire. These teachers found some sections of the one day in-service course beneficial and all stated that it should be compulsory for intending users of the Jarrahdale Centre to attend an in-service course. Ninety-one per cent (91%) stated that the in-service course had been of assistance in planning field-oriented studies for their students. However the teachers made several suggestions for changes to the in-service course format. Perhaps participants should be more actively involved in the course. The teachers could use part of the day to prepare new field worksheets or rewrite some of the existing ones. If the course was of longer duration specialised personnel (e.g. botanists) could be available for consultation and (or) talks. Many of the in-service participants suggested that herbarium sheets, slides and (or) photographs of the local fauna should be provided at the Centre.

Student attitudes towards the environment were assessed using a Likert scale and questionnaires to obtain student background information were also administered. These instruments were given to a total of 86 upper primary and upper secondary students, who stayed at least two days at Jarrahdale during 1979. Four schools, two government and two non-government, were represented in this survey. Although in three of the schools all students surveyed had previously visited a forest region, in the other school twenty per cent (20%) of the students surveyed had never visited the bush until their stay at the Jarrahdale Centre. The majority of primary and secondary students surveyed particularly enjoyed the hiking and bush walks through the native forest. The students stated they 'learnt' to appreciate and care for the flora and fauna of the bush.

An attitude change was recorded in only one of the four school groups. After their visit to Jarrahdale secondary students from one school had more positive attitudes towards the environment and its associated problems.

Practising primary and secondary teachers who regularly take their students into field environments reviewed some of the worksheets provided at Jarrahdale. They considered these worksheets suitable for use with appropriate year levels in the specific Jarrahdale localities.

The Evaluation Study has shown that in general the aims of the Jarrahdale Centre for Environmental Education, as outlined by the Environmental Education Committee are being fulfilled.

INTRODUCTION

During the 1970's there appeared an emerging interest in environmental education and its associated activities. The declaration of the Tbilisi International Conference on Environmental Education (1976) and the Belgrade Charter (developed at the International Workshop on Environmental Education, Belgrade, 1975) stress a world-wide concern for the environment and an urgent need for environmental education. In 1977 the Western Australian Education Department issued a formal policy statement on environmental education (see Figure 1). Among other things this policy statement enjoined teachers to provide students with experiences of environments different from those of the school. Field-studies centres are one means of providing these different environments.

The objectives of environmental education are to help individuals and social groups develop:

- (i) awareness and sensitivity to the total environment and its allied problems;
- (ii) an understanding of the total environment and its associated problems, and humanity's critical responsible presence and role in it;
- (iii) attitudes of concern for the environment and the motivation for actively participating in its protection and improvement;
- (iv) skills for evaluating environmental measures and educational programmes in terms of ecological, political, economic, social, aesthetic and educational factors and skills for solving environmental problems; and
- (v) a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to solve these problems.

FIGURE 1

THE OBJECTIVES OF ENVIRONMENTAL EDUCATION,
QUOTED FROM THE WESTERN AUSTRALIAN EDUCATION
DEPARTMENT'S POLICY STATEMENT ON ENVIRONMENTAL
EDUCATION (1977).

The Jarrahdale Centre for Environmental Education is one of two field-studies centres established jointly by the Education Department and the Forests Department of Western Australia. The two aims of the Jarrahdale Centre are listed in the **Jarrahdale Centre for Environmental Education: Teachers' Information Guide** (in press). One of the main aims of the Centre is to provide students with resources and experiences in natural and man-modified environments that are different from those that they normally experience. Another important aim of the Centre is to provide teachers with methods, suggestions and direct experiences in the development of environmental activities for their classes. It is hoped that teachers will use the facilities of the Centre to gain confidence and skills in field-studies that can then be applied to other environments which are perhaps closer to their schools. General administration of the Centre, and co-ordination of its useage, is controlled by the Education Department's Environmental Education Officer.

Rationale for the Evaluation Study

Interest in, and concern for, environmental problems has led to an associated development of 'environmental' curricula and of field-studies centres and programmes. Yet as Doran (1977) observed, few schools and material developers have obtained 'hard' evaluative data on the effects of their programmes and materials. Few evaluation studies have been conducted into Australia's field-studies centres; however, the importance of such studies does seem to have been recognised. The Curriculum Development Centre now requires that environmental education projects include some form of evaluation. The present evaluation study was undertaken to determine what benefits teachers and students were obtaining from their use of the Jarrahdale Centre for Environmental Education and to outline suggested recommendations.

Description of the Jarrahdale Centre for Environmental Education

Jarrahdale is a small country town 45 kilometres from Perth. The Centre is located in the main part of the townsite. The Metropolitan Transport Trust operates a limited bus service to and from Perth and Jarrahdale three times a week. To travel directly to and from Jarrahdale at other times school parties would need to hire buses or elicit help from parents. The Centre comprises a communal workroom and dormitory accommodation for 26 students. Toilet and workroom amenities and cooking facilities are provided and there is also a barbecue area. Little field equipment is provided and it is suggested that schools bring with them any equipment they require. One group may stay at the Centre for up to one week, their teachers having the responsibility of leaving the Centre clean and ready for the groups to follow. No charge is made for the use of the Centre

but it has been suggested that groups leave display material (i.e. charts) and collected data at the Centre and donate a book to the Centre's meagre library.

Within a short distance of the Centre there are a variety of areas which can be studied. These are set out in the **Jarrahdale Centre for Environmental Education: Teachers' Information Guide** (in press) and include the following:

- (i) a jarrah (**Eucalyptus marginata**) forest which had been logged until about 1880 (1 kilometre from the Centre);
- (ii) an area affected by jarrah dieback (**Phytophthora cinnamomi**) (2 kilometres);
- (iii) a freshwater stream (2 kilometres);
- (iv) man's effect on the environment through mining (bauxite mining by Alcoa, 9 kilometres);
- (v) a granite rock (5 kilometres);
- (vi) man's attempts at rehabilitation of an area after mining (Alcoa and the Forests Department, 5 kilometres);
- (vii) a local sawmill;
- (viii) a well-established cemetery (1 kilometre); and
- (ix) a small country town.

Worksheets related to the above areas are provided at the Centre. These are appropriate for children of various age levels (upper-primary, lower-secondary, and Years 11 and 12). The Environmental Education Officer suggests to the teachers that many of these worksheets could or should be updated and redesigned. He also expresses the hope that the Centre will be used for long-term studies, with each group of students leaving information and data which can be utilised by the following groups.

Description of the Jarrahdale Centre In-service Course

Before using the Centre teachers must attend a one-day in-service course run by the Environmental Education Officer. The course familiarises the teachers with the Jarrahdale area and its surrounds and elaborates upon appropriate field techniques. Teachers may use these techniques if they bring parties to the Centre or they may find them applicable to studies in the immediate environs of their schools. Three in-service courses were conducted by the Environmental Education Officer and

assistants during 1979. On the two in-service courses attended by the author of this evaluation study, the morning was spent working through two of the prepared worksheets. Each in-service course participant completed the 'Bushwalk' worksheet and could then choose another area for study. The 'Bushwalk' worksheet was well prepared and suitable for all student levels hence this activity would be used by most teachers bringing students to Jarrahdale.

During the afternoon of one of the courses an Alcoa executive outlined ways schools could use Alcoa for visits and debates. In response to their expressed wishes the participating teachers were shown over Alcoa's bauxite and reafforestation operations as well as the other local study areas. On the other 1979 courses the Environmental Education Officer had used the afternoon to show participants the reafforestation and local study areas only.

The in-service course concluded with the Environmental Education Officer relating how he felt the Centre should be used. He expressed the misgiving that teachers utilising the Centre might only be concerned with cognitive outcomes. He said the Centre should be part of environmental education which, as well as being **about** the environment, and **in** the environment, must also be **for** the environment. Education for the environment means the development of interest, concern and positive valuing of the environment.

Publicising the Jarrahdale Centre and the In-service Course

During 1979 two information brochures providing details of the Jarrahdale Centre for Environmental Education and its related in-service course were sent to all metropolitan government and non-government schools. The Environmental Education Officer contributed articles to **Education and Filter** (scienceteachers' newsletter). These articles elaborated on the Jarrahdale and the Mundaring field-studies centres.

It was planned that at the commencement of the 1980 school year, copies of the **Jarrahdale Centre for Environmental Education: Teachers' Information Guide** (in press) would be sent to all Western Australian schools. Every library and resource centre in the State would have a copy of the publication as would Technical Colleges and Colleges of Advanced Education. Copies would also be distributed to administrative and advisory staff in the Education Department's Regional and Head Offices.

METHOD AND SCOPE OF THE EVALUATION STUDY

Audiences for the Study

The primary audience for this evaluation study will be the Western Australian Education Department's Environmental Education Officer and the Environmental Education Committee. It is assumed

that the study will be forwarded to administrative and advisory staff in the Education Department's Regional and Head Offices.

Other interested audiences include:

- (i) teachers in government and non-government schools;
- (ii) the Curriculum Development Centre (in 1978-1979, \$32,000 had been allocated to projects in the area of environmental education);
- (iii) Environmental Education Committees and personnel in other Australian states;
- (iv) tertiary institutions conducting courses in Environmental Education (State Colleges [Melbourne and Rusden]; Colleges of Advanced Education [Tasmania, Murray Park, Canberra and the Riverina], and Universities [Monash and Queensland]);
- (v) the Western Australian Forests Department; and
- (vi) Alcoa public relations personnel.

Design of the Study

Different aspects of the evaluation study were decided upon following discussions with members of the Environmental Education Committee, the Education Department's Environmental Education Officer, practising teachers and a former Curriculum Advisory teacher.

It was apparent that the evaluation study should determine whether the aims of the Jarrahdale Centre for Environmental Education, as outlined by the Environmental Education Committee, were being fulfilled. To ascertain whether students visiting the Centre are being exposed to natural and man modified environments that are different from those they normally experience, questionnaires would be administered to students visiting Jarrahdale.

To find out how teachers use the Jarrahdale Centre and hence determine whether the Centre is being used within the framework outlined by the Environmental Education Committee and the Western Australian Education Department's policy statement on environmental education, teacher interviews would be conducted, and questionnaires would be administered to teachers and students visiting Jarrahdale.

To determine whether the Centre is providing teachers with methods, suggestions and direct experiences in the development of environmental activities for their classes a survey of teachers who have attended the in-service course would be conducted. The questionnaire would ask whether the teachers are applying

acquired field-study skills to their local and other environments.

The suitability of the Centre and its environs for teacher-directed and other activities would be determined from the surveys of teachers who have visited Jarrahdale for the in-service course or with student groups.

Teachers who may in the future consider attending the in-service course and using the Centre, expressed interest in the type of student worksheets and activities available at the Centre. Experienced practising teachers would be asked to comment on these provided worksheets.

The objectives of the Department's policy statement on environmental education are concerned with the development of attitudes of concern for the environment and an awareness and sensitivity to the environment. Attitudes of students towards general and specific environmental issues would be measured before and after the students visited the Jarrahdale Centre.

An indication of the rate of useage of the Centre was requested by some members of the evaluation studies' audiences. These data, obtained from the records of the Environmental Education Officer, would be presented in summary form.

Instruments Used in the Study

The instruments used in the evaluation study are summarised below. Further details regarding these instruments are provided in subsequent sections.

(a) Observation

Observational data were collected when the evaluator visited the Centre with the Environmental Education Officer in May 1979 and attended the May and August 1979 Jarrahdale Centre in-service courses.

(b) Teacher Survey

The Teacher Survey was mailed in September 1979 to all teachers listed as visiting the Centre with student groups during January to November 1979. See Appendix A for the Teacher Survey, and the introductory and follow-up letters.

(c) In-service Course Survey

The In-service Course Survey (see Appendix B) was completed by all participants at the conclusion of the August 1979 in-service course. This survey was mailed in September 1979 to

all teachers listed as attending the March or May 1979 in-service courses.

(d) **Student Surveys**

Pre-visit and post-visit questionnaires and a Likert scale to measure affective outcomes were administered to 86 primary and secondary school students who had stayed at least two days at the Jarrahdale Centre during 1979. Figure 2 outlines the data gathering schedule followed. Further details of this quasi-experimental design and details of the surveyed school groups are provided in subsequent sections. The pre-visit and follow-up Student Surveys for the secondary school students are found in Appendix C and the pre-visit and follow-up Student Surveys for the primary school students are found in Appendix D.

(e) **Materials Checklist**

The Materials Checklist and a covering letter were mailed to experienced practising teachers in October 1979. Refer to Appendix E for this Checklist.

| Student Group | Data Gathering | | | | |
|----------------------|---------------------------------|--------------------|--------------------|--------------------|---------------------------------|
| | Pre-visit Question- naire | Affective Scale | Jarrahdale Camp | Affective Scale | Follow-up Question- naire |
| PRIMARY | | | | | |
| School A | | | | | |
| Group A ₁ | X | X | X | X | X |
| Group A ₂ | X | X | X | X | X |
| School B | | | | | |
| Campers | X | X | X | X | X |
| Non-campers | | X | | X | |
| SECONDARY | | | | | |
| School C | | | | | |
| Group C ₁ | X | X | X | X | X |
| Group C ₂ | | | X | X | X |
| School D | | | | | |
| Campers | X | X | X | X | X |
| Non-campers | | X | | X | |

FIGURE 2

DATA GATHERING SCHEDULE FOR THE ADMINISTRATION OF STUDENT SURVEYS TO THE SCHOOL GROUPS.

USEAGE OF THE JARRAHDALE CENTRE FOR ENVIRONMENTAL EDUCATION DURING 1979

The Jarrahdale Centre is available for bookings during school terms and Easter, May and August school vacations. Because of the fire risk the Forests Department discourages school reservations over the summer months. During 1979 the Jarrahdale Centre and its environs were visited by 50 school groups. Nineteen (19) visits were for one day only, 17 were of two days' duration, and 14 visits were longer than two days.

From the beginning of March 1979 to the end of November 1979, the Centre was being used by school groups for 37% of the time. Thirty-two (32) of the visits were from secondary school groups and 18 from primary school groups. A total of 32 different schools made use of the Centre and its environs. Six (6) of the schools took four student groups to the Centre and another took five groups. One secondary school visited Jarrahdale with six student groups. The multiple use of the Centre by these schools was on different occasions.

Tables 1 and 2 summarise the booking figures for 1979. The Centre is most commonly used by upper secondary and upper primary student groups. Group sizes range from 5 to 70 students; the larger groups obviously visiting for one day only. Throughout March, May and September the Jarrahdale Centre was used by a total of only six student groups.

| | Years 11 and 12 | | | | Years 9 and 10 | | Year 7 | | | | Years 5 & 6 | Years 3 & 4 |
|-------------------------|----------------------------|------|-------|------|----------------|----|--------|---|---|-----|-------------|-------------|
| Length of visit in days | 1 | 2 | 3 | 4-5 | 3 | 4 | 1 | 2 | 3 | 4-5 | 2 | 3 |
| No. of groups | 18 | 3 | 3 | 5 | 2 | 1 | 1 | - | - | 1 | 13 | 1 |
| Range of group size | 17-70 (150 possibly) | 5-26 | 20-25 | 9-26 | 18-24 | 24 | 60 | - | - | 30 | 16-26 | 24 |
| Average group size | 50 Mode: 60-70 | 18 | 22 | 20 | 21 | 24 | 60 | - | - | 30 | 25 | 24 |

Special Schools - Years 8-10: 25 students for 4 days
Year 7: 7 students for 2 days

Conferences (2) - 1 day duration
2 days duration

* Compiled from booking records kept by the Environmental Education Officer.

TABLE 1

GOVERNMENT AND NON-GOVERNMENT SCHOOL USE OF THE JARRAHDALE CENTRE
BY SCHOOL GROUPS DURING 1979.*

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|--|------|------|-------|-------|-----|------|------|------|-------|------|------|------|
| Total no. of days Centre used by school groups | - | - | 5 | 13 | 2 | 16 | 15 | 8 | 3 | 21 | 22 | - |
| No. of groups | - | - | 3 | 6 | 2 | 10 | 7 | 5 | 1 | 7 | 9 | - |
| % monthly useage | 0 | 0 | 16 | 43 | 6 | 53 | 49 | 26 | 3 | 68 | 73 | 0 |

Conferences - August. 1 day September. 2 days
 "Double" reservations - On 4 days two different schools used the Centre and/or local study areas.
 *Compiled from booking records kept by the Environmental Education Officer.

TABLE 2

MONTHLY USEAGE OF THE JARRAHDAL CENTRE BY SCHOOL GROUPS DURING 1979.*

Twenty-three (23) school groups cancelled their 1979 reservations, perhaps as has been suggested by the Environmental Education Officer an indication of the difficulties involved in removing students from quite rigid school timetables. During weekends many students are committed to part-time jobs and(or) competitive sports.

Use of the Centre from early December 1979 to early February 1980 has been reserved by Alcoa for that Company's research assistants. This arrangement also existed in the preceding year.

SURVEY OF TEACHERS UTILISING THE JARRAHDAL CENTRE DURING 1979

A questionnaire was administered to teachers who had taken student groups to the Jarrahdale Centre during 1979. These teachers were questioned about their useage of the Centre. They were also asked to offer suggestions for future improvements to the Centre and its provided materials.

The Teacher Survey (refer Appendix A) was sent to all teachers who were listed by the Environmental Education Officer as having used the Jarrahdale Centre during the months of January to November 1979. Twenty-eight (28) secondary and five primary school teachers were surveyed. The overall response rate was 73% with replies from 19 secondary school teachers and all five primary school teachers. A number of teachers surveyed had visited the Centre more than once during 1979.

Another aspect of the study was the administration of questionnaires to randomly selected student groups attending Jarrahdale during 1979. Interviews were also conducted with the teachers who had taken these students to Jarrahdale. Interview

information and data from the Teacher Survey have been summarised and are reported below.

Numbers of students and student year levels visiting the Jarrahdale Centre, and the duration of the visits, were also collated from the returned questionnaires. Nineteen (19) Years 11 and 12 student groups used the Centre for periods of one to four days. Five lower secondary student groups used the Centre for one to four days and four primary student groups stayed for two or three days.

Knowledge of the Centre's Existence

School teachers using the Jarrahdale Centre heard of its existence from a number of sources, as summarised in Table 3.

The majority of school teachers learnt of the Centre's existence from the information brochure and letters sent to schools, and by 'word of mouth'. One teacher commented on the **Education** article and two had read the article in **Filter**. One secondary teacher had been involved in the initial planning of the Centre. Two secondary teachers attributed their knowledge of the Centre's existence to the Education Department's policy statement on environmental education.

| | Teachers | | |
|--|----------|-----------|-------|
| | Primary | Secondary | Total |
| Information brochure and letter to school | 3 | 12 | 15 |
| Other teachers | 1 | 4 | 5 |
| Biology/geography senior master/ mistress | - | 3 | 3 |
| <u>Filter</u> | - | 2 | 2 |
| Policy statement on environmental education | - | 2 | 2 |
| Principal | - | - | - |
| Could not remember | - | 2 | 2 |
| Other | 1 | 4 | 5 |

TABLE 3

SOURCES OF INFORMATION ABOUT THE JARRAHDAL CENTRE FOR THOSE TEACHERS USING THE CENTRE DURING 1979.

In-service Course Attendance

Fifteen (15) teachers had attended the required in-service course and two others had made private arrangements with the Environmental Education Officer to use the Centre. Eight teachers (33%) had not attended the in-service course. However, it is noted that two of the latter commented they had previously used the Centre under the guidance of a teacher who had attended the in-service course.

Facilities

A majority of school teachers (87%) who had stayed at the Centre with students felt that in general the facilities were better than other available accommodation. However, the toilet and bathroom amenities and cooking facilities were frequently mentioned as being limited or just adequate for the maximum group sizes. Although an increase in sleeping accommodation was requested by the primary teachers, the size of the building presents physical limitations for this suggestion.

Criticisms that kitchen appliances and electric sockets were not working are partially expected as the Centre does not have a full-time caretaker or guide. Any repair work cannot be completed unless previous occupants have notified the Environmental Education Officer.

The teachers suggested some additional materials that could be provided if finance was available. Recreation facilities requested by a number of teachers included a flat games area and bean bags or some form of additional seating for informal group work. A further suggestion was that a projector screen remain permanently at the Centre.

Some teachers did comment on the lack of displays in the building. This could be remedied if student groups prepared charts and donated them to the Centre.

One teacher stated that other groups 'dropping in' at the Centre during the day interfered with the planned work programmes.

The Jarrahdale Centre for Environmental Education: Teachers' Information Guide (in press) would provide the lists of equipment and facilities requested by some users.

Reasons for Choice of the Centre

Teachers gave a number of reasons for using the Jarrahdale area rather than another locality. Eighty-seven per cent (87%) stated they came to the Centre because it was close to a number of different, natural and man-modified environments. The proximity of the jarrah (*Eucalyptus marginata*) forest, a freshwater stream, a region of jarrah dieback (*Phytophthora cinnamomi*) and Alcoa's

bauxite mining and reafforestation areas were most consistently mentioned. Students could complete land-use surveys and study man's impact on the environment. The suitability of the valley region for hiking was commented on by two teachers and also their Year 11 students.

Teachers had also elected to use this Centre because there was no charge and because of its proximity to the southern schools of Perth.

Objectives

As a group these school teachers expressed the hope that social, affective and cognitive outcomes might be obtained by the attendance of their students at the Centre. Social outcomes related to teacher/student and peer group relationships. Affective outcomes related to management and use of the jarrah forest and the aesthetic value of this forest. Cognitive outcomes were concerned with specific course objectives. Knowledge of forest species and development of practical skills were other listed objectives.

Ways in which the Centre is Used

Teachers were asked how they had actually utilised the Jarrahdale Centre. For a variety of subject areas the teachers rated usage of the Jarrahdale Centre on a scale from 0 (not used at all) to 4 (used a great deal). Table 4 summarises these ratings.

| Subject Area | Teachers | | | |
|-----------------------|----------------|-------------|-----------------|-------------|
| | Primary | | Secondary | |
| | Mean Use (n=5) | Ratings > 0 | Mean Use (n=18) | Ratings > 0 |
| Biology | 3.8 | 5 | 2.9 | 15 |
| Environmental Studies | 3.8 | 5 | 2.6 | 13 |
| Science | 3.4 | 5 | 1.1 | 7 |
| Geography | 1.2 | 4 | 1.7 | 10 |
| Social Studies | 2.2 | 5 | 0.7 | 4 |
| Geology | 1.0 | 4 | 0.8 | 7 |
| Other | 2.0 | 3 | 0.6 | 3 |
| TOTAL | | 31 | | 59 |

*Scale: Not at all 0 1 2 3 4 A great deal

TABLE 4

TEACHER RATINGS OF THEIR UTILISATION OF THE JARRAHDALE CENTRE.*

Primary school teachers are using the Jarrahdale Centre and its environs for biology, science, environmental studies and social studies activities. While at the Centre primary school teachers also completed with their students exercises in creative drama, writing, English expression and art.

The majority of secondary school teachers (83%) use the Centre for some biologically based activity(s). The Centre was being used for environmental studies by 72% of the secondary teachers. There was quite wide use of the Centre for science and geography studies. One secondary teacher used the Centre specifically for the personal development of her students.

Multidisciplinary use of the Centre by both primary and secondary teachers is apparent. In particular the primary school teachers appeared to be incorporating use of the Centre into their overall school programmes.

Use of Worksheets

With one exception all teachers made use of one or more of the provided worksheets. Particular worksheets are used more widely as shown by Table 5. The 'Bushwalk' material was the most popular provided worksheet. A number of visiting student groups are also being shown the jarrah dieback areas.

| Worksheet | Teachers | | |
|---|----------|-----------|-------|
| | Primary | Secondary | Total |
| Bushwalk: | | | |
| Primary | 5 | - | 5 |
| Middle Secondary | 2 | 1 | 3 |
| Upper Secondary | - | 14 | 14 |
| Jarrahdieback | 4 | 9 | 13 |
| Granite outcrop | - | 9 | 9 |
| Jarrahdieback transect | - | 8 | 8 |
| Rehabilitated minesite - Langford Park | 3 | 3 | 6 |
| Urban activities | - | 6 | 6 |
| Bauxite mining | 1 | 2 | 3 |
| Stream study: | | | |
| Middle Secondary | - | - | - |
| Upper Secondary | - | - | - |
| Gooralong Picnic Area | 2 | - | - |

TABLE 5

NUMBERS OF THE TEACHER SURVEY RESPONDENTS WHO HAD USED THE SPECIFIC WORKSHEETS PROVIDED AT THE JARRAHDAL CENTRE.

Approximately half of the primary and secondary school teachers each stated they had modified the existing worksheets and (or) had prepared new ones for use by their students at the Centre.

Vacation Useage

The majority of secondary school teachers (16) stated they would not use the Centre during school vacations. School camps are extremely demanding in terms of time and energy and it is apparent that a number of these teachers already have heavy time commitments outside school hours, to student camps and excursions. Three primary school teachers commented they may use the Centre during vacation time.

Other General Comments

In general, all the teachers surveyed indicated that the time spent at the Jarrahdale Centre and in its environs was of value in a teaching programme. As well as having an enjoyable camp, students have been provided with worthwhile experiences different from the normal school environment. Classroom and field work have been combined together in the many different environments close to the Centre. The Centre lends itself to a relaxed atmosphere for social interactions.

Teachers indicated that the Centre offered students the opportunity to appreciate the beauty of the bush setting - during the spring months in particular.

One aspect of some concern is the effect of frequent and sometimes large student groups on the forest ecosystem. The data summarised in Table 1 show groups of up to 70 students are visiting the Centre and its environs. One teacher noticed what she called the rapidly changing environment. She commented that too much pressure has been put on the granite rock region and the bushwalk trail area. For this reason another school now also uses an alternative rock area for succession studies.

SURVEY OF TEACHERS ATTENDING THE 1979 IN-SERVICE COURSES

A questionnaire was administered to teachers to determine what they had gained by attendance at the in-service course. The participants were asked to offer suggestions for improvements and changes that could be made for future in-service courses. They were also questioned about their intended useage of the Jarrahdale Centre with student groups.

Participants of the August in-service course included 10 secondary school teachers and 12 primary school and special-school teachers. Immediately after the conclusion of the course each participant completed a questionnaire. Some questions were deleted and others added to this initial questionnaire to form

the subsequent In-service Course Survey (refer Appendix B; the additional questions included were Numbers 3 and 7 in the In-service Course section and Numbers 2 and 7 in the General section).

The In-service Course Survey was sent to all teachers who had attended the March or May in-service courses. Twenty-six (26) secondary and 11 primary school teachers were surveyed. The overall response rate was 87% with replies from 23 secondary teachers and 9 primary teachers.

Data from the initial questionnaire and the In-service Course Survey have been summarised and are reported below. Unless stated otherwise the data and information presented have been summarised from the total of 33 secondary school teachers and 21 primary school and special-school teachers.

In-service Course Information

(a) Knowledge of the In-service Course

Teachers attending the March or May in-service course learnt of the course from a number of sources, as summarised in Table 6.

| | Primary | Secondary | Total |
|---|---------|-----------|-------|
| Information brochure and letter to school | 4 | 10 | 14 |
| Other teachers | 1 | 6 | 7 |
| Biology/Geography senior master/mistress | - | 8 | 8 |
| Principal | 4 | - | 4 |
| Deputy Principal | 2 | 1 | 3 |
| <u>Filter</u> | 2 | 1 | 3 |
| Policy statement on environmental education | 1 | 1 | 2 |
| Other | - | - | - |

*Data from the In-service Course Survey only.

TABLE 6

SOURCES OF INFORMATION ABOUT THE JARRAHDALÉ CENTRE FOR THOSE TEACHERS ATTENDING THE COURSE DURING 1979.*

The majority of teachers learnt of the in-service course from the information brochure and letters sent to schools and (or) from other teachers and administrative personnel in the schools. Three teachers had read the **Filter** article. One primary and one secondary school teacher related the in-service course to the Education Department's policy statement on environmental education.

(b) **'Beneficial' and 'Irrelevant' Aspects of the In-service Course**

Except for one primary school teacher all the teachers found some section(s) of the in-service course beneficial. Twenty-two per cent (22%) of the secondary teachers and 43% of the primary school and special-school teachers found some section(s) irrelevant. The teachers believed that it was beneficial to have visited all the different localities. By participating in the worksheet activities the teachers identified problems likely to arise with their own student groups.

The tour of the bauxite mine and reafforestation areas and the accompanying talk by an Alcoa public relations officer, received specific positive and negative comments. Three teachers commented on the value of this qualified guide, but two teachers believed that the guided tour was a political activity benefitting only Alcoa. One suggestion made was that it might have been possible to have an alternative viewpoint presented from another organisation such as the Campaign To Save Native Forests.¹ In the opinion of this evaluator the informative presentation given by Alcoa's personnel officer contributed positively to the in-service course.

Section(s) of the in-service course that participants were previously familiar with, were judged by them as being irrelevant. A minority of teachers commented that an excess of biological information was presented. Many of the primary school teachers considered some biological aspects too advanced and not directly applicable.

The teachers were divided equally when asked whether more factual information, such as species identifications, should be taught during the in-service course. Fifty-three per cent (53%) of the primary school teachers and 48% of the secondary school teachers replied in the affirmative.

¹ The Environmental Education Officer had invited participation by members of such organisations.

Opinions were also divided about the lunch-time arrangements. A number of teachers commented favourably on the staff socialisation that occurred during the informal counter lunch. Others believed that a quicker picnic lunch followed by further in-service course activities was more appropriate.

(c) Assistance of the In-service Course in the Planning of Field-Studies

Ninety-one per cent (91%) of these teachers stated that the in-service course had been of assistance in planning field-oriented studies for their students. Teachers were introduced to new ideas and they could obtain the opinions of other school teachers on these varied activities. One teacher commented that the in-service course for him, led to a revival of interest in field based activities.

Thirty-six per cent (36%) of the secondary school teachers surveyed and 25% of the primary school teachers have modified for their own use the Jarrahdale worksheets provided at the in-service course (data from In-service Course Survey only).

(d) Adequacy of the In-service Course and Suggested Improvements

Sixty-one per cent (61%) of the teachers indicated that in the present one-day format the in-service course was adequate. Twenty-four per cent (24%) replied that the course was inadequate and the remaining 15% did not reply to the direct question of the course's adequacy. Suggestions were outlined for changes to future in-service courses.

One suggestion made by four teachers, was that the participants should be more actively involved in the in-service course. For part of the day they could work in an area of their choice to develop their own teaching materials. For example, trail worksheets, bush activities, a guide to the flora on the exposed granite rock and primary level worksheets could be devised or rewritten. These up-to-date materials would be in accord with the changes in the forest that have occurred during the last few years. Also, by developing activities in a number of localities, pressure on the particular 'popular' areas would be lessened. To test the effectiveness of such activities it should then be possible for other teachers to work through materials developed by earlier groups.

It was suggested by five primary school teachers that the primary and secondary teachers should be separated into two homogeneous groups. Section(s) of the in-service course could be appropriately modified for these two groups. The Environmental Education Officer had separated primary and

secondary teachers for some sections of the August in-service course. Three primary school teachers specifically commented on the positive contribution of their primary teacher leader. Although some teachers wished to be divided into specific subject areas, it was pointed out by others that there is substantial value in becoming familiar with the subject matter of various disciplines.

(e) Duration of the In-service Course

Seventy per cent (70%) of the teachers surveyed stated that the current one day duration of the in-service course should not be extended. Others suggested that with particular changes in format the course could run for at least two days. A longer time period would allow teachers to concentrate on the preparation of their own materials for use at Jarrahdale. If necessary teachers could remain for longer periods at each locality. It may also be possible to have specialised personnel available for consultation and (or) talks. Forests Department officers could answer specific botanical queries. Perhaps a local ornithologist could also assist with bird identifications.

(f) Compulsory Attendance of the In-service Course

Ninety-four per cent (94%) of the teachers stated that attendance of an in-service course should be compulsory for intending users of the Jarrahdale Centre.

(g) General Comment

The participants of these three 1979 in-service courses took this opportunity to thank the Environmental Education Officer. The teachers had obviously appreciated his work and he was specifically thanked by many teachers for an enjoyable and well organised day.

General Information

Seventy-eight per cent (78%) of the secondary school teachers and 57% of the primary school teachers said they intended bringing students to the Jarrahdale Centre within the next six months. As shown by Table 7, the Centre and its environs would be used for biology, environmental studies, geography, science and social studies activities. However, these teachers considered attainment of social and affective objectives by students visiting the Jarrahdale Centre more important than cognitive outcomes.

The teachers gave a number of reasons why they would come to the Jarrahdale area in preference to another locality. Some teachers chose this Centre because of its proximity to Perth and also

because there is no charge for its use. Special-school teachers commented that the design of the Jarrahdale Centre was appropriate for students in wheelchairs.

| Subject Area | Teachers | | |
|-----------------------|-------------------------------|-----------|-------|
| | Primary and Special School | Secondary | Total |
| Biology | 7 | 17 | 24 |
| Environmental Studies | 12 | 11 | 23 |
| Geography | 3 | 10 | 13 |
| Science | 8 | 5 | 13 |
| Social Studies | 8 | 4 | 12 |
| Geology | - | - | - |
| Other | 4 | 3 | 7 |

TABLE 7

INTENDED UTILISATION OF THE JARRAHDALÉ CENTRE AND ITS ENVIRONS BY
THE IN-SERVICE COURSE PARTICIPANTS.

Seventy-five per cent (75%) of the teachers stated that there were environmental reasons for utilising Jarrahdale and not another area. Localities teachers mentioned they would use for field-based activities included the jarrah (*Eucalyptus marginata*) forest, the jarrah dieback (*Phytophthora cinnamomi*) region, succession on the granite rock and Alcoa's bauxite mining and reafforestation programmes.

Of those school teachers with sufficient experience to comment, 68% stated that in general the facilities at the Jarrahdale Centre compared favourably with other available areas. In particular, teachers appreciated the worksheets and the equipment provided at the Centre.

Many of these teachers did ask that herbarium sheets, field identification folders, slides and (or) photographs of the local flora be provided. These would be of assistance to teachers lacking the botanical expertise required, for many plant identifications. The Forests Department will be relabelling representative plant specimens along the 'Bushwalk' trail.

Although additional maps of the area were requested by some teachers these can be easily and readily obtained from the Western Australian Mines and Lands and Surveys Departments.

Information about the local history of Jarrahdale was also requested. The second edition of **The Mills of Jarrahdale** written by the late V.G. Fall and published seven years ago to mark the town's centenary is at present being reprinted. This book outlines the history of the Jarrahdale area and may be of interest and relevance.²

SURVEY OF STUDENTS STAYING AT THE JARRAHDAL CENTRE DURING 1979

The Centre is most commonly used by upper primary and lower secondary students (see Table 1). Student Survey instruments were devised for these year levels (refer Appendices C and D). Student Survey questionnaires were administered to Years 5, 6 and 7 and Years 11 and 12 students who attended the Jarrahdale Centre for Environmental Education during September, October or November, 1979, for two or more days.

Instrument Choice

(a) Questionnaires

Background information was obtained from the students prior to their visit to the Centre (refer Appendices C and D, General Section, pre-visit). From this it was possible to determine whether the students' visit to the bush environment of such a locality was a new, frequent or infrequent experience.

Prior to and after staying at the Centre the same students were asked to rate the purpose of their Jarrahdale visit (refer Appendices C and D, General Section). Students were asked to indicate for each item whether they 'strongly agree', 'agree', 'uncertain', 'disagree' or 'strongly disagree'. These responses were rated 1 for 'strongly agree' to 5 for 'strongly disagree' for each statement. Dependent t-tests determined whether students' perceptions of the visit had changed ($\alpha = 0.05$).

It was apparent following conversations with teachers attending the in-service courses, that they were hoping their students would be drawn closer together as a consequence of the shared experience of the field-studies camp. Questions were designed for the student survey to determine whether some degree of socialisation had occurred (refer Appendices C and D, General Section, follow-up). Students were asked to specify the activities at the Jarrahdale Centre that they had found the most, and the

² **The Mills of Jarrahdale** by V.G. Fall, is available from the Principal of the Jarrahdale Primary School. Cost is \$3.50 plus 50c. postage.

least, enjoyable. They were also asked what they had learnt the most about during their stay at the Centre.

(b) **Affective Scale**

The Environmental Education Committee is keen to ensure that the Jarrahdale Centre is being used as part of a school's environmental education programme. The policy statement on environmental education by the Education Department of Western Australia cites a number of objectives relating to the attainment of affective outcomes by students. The relevant objectives are that students develop the following:

- (i) an awareness and sensitivity to the total environment and its allied problems;
- (ii) an understanding of the total environment, and its associated problems, and of humanity's critical, responsible presence and role within that environment;
- (iii) attitudes of concern for the environment and the motivation for actively participating in its protection and improvements; and
- (iv) a sense of responsibility and urgency regarding environmental problems.

(Modified from the Western Australian Education Department policy statement on environmental education, 1977).

The majority of instruments designed to assess attitudes toward general or specific environmental issues consist of Likert-type items (Arbuthnot, 1977; Bowman, 1974; Doran, 1977; Fleetwood and Hounshell, 1976; Horvat and Voelker, 1976; Jaus, 1978; Pettus et al, 1978; Stronch, 1972; Tognacci et al, 1972; Watkins, 1974; Watkins, 1975; Weigel and Weigel, 1978). The available literature indicates the successful use of Likert scales to assess environmental attitudes and values and Likert scales have been found to correlate highly with Thurstone scales developed for the same purpose (Oppenheim, 1966).

The affective objectives of the Jarrahdale Centre for Environmental Education were assessed using Likert scales devised by the author (refer Appendices C and D, Scale Section). Students were asked to indicate for each item whether they 'strongly agree', 'agree', 'uncertain', 'disagree' or 'strongly disagree' with the statement. These responses were rated from 1 for 'strongly agree' on a positive item to 5 for "strongly disagree" on a positive item. The author decided which statements were environmentally positive and which were environmentally negative. This Likert-type scale was designed to detect overall changes in environmental attitudes and subscales were not considered.

The scales had been trialled on students not having previously visited the Jarrahdale Centre for Environmental Education. The 20-item Likert scale devised for upper secondary levels was trialled on 43 Years 11 and 12 students from a metropolitan government secondary school. The internal consistency of the scale was calculated using Cronbach's alpha. The satisfactory reliability measure of $\alpha = 0.80$ was obtained. The 17-item Likert scale devised for upper primary levels was trialled on 16 Year 6 and 19 Year 7 students from a metropolitan government primary school (Year 6 students' Cronbach's $\alpha = 0.53$, Year 7 students' Cronbach's $\alpha = 0.63$).

To enable comparisons of any changes in environmental attitudes, when possible the Likert scales were administered on a before and after basis to control students who were not visiting the Jarrahdale Centre for Environmental Education. The groups of control students were selected from other classes at the same school and preferably having the same teachers as the student groups attending the Centre (refer to Figure 2 for the data gathering schedule used).

The dependent t-test analysed difference scores from the control and experimental groups ($\alpha = 0.05$). Male and female data were analysed separately, since other authors (e.g. Collins, 1976) have found gender differences when determining attitudes towards environmental issues.

Survey Schools

The selection of student groups was limited, as few schools reserved the Centre for use during September, October or early November, 1979 (see Table 1). During this time period, upper secondary and upper primary student groups from the following schools were surveyed.

(a) School A

School A is a metropolitan, government, primary school which is classified by the Western Australian Education Department as a disadvantaged school. Pre-visit and follow-up student surveys were administered to a Year 6 student group and a Year 5 student group from this school. The students completed the questionnaires in their classrooms prior to, and following, the Jarrahdale visit. The composition of the 24 students in Group A₁ (Year 6) was 6 females and 18 males. Group A₂ (Year 5) was composed of 9 females and 15 males. Each group stayed at the Centre for 2.5 days. These students had not attended any other school-organised camp during or prior to 1979.

(b) **School B**

School B is a metropolitan non-government, Catholic, systemic school. The pre-visit and follow-up school surveys were administered during class time to 18 Year 7 students from this school (11 females and 7 males). A Year 6 control student group (20 students) taught by the same grade teacher as the surveyed group was also given the pre-visit and follow-up attitude scales. During the first school term in 1979, the above students had all participated in a school camp other than at Jarrahdale. The grade teacher followed up the two day Jarrahdale camp with a discussion and debate led by a personnel officer from Alcoa. It was planned that a representative from the Friends Of The Earth would also speak to the students.

(c) **School C**

School C is a metropolitan, government, senior secondary school. A regular field-studies programme has been organised for Years 11 and 12 biology students by the biology teachers of this school. The programme is under the direct supervision of the biology senior master. The pre-visit Student Survey was administered during class time to a group of 12 Year 11 students (7 females and 5 males - Group C₁). At the conclusion of their five day visit the follow-up Student Survey was completed by these students in the Jarrahdale Centre. The data from this follow-up Student Survey were compared with the data from a follow-up Student Survey given to a group of 14 Year 11 students who returned from a five day Jarrahdale visit fourteen days previously (Group C₂, refer Figure 2). In this case it was not possible to have an absolute control group as all other Years 11 and 12 biological science students had already visited the Jarrahdale Centre.

(d) **School D**

School D is a metropolitan, Catholic, non-systemic school attended by females only. Eight (8) Year 11 biology students were given the pre-visit and follow-up Student Surveys to complete in class time. This group stayed three days at the Jarrahdale Centre accompanied by the biology teacher from the school. The girls did not attend other field camps during 1979. The control group consisted of 12 Year 11 students who were studying human biology in preference to general biology. They were not taught during 1979 by the biology teacher. The pre-visit and follow-up attitude scales were administered to the control group.

Because of the heterogeneous nature of the four selected schools and of the groups surveyed from within the schools, attitude and student perception scores were analysed separately.

Student Survey Data and Discussion

(a) General Information

For students from one of the schools surveyed, the visit to the forest region of the Jarrahdale district was a relatively new experience. Ten (10) students from the School A student group said they had never before been to the bush. Fifteen (15) students had not visited the bush during the eight months prior to the Jarrahdale visit. With the exception of five students the remainder of students from the School A group said they would like to go to the bush more often.

Over 75% of the students from School A said they made new friends during their stay at the Jarrahdale Centre. More than 80% came to know other students and the teachers better. The School A group of students especially enjoyed the bush-hikes, swimming and organised sports. Jogging and silent reading were activities not widely enjoyed. Concern, respect for and care of the flora and fauna of the bush was consistently mentioned by the students as having been 'learnt' at Jarrahdale. Four students from the School A group did not wish to go to Jarrahdale again.

All the students surveyed from other schools (Schools B, C and D) stated they had previously visited a native forest region and only four had not done so during the previous eight months. They would all like to go to the bush more frequently.

The majority of the students from B, C and D school groups came to know other students and teachers better during their stay at Jarrahdale. Sixty-three per cent (63%) said they also made new friends. Hiking and bush-walks through the forest were the activities these students enjoyed the most. Waking up early in the morning and leaving Jarrahdale to go home were activities least enjoyed. Fourteen (14) students replied they enjoyed everything about the camp. All the students from Schools B, C and D would like to go to Jarrahdale again.

Students from School B said they learnt about 'the wildflowers of the forest and the importance of caring for the bush and not picking the flowers'. Students from the two secondary schools stated they had learnt the most about native plants and their ecological relationships, and about jarrah dieback. A number of the secondary school students said they benefitted from sharing experiences and learning to live together with others.

(b) **Student Perceptions**

Results for students from Group A₁ and Group A₂ (School A) were not the same when perception ratings of the Jarrahdale visit were compared (unpublished data). Thus the perception scores were not combined in the following analyses.

Student perception scores from the school groups were analysed separately and Tables 8 and 9 provide a summary of scores and data analysis.

| Purpose of the visit to the Jarrahdale Centre: | School A | | | | | | | | | School B | | | | | |
|--|----------------------|------|-----------|------|-------------------------|----------------------|------|-----------|------|------------|-----------|------|-----------|------|------------|
| | Group A ₁ | | | | | Group A ₂ | | | | | | | | | |
| | Pre-visit | | Follow-up | | Comparison ^a | Pre-visit | | Follow-up | | Comparison | Pre-visit | | Follow-up | | Comparison |
| | \bar{x} | Rank | \bar{x} | Rank | | \bar{x} | Rank | \bar{x} | Rank | | \bar{x} | Rank | \bar{x} | Rank | |
| | | | | | | | | | | | | | | | |
| study science out in the bush | 2.8 | 3 | 2.8 | 3 | NS | 2.25 | 3 | 2.0 | 3.5 | NS | 1.6 | 2 | 1.6 | 2.5 | NS |
| give you a break from normal class lessons | 2.85 | 4 | 3.0 | 6 | NS | 3.0 | 6 | 3.8 | 7 | * | 4.1 | 7 | 3.9 | 7 | NS |
| study a stream, bushland and a small country town | 2.2 | 1 | 2.2 | 1 | NS | 1.9 | 2 | 1.95 | 2 | NS | 1.5 | 1 | 1.6 | 2.5 | NS |
| let you get to know your class members and teachers better | 1.5 | 6 | 2.95 | 5 | NS | 2.3 | 4 | 2.0 | 3.5 | NS | 3.8 | 6 | 3.0 | 6 | * |
| introduce a new science topic | 3.1 | 5 | 3.2 | 7 | NS | 3.4 | 7 | 2.7 | 6 | * | 2.5 | 5 | 2.3 | 5 | NS |
| show how man can affect the bush | 3.7 | 7 | 2.9 | 4 | * | 2.8 | 5 | 2.6 | 5 | NS | 2.4 | 4 | 1.4 | 1 | * |
| let you enjoy the beauty of the bush | 2.7 | 2 | 2.6 | 2 | NS | 1.4 | 1 | 1.5 | 1 | NS | 1.8 | 3 | 2.1 | 4 | NS |

^a NS - not significant pre-visit, follow-up comparison
 * - pre-visit, follow-up comparison significant at $\alpha = 0.05$

TABLE 8

SCHOOL A AND SCHOOL B SUMMARISED STUDENT PERCEPTION RATINGS. PRE-VISIT AND FOLLOW-UP MEANS, RANKS, AND DEPENDENT t-TEST COMPARISONS.

Prior to and following the Jarrahdale visit all the primary school students (students from Schools A and B) listed enjoying the beauty of the bush, studying science in the bush and studying the local environs of the Jarrahdale district as the most important reasons for attending the Centre.

Seeing how man can affect the environment was perceived as being more important by Group A₁ students (School A) after the Jarrahdale visit. Following the camp, Group A₂ students placed less importance on the use of Jarrahdale as a break from class lessons. Perceptions to the Jarrahdale visit by School B students changed. Coming to know other class members better and seeing how man affects the bush became more important aspects of the visit. After their Jarrahdale visit, it was generally perceived by all the primary school students that a break from normal class lessons was not the main purpose of the field-studies camp.

The studying of field aspects of biology in different environments and the appreciation of the beauty of the bushlands were 'before' and 'after' perceptions of the Jarrahdale visit by the secondary students (student groups from Schools C and D).

| Purpose of the visit to the Jarrahdale Centre. | School C | | | School D | | |
|---|----------------|----------------|-------------------------|----------------|----------------|------------|
| | Pre-visit | Follow-up | Comparison ^a | Pre-visit | Follow-up | Comparison |
| | \bar{x} Rank | \bar{x} Rank | | \bar{x} Rank | \bar{x} Rank | |
| study biology in a field situation | 1.6 2 | 1.8 4 | NS | 1.4 1 | 1.1 1 | NS |
| give you a break from normal class lessons | 3.4 7 | 2.9 7 | NS | 2.5 4 | 2.1 6 | NS |
| study a number of different environments (ie. stream, Jarrah forest; small country town). | 1.7 3 | 2.1 5 | NS | 2.0 3 | 1.9 4.5 | NS |
| enable you to get to know your class members and teachers better | 2.0 5 | 1.6 2.5 | NS | 2.9 6 | 1.5 2.5 | * |
| introduce a new biology/geography topic | 3.1 6 | 2.7 6 | NS | 1.6 7 | 3.0 7 | * |
| show how man can affect the environment | 1.4 1 | 1.6 2.5 | NS | 2.8 5 | 1.9 4.5 | * |
| let you appreciate the beauty of the bushlands | 1.8 4 | 1.5 1 | NS | 1.8 2 | 1.5 2.5 | NS |

^aNS - not significant pre-visit, follow-up comparison
 * - pre-visit, follow-up comparison significant at $\alpha = 0.05$

TABLE 9

SCHOOL C AND SCHOOL D SUMMARISED STUDENT PERCEPTION RATINGS. PRE-VISIT AND FOLLOW-UP MEANS, RANKS, AND t-TEST COMPARISONS.

Prior to and following the Jarrahdale visit, School C students also perceived as important, being able to see man's effect on the environment and coming to know class members and teachers better. There were changes in perception to these same two aspects by the School D student group. This group also considered class socialisation and seeing the effect of man on the forest's ecology to be more important following the Jarrahdale visit. Using Jarrahdale as a break from class lessons and (or) to introduce a new biology topic were viewed as least important aspects of the field-studies camp by these secondary school students.

(c) **Likert Scales**

Comparisons of before and after attitude scores of the two control groups showed no changes (unpublished data). The control groups had not visited the Jarrahdale Centre for Environmental Education. Any attitude changes in the other groups, surveyed before and after their Jarrahdale visit, could therefore reasonably be attributed to experiences in a field-studies environment.

Results for students from Groups A₁ and A₂ (School A) were initially the same when total attitude scores and male and female scores were compared (unpublished data). The attitude data from the two groups were combined for further analyses.

| School | Pre-visit | Follow-up |
|--------|------------------|-----------------|
| A | $\alpha = 0.63$ | $\alpha = 0.67$ |
| B | $\alpha = 0.42$ | $\alpha = 0.37$ |
| C | $\alpha = 0.48$ | $\alpha = 0.45$ |
| D | $\alpha = -0.10$ | $\alpha = 0.31$ |

TABLE 10

CRONBACH'S ALPHA ATTITUDE SCALE RELIABILITY COEFFICIENTS FOR SCHOOL GROUPS VISITING THE JARRAHDALE CENTRE.

Attitude scale data from the four school groups visiting Jarrahdale were analysed separately. Cronbach's alpha reliability coefficients were calculated for each school group and these are listed in Table 10. The low values

for student groups from Schools B, C and D can be partly attributed to the small numbers of students surveyed from these schools (18, 12 and 8 respectively).

Table 11 summarises the mean pre-visit and post-visit attitude scores and the related dependent t-tests for each school group. The Year 11 students from School C were the only group to record any attitude change. After their visit to the Jarrahdale Centre these students had more positive attitudes towards the environment and its associated problems. The scores of this student group were compared with other Year 11 students from School C who had visited Jarrahdale and completed the follow-up Student Survey in

| School | n | Pre-visit | | Follow-up | | Dependent t-test $\alpha = 0.05$ |
|--------|----|-----------|--------|-----------|--------|--|
| | | \bar{x} | s | \bar{x} | s | |
| A | 48 | 39.5208 | 8.5340 | 39.4167 | 8.1498 | $\bar{d} = 0.1042$ $S_d = 7.8476$ $t = 0.0920$ $t_{0.05[47]} = \pm 2.012$ $p > 0.05$ |
| B | 18 | 38.1111 | 5.3566 | 37.6111 | 5.9224 | $\bar{d} = 5.0000$ $S_d = 4.7558$ $t = 0.4460$ $t_{0.05[17]} = \pm 2.110$ $p > 0.05$ |
| C | 12 | 46.5833 | 6.3741 | 43.0000 | 5.9544 | $\bar{d} = 3.5833$ $S_d = 4.7186$ $t = 2.6304$ $t_{0.05[11]} = \pm 2.201$ $p < 0.05$ |
| D | 8 | 45.5000 | 4.3095 | 45.0000 | 5.4248 | $\bar{d} = 0.5000$ $S_d = 6.1179$ $t = 0.2313$ $t_{0.05[7]} = \pm 2.365$ $p > 0.05$ |

TABLE 11

SUMMARISED TOTAL ATTITUDE SCORE DATA FROM THE SCHOOL GROUPS VISITING THE JARRAHDALe CENTRE.

class time. The attitude scores of the two groups of students from School C did not differ in the follow-up survey (unpublished data). This indicates that the recorded attitude change is not entirely attributed to the fact that when completing the follow-up Student Survey the students were in a situation in which they would be especially conscious of the environment. Individual item analyses were completed on change data from the School C group and no changes in attitudes for individual items were detected (unpublished data).

Separate analyses of pre-visit male and female attitude scores for groups visiting Jarrahdale revealed no gender differences (refer to Tables 12 and 13). Figures 3 and 4 illustrate average male and female attitude scores from the pre-visit and follow-up Likert scales. No gender differences were found in any of the surveyed groups when pre-visit and follow-up scores were compared (see Tables 12 and 13).

| School | PRE-VISIT | | | | | FOLLOW-UP | | |
|--------|-----------|----|-----------|--------|---|-----------|--------|--|
| | Sex | n | \bar{x} | s | Comparison male/female Independent t-test $\alpha = 0.05$ | \bar{x} | s | Comparison pre-visit/follow-up Dependent t-test $\alpha = 0.05$ |
| A | Female | 15 | 38.0000 | 5.8445 | $t = 0.8499$ $t 0.05(46) = \pm 2.013$ $p > 0.05$ | 40.2667 | 6.7872 | $\bar{d} = - 2.2667$ $S_d = 6.7872$ $t = 1.2934$ $t 0.05(14) = \pm 2.145$ $p > 0.05$ |
| | Male | 33 | 40.2121 | 8.9399 | | 39.0303 | 7.7958 | $\bar{d} = 1.1818$ $S_d = 8.1527$ $t = 0.8327$ $t 0.05(32) = \pm 2.037$ $p > 0.05$ |
| B | Female | 11 | 37.3636 | 5.9078 | $t = - 0.7320$ $t 0.05(16) = \pm 2.120$ $p > 0.05$ | 37.1818 | 6.7353 | $\bar{d} = 0.1818$ $S_d = 3.9955$ $t = 0.1509$ $t 0.05(10) = \pm 2.228$ $p > 0.05$ |
| | Male | 7 | 39.2857 | 4.5356 | | 38.2857 | 4.7859 | $\bar{d} = 1.0$ $S_d = 6.0828$ $t = 0.4550$ $t 0.05(6) = \pm 2.447$ $p > 0.05$ |

TABLE 12

SUMMARY OF MALE AND FEMALE ATTITUDE SCORE DATA FROM SCHOOL A AND SCHOOL B STUDENT GROUPS VISITING THE JARRAHDALÉ CENTRE

| School | Sex | n | PRE-VISIT | | | FOLLOW-UP | | Comparison pre-visit/follow-up |
|--------|--------|---|-----------|--------|--|-----------|--------|---|
| | | | \bar{x} | s | Comparison male/female Mann-Whitney U test $\alpha = 0.05$ | \bar{x} | s | |
| C | Female | 7 | 43.8571 | 6.1489 | U = 27.5 U 0.05(5,7) = 30 p > 0.05 | 41.5714 | 5.7111 | $\bar{d} = 2.2857$ $s_d = 4.6803$ t = 1.2921 t 0.05(6) = 2.447 p > 0.05 |
| | Male | 5 | 50.4000 | 4.8785 | | 45.0000 | 6.3246 | $\bar{d} = 5.4$ Sample size too small for analysis |

TABLE 13

SUMMARY OF MALE AND FEMALE ATTITUDE SCORE DATA FROM THE SCHOOL C STUDENT GROUP VISITING THE JARRAHDALE CENTRE.

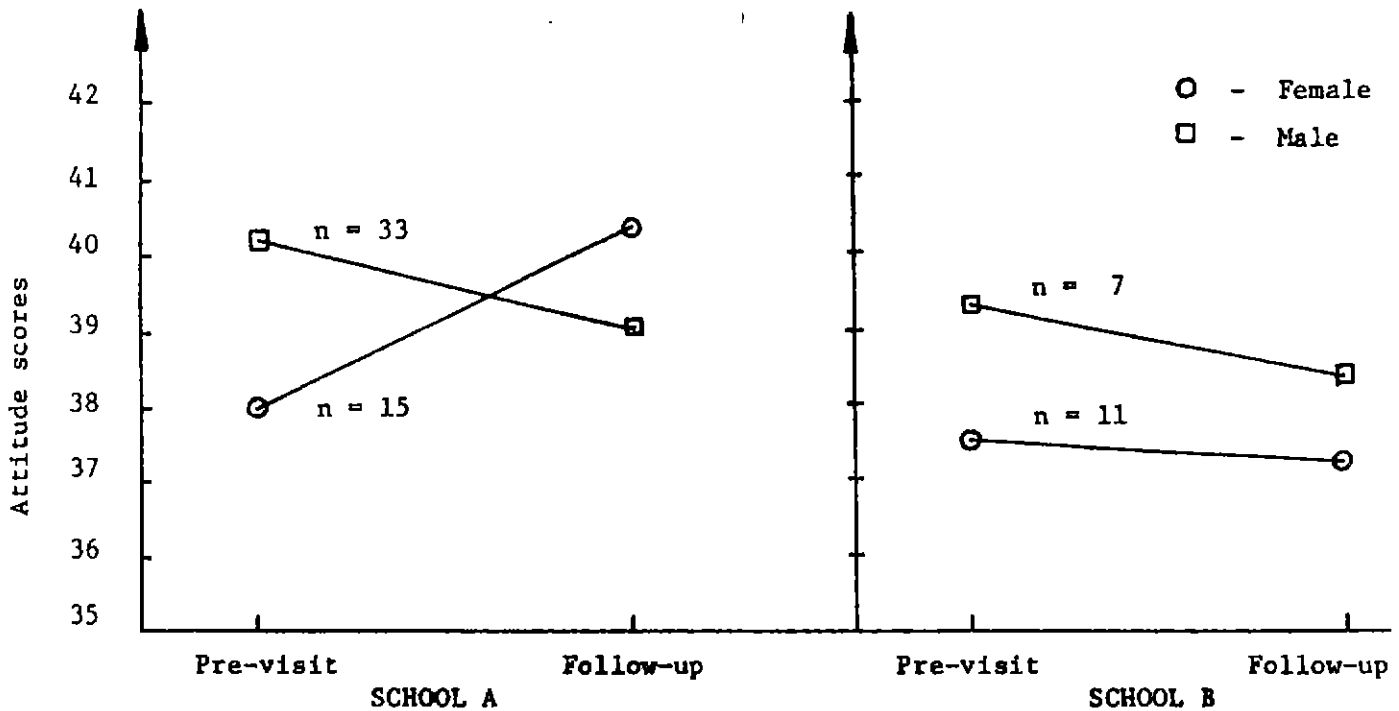


FIGURE 3

COMPARISON OF MEAN MALE AND FEMALE ATTITUDE SCORE DATA FROM PRE-VISIT AND FOLLOW-UP LIKERT SCALES, FOR SCHOOL A AND SCHOOL B.

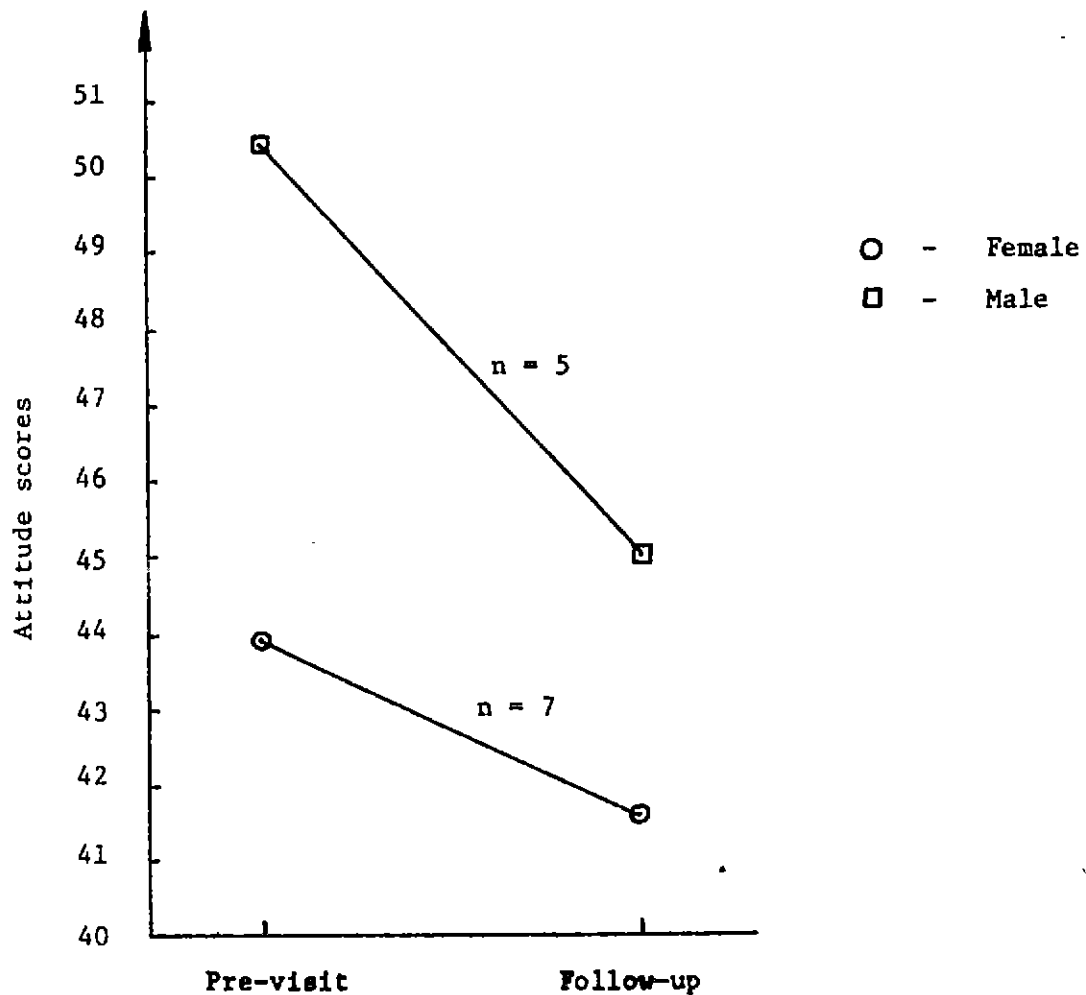


FIGURE 4

COMPARISON OF MEAN MALE AND FEMALE ATTITUDE SCORE DATA FROM PRE-VISIT AND FOLLOW-UP LIKERT SCALES, FOR SCHOOL C.

REVIEW OF WORKSHEETS PROVIDED AT THE JARRAHDALÉ CENTRE

Table 5 lists the field worksheets provided at the Jarrahdale Centre for Environmental Education. The 'Bushwalk' worksheet was widely used by the Teacher Survey respondents. The 'Jarrah Dieback', 'Granite Outcrop' and 'Jarrah Forest Association

Transect' were other worksheets commonly used by these teachers.

Experienced practising primary and secondary school teachers critically reviewed the field worksheets. All these teachers had taken students to field-studies environments other than Jarrahdale (personal communication). The Materials Checklist (refer Appendix E) devised by the author was provided to assist the teachers with the review. The Materials Checklist was mailed to the teachers after they had verbally consented to complete the review by a specified date. Forty-six (46) Checklists were mailed to a total of 19 teachers and 26 Checklists were returned (78%).

Teachers rated the field worksheets on specific aspects and added additional comments if appropriate. Ratings and comments are summarised in Tables 14 and 15. These reviewed worksheets were considered suitable for particular student groups in the specific Jarrahdale locations. Some modifications would be required if the field worksheets were to be completed in another locality. Such modifications can be relatively easily made provided the teacher(s) makes a prior visit to an intended study area.

| Worksheet: Primary | (1) Year Level | (2) Readability | (3) Interest Level | (4) Content Difficulty | (5) Content Range | (6) Practicality in Another Region | (7) Subject Relevance | Additional comments in point form |
|---|-------------------|--------------------|-----------------------|---------------------------|----------------------|---------------------------------------|---|--|
| Bushwalk middle and upper primary (n = 5) | Years 4-5 | 3.8 | 3 | 3 | 2.8 | 2.8 | Environmental education, primary science. | <ul style="list-style-type: none"> - To alert children to the bush flora and fauna they should have been <u>initially</u> asked to watch for birds and insects rather than this final suggestion. - Does not encourage other senses i.e. hear, smell, feel. - To stimulate interest ask students to make illustrations - Reasonable botany level required of students. |
| Gooralong Picnic Area (n = 10) | Years 5-7 | 3.8 | 3.8 | 2.8 | 3.3 | 2.3 | Environmental education, primary and lower secondary science, social studies. | <ul style="list-style-type: none"> - Overall a well planned worksheet requiring children to think about the questions. - Clear simple vocabulary. - Variety of interesting areas studied and care for the environment stressed. - Rather than just looking and listening more interesting for children if other senses i.e. smell and touch included. - Trail may be too long for the children if all areas covered |

Key: (1) Year level worksheet written for
 (2) Readability of the worksheet for selected year level.
 (3) Interest level of the worksheet for selected year level.
 (4) Content difficulty of the worksheet for selected year level.
 (5) Content range of the worksheet for selected year level.
 (6) Exercise completion in another locality.
 (7) Relevance of the worksheet to specific subject areas.

TABLE 14

MEAN RATINGS OF MATERIALS CHECKLIST REVIEW GUIDE (SEE APPENDIX E). SCALE: NOT AT ALL 0 1 2 3 4 A GREAT DEAL.

| Worksheet, Secondary | (1) Year Level | (2) Readability | (3) Interest Level | (4) Content Difficulty | (5) Content Range | (6) Practicality in Another Region | (7) Subject Relevance | Additional comments in point form |
|--|--------------------|--------------------|-----------------------|---------------------------|----------------------|---------------------------------------|---|---|
| Rehabilitated mine-site, Lureford Park (n = 3) | Years 11-12 9 | 4 | 2.7 | 1.3 | 4 | 3 | Environmental education, biology, geography, middle secondary science | - Although middle secondary students could complete the exercise the worksheet would be fully appreciated by Year 11 and 12 levels. - Students may infer that the forest can be returned to its original state following bauxite mining. Elaboration of all re-afforestation implications required. |
| Jarraah Dieback (n = 6) | Years 11-12 10? | 3.6 | 3.3 | 2 | 3.2 | 3.6 (Another die-back area) | Environmental education, biology, geography | - Field technique skills stressed - Possibly used with higher ability middle school science students |
| Granite succession (n = 4) | Years 11-12 | 3.5 | 3.5 | 3.5 | 3 | 3 | As above | |
| Bushwalk: middle secondary (n = 3) | Years 10-11 | 3.5 | 4 | 3 | 3 | 2.5 | Environmental education, biology, middle secondary science. | - Too much knowledge assumed for stated years 6 to 8 - Considerable teacher guidance required if used at primary level - Assumes ecology knowledge |
| Jarraah forest association transect (n = 1) | Years 11-12 | 1 | 3 | 3 | 2 | 4 (In a Jarraah forest) | Environmental education, biology, geography | - Reference to indicator species by botanical names only not suited to geography students or teachers - Clear photographs or sketches of species would help students identify vegetation types. |
| Urban activities (n = 1) | Years 11-12 | 4 | 3 | 1 | 3 | 4 | Geography | - Instructions clear, land use coding system is simple and easily applied - Updated map of townsite required |
| Stream study (n = 1) | Years 9-11 | 2 | 3 | 3 | 2 | 4 | Environmental education, biology, middle secondary science. | - Instructions, language level and assumed terminology too difficult for suggested years 6-8 - Equipment list should include thermometer, metre rule, etc. - Suggest 3 point scale for velocity, measure. - Divide worksheet into field portion and class session where data exchanged - Tell students when to return specimens |

Key. (1) Year level worksheet written for.
(2) Readability of the worksheet for selected year level.
(3) Interest level of the worksheet for selected year level.
(4) Content difficulty of the worksheet for selected year level.
(5) Content range of the worksheet for selected year level.
(6) Exercise completion in another locality.
(7) Relevance of the worksheet to specific subject areas.

TABLE 15

MEAN RATINGS OF MATERIALS CHECKLIST REVIEW GUIDE (SEE APPENDIX E). SCALE: NOT AT ALL 0 1 2 3 4 A GREAT DEAL.

ACKNOWLEDGEMENTS

This study could not have been undertaken without the time made available through Professional Experience Programme leave granted to the author by the Western Australian Institute of Technology

The author wishes to acknowledge the assistance and co-operation of members of the Western Australian Education Department during the course of this study; in particular, thanks go to principals and teachers from the several schools involved in the surveys,

and to members of the Environmental Education Committee (1979) for their time given to interviews. Special thanks are due to Mr Keith Anderson, the Environmental Education Officer (1979) who provided invaluable assistance and information. I also wish to thank Dr Ralph Straton (School of Education, Murdoch University), for his guidance and his comments on the manuscript of this paper. The assistance given by the typists Mrs Nancy Woodward and Mrs Merlyn Gurr (original text and appendices) and Mrs Jennie Lumsden (final draft) was very much appreciated. Thank you also to Mrs Doris Madden, a primary teacher who helped considerably. Last but not least I am grateful to Mr David Osborne for his patience and encouragement.

REFERENCES

- Arbuthnot, J. (1977) - The Roles of Attitudinal and Personality Variables in the Prediction of Environmental Behaviour and Knowledge. Environmental and Behaviour 9: 217-232.
- Bowman, M.L.C. (1974) - Assessing College Student Attitudes Toward Environmental Issues. Journal of Environmental Education 6: 1-5.
- Collins, M.A.J. (1976) - Questionnaire and Changing Students' Attitudes to Animals. Journal of Environmental Education 8: 37-40.
- Doran, R.L. (1977) - 'State of the Art' for Measurement and Evaluation of Environmental Objectives. Journal of Environmental Education 9: 50-63.
- Fleetwood, G.R. & Hounshell, P.B. (1976) - Assessing Cognitive and Affective Outcomes of Environmental Education. Journal of Research in Science Teaching 13: 29-35.
- Horvat, R.E. & Voelker, A.M. (1976) - Using a Likert Scale to Measure 'Environmental Responsibility'. Journal of Environmental Education 8: 36-47.
- Jaus, H.H. (1978) - The Effect of Environmental Education Instruction on Teachers' Attitudes Toward Teaching Environmental Education. Science Education 62: 79-84.
- Oppenheim, A.N. (1966) - Questionnaire Design and Attitude Measurement. London: Heinemann.
- Pettus, A.M., Percy, R.B. & Teates, T.G. (1978) - The Attitudes of Science and Social Studies Teachers Toward Environmental Issues. Journal of Research in Science Teaching 15: 367-372.
- Stronch, D.R. (1972) - A Questionnaire on Environmental Issues. American Biology Teacher 34: 212-214.

Teachers Information Guide: Jarrahdale Centre for Environmental Education (in press).

Tognacci, L.N., Weigel, R.H., Widen, M.F. & Vernon, D.T.A. (1972) - Environmental Quality: How Universal is Public Concern? Environment and Behaviour 4: 73-86.

U.N.E.S.C.O. (1975) - The Belgrade Charter: Framework for Environmental Education (Belgrade Workshop).

U.N.E.S.C.O. (1976) - Declaration of the Tbilisi International Conference on Environmental Education (Tbilisi).

Watkins, G.A. (1974) - Developing a 'Water Concern' Scale. Journal of Environmental Education 5: 54-58.

Watkins, G.A. (1975) - Scaling of Attitudes Toward Population Problems. Journal of Environmental Education 7: 14-20.

Weigel, R. & Weigel, J. (1978) - Environmental Concern: The Development of a Measure. Environment and Behaviour 10: 3-15.

Western Australian Education Department (1977) - Policy From the Director-General's Office, No. 8. Perth: W.A. Education Department.

Appendix A

TEACHER SURVEY

Kent Street
Bentley
Western Australia 6102
Telephone (09) 350 7368
Telex AA 92983



School of Biology

Western Australian Institute of Technology

File No.:

Reply to:

Your Ref.:

Dear

The questionnaire I have enclosed is part of an evaluation study of the Jarrahdale Centre for Environmental Education. Would you please complete the questionnaire and return it to me.

The purpose of the questionnaire is to obtain information about your reaction(s) to the Jarrahdale Centre.

I obtained your address from Mr. Keith Anderson (Environmental Education Officer, Claver House) who has you listed as a user of the Jarrahdale Centre in 1979.

I would be grateful if you would return the questionnaire promptly in the self addressed envelope provided.

Your responses to the questionnaire will be strictly confidential. Only group results will be supplied to the Education Department.

Thank you very much for your time and assistance.

Yours sincerely,

Joan Osborne,
Biology Department, WAIT/School
of Education Murdoch University.

Encls.2.

EVALUATION STUDY OF THE JARRAHDALÉ CENTRE

TEACHER SURVEY

Joan Osborne
Biology Department, WAIT/School of
Education, Murdoch University

INSTRUCTIONS:

Please respond to all questions and return the questionnaire in the self addressed envelope provided.

- (1) Do you think the facilities at Jarrahdale are better than other centres you may have considered using? Yes ☐ No ☐
Please explain _____

- (2) How many students did you take to Jarrahdale? _____
What age group were they? _____
How long did you stay at Jarrahdale? _____
- (3) Were there environmental reasons for utilizing Jarrahdale and not another area? Yes ☐ No ☐
(If yes please elaborate) _____

- (4) Were there any additional materials/facilities you feel the Jarrahdale Centre could have provided? _____

- (5) What outcomes were you hoping your students might attain by their attendance at Jarrahdale eg., social, affective (attitudes), cognitive outcomes? Please elaborate on any listed outcomes. _____

- (6) Circle the numbers that best indicate how you utilized the Jarrahdale Centre. Please use the following scale :

NOT AT ALL 0 1 2 3 4 A GREAT DEAL

The Jarrahdale Centre was used for :

| | | | | | |
|-------------------------|---|---|---|---|---|
| o biology | 0 | 1 | 2 | 3 | 4 |
| o science | 0 | 1 | 2 | 3 | 4 |
| o geography | 0 | 1 | 2 | 3 | 4 |
| o social studies | 0 | 1 | 2 | 3 | 4 |
| o environmental studies | 0 | 1 | 2 | 3 | 4 |
| o geology | 0 | 1 | 2 | 3 | 4 |
| o other | 0 | 1 | 2 | 3 | 4 |

Please list _____

- (7) Did you use any of the following worksheets provided by the Centre for your students? Yes ☐ No ☐

If yes would you please tick these.

| | | | | |
|--|---|----------------------------------|---|--|
| Bushwalk | : | primary <input type="checkbox"/> | middle secondary <input type="checkbox"/> | upper secondary <input type="checkbox"/> |
| Stream study: | | | middle secondary <input type="checkbox"/> | upper secondary <input type="checkbox"/> |
| Jarrahdale forest association transect | | | <input type="checkbox"/> | |
| Rehabilitated minesite-Langford Park | | | <input type="checkbox"/> | |
| Gooralong picnic area | | | <input type="checkbox"/> | |
| Bauxite mining | | | <input type="checkbox"/> | |
| Jarrahdale dieback | | | <input type="checkbox"/> | |
| Urban activities | | | <input type="checkbox"/> | |
| Granite outcrop | | | <input type="checkbox"/> | |

- (8) Did you prepare any completely new worksheets/materials?

Yes ☐ No ☐

(If yes please elaborate) _____

(9) What was your source(s) of information about the Jarrahdale Centre?

- o information brochure _____
- o Filter _____
- o other teachers _____
- o policy statement on environmental education _____
- o Principal _____
- o biology/geography senior master/mistress _____
- o other _____

Please describe _____

(10) Have you attended any of the following field days and inservice courses?

| | | |
|---|------------------------------|-----------------------------|
| Urban Geography Inservice Course | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Mundaring Inservice Course | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Science Education Seminar - Environmental Impact: A Case Study | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Science Education Seminar - Classroom Activities for Primary School Science | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Science Education Seminar - Biological Techniques for Secondary School | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Jarrahdale Inservice Course | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

(11) If the Jarrahdale Centre was available could you make use of it during any of the vacations for other activities (ie. bush craft, Church group, scouting, school camp etc)? Please describe _____

(12) Please add any other general comments about the Centre. _____

Kent Street
Bentley
Western Australia 6102
Telephone (09) 350 7368
Telex AA 92983



School of Biology

Western Australian Institute of Technology

JMO:cr

File No. Mrs. Osborne

Reply to:

Your Ref.:

9th October 1979

Dear

On 24th September I forwarded a covering letter and a questionnaire which is to provide information for the evaluation study of the Jarrahdale Centre for Environmental Education.

I would like to thank those who have already returned the questionnaire. However, if you have not yet completed the questionnaire, it would be much appreciated if you would complete and return it to me at your earliest convenience. If you have misplaced the questionnaire, ring me on 330.4978 or leave a message on 350.7368 and I will forward another copy.

The Evaluation Study has been discussed with, and has been approved by, members of the Environmental Education Committee (Dr. H. Pearson, Mr. Ken Betjeman and Mr. Keith Anderson). This Committee co-ordinates the Jarrahdale Centre and the findings will be utilized by its members.

Thanking you in anticipation.

Yours sincerely,

Joan Osborne (Mrs.)
Senior Tutor, Biology Department,
Western Australian Institute of Technology.

Appendix B

IN-SERVICE COURSE SURVEY

Kent Street
Bentley
Western Australia 6102
Telephone (09) 360 7368
Telex AA 92983



School of Biology

Western Australian Institute of Technology

File No.:

Reply to:

Your Ref.:

Dear

The questionnaire I have enclosed is part of an evaluation study of the Jarrahdale Centre for Environmental Education. Would you please complete the questionnaire and return it to me.

The purpose of the questionnaire is to obtain information about the adequacy of the Inservice Course you attended at Jarrahdale earlier this year.

I obtained your address from Mr. Keith Anderson (Environmental Education Officer, Claver House) who has you listed as having attended the Inservice Course in 1979.

I would be grateful if you would return the questionnaire promptly in the self addressed envelope provided. Your responses to the questionnaire will be strictly confidential. Only group results will be supplied to the Education Department.

Thank you very much for your time and assistance.

Yours sincerely,

Joan Osborne,
Biology Department, WAIT/School
of Education Murdoch University.

Encls.2.

EVALUATION STUDY OF THE JARRAHDAL CENTRE

INSERVICE COURSE SURVEY

Joan Osborne
Biology Department, WAIT/School of
Education, Murdoch University

INSTRUCTIONS:

Please respond to all questions and return the questionnaire in the self addressed envelope provided.

GENERAL

(1) In the next six months do you intend

: utilizing the Jarrahdale Centre

Yes ☐

No ☐

: using another study area

Yes ☐

No ☐

Would you be using these areas for

o biology

o science

o geography

o social studies

o environmental studies

o geology

o other

courses?

Please describe _____

(2) This year have you taken students into a field study environment?

Yes ☐

No ☐

If yes

o what age group(s)?

o for what period of time?

o location?

(3) Do you think the facilities at Jarrahdale are better than other centres you may have considered using?

Yes ☐

No ☐

Please explain _____

- (4) Are there environmental reasons for utilizing Jarrahdale and not another area? Yes ☐ No ☐

(If yes please elaborate) _____

- (5) Are there any additional materials/facilities you feel the Jarrahdale Centre should provide? _____

- (6) What outcomes are you hoping your students will attain if they attend Jarrahdale or a similar centre, eg., social, affective (attitudes), cognitive outcomes? Please elaborate on any listed outcomes. _____

- (7) If the Jarrahdale Centre was available could you make use of it during any of the vacations for other activities (ie. bush craft, Church group, scouting, school camp etc.)? Please describe _____

INSERVICE COURSE

- (1) Did you find any sections of the Jarrahdale Inservice Course particularly beneficial? _____

Did you find particular sections irrelevant? _____

- (2) Has the Inservice Course been of assistance in planning field studies for your students? Yes ☐ No ☐

(If yes please elaborate) _____

- (3) Have you modified any of the materials from Jarrahdale for your own use? Yes ☐ No ☐

(If yes please elaborate) _____

- (4) Is the Jarrahdale Inservice Course in its present form adequate? Yes ☐ No ☐

Outline any improvements/changes you feel could be made to the Inservice Course _____

- (5) Should the Inservice Course be longer?

o no _____
 o yes _____
 o number of days _____

- (6) Should more factual information (eg. species identification) be taught during the course? Yes ☐ No ☐

If so, then in what areas? _____

- (7) What was your source/sources of information about the Inservice Course?

o information brochure _____
 o Filter _____
 o other teachers _____
 o policy statement on environmental education _____
 o principal _____
 o deputy principal _____
 o biology/geography senior master or mistress _____

- (8) Should it be compulsory for intending users of the Jarrahdale Centre to attend an inservice course? Yes ☐ No ☐

(9) Please add any additional comments relating to the Inservice Course _____

Thank you very much for your assistance.

Joan Osborne.

Kent Street
Bentley
Western Australia 6102
Telephone (09) 350 7368
Telex AA 92983



School of Biology

Western Australian Institute of Technology

File No.:

Reply to: JMO:cr

Your Ref: Mrs. Osborne

9th October 1979

Dear

On 24th September I forwarded a covering letter and a questionnaire which is to provide information for the evaluation study of the Jarrahdale Centre for Environmental Education.

I would like to thank those who have already returned the questionnaire. However, if you have not yet completed the questionnaire, it would be much appreciated if you would complete and return it to me at your earliest convenience. If you have misplaced the questionnaire, ring me on 330.4978 or leave a message on 350.7368 and I will forward another copy.

The Evaluation Study has been discussed with, and has been approved by, members of the Environmental Education Committee (Dr. H. Pearson, Mr. Ken Betjeman and Mr. Keith Anderson). This Committee co-ordinates the Jarrahdale Centre and the findings will be utilized by its members.

Thanking you in anticipation.

Yours sincerely,

Joan Osborne (Mrs.)
Senior Tutor, Biology Department,
Western Australian Institute of Technology.

Appendix C

STUDENT SURVEY: PRE-VISIT AND POST-VISIT (SECONDARY SCHOOL STUDENTS)

EVALUATION STUDY OF THE JARRAHDALL CENTRE

STUDENT SURVEY

Joan Osborne
Biology Department, WAIT/School of
Education, Murdoch University.

INFORMATION :

This questionnaire concerns your intended visit to the Jarrahdale Centre for Environmental Education.

Your answers will be used to improve the Centre. The answers will not be read by your teachers (you put the questionnaire in a sealed envelope) and I will not discuss your answers with the teachers. The answers will not be used to assess you.

INSTRUCTIONS :

This questionnaire is divided into TWO sections and I would like you to answer EVERY question in both sections.

Thank you for your help.

Joan Osborne.

SECTION A : PRE-VISIT GENERAL

Please write your response in the space provided or put a tick in the box which has the best answer for you.

Name : _____

Age : 15 years ☐ 16 years ☐ 17 years ☐ 18 years ☐

Sex : male ☐ female ☐

1. When was the last time you went to the beach? _____

2. When was the last time you went to the bush? _____

3. How many times did you go to the bush last month? _____

didn't go ☐

once ☐

twice ☐

3 or more times ☐

4. Would you like to go to the bush more often? Yes ☐ No ☐

Please explain your answer _____

5. Did you go away from Perth during the August holidays?

Yes ☐ No ☐

If you did go away, where did you go to?

6. What did you do with the rest of your time during the August holidays (eg. pictures; T.V.; into Perth etc.)? _____

7. For this question please circle the lettering on the right hand side of the page that best describes your reaction to the question. These letters have the following meaning:

| | |
|----|-------------------|
| sa | strongly agree |
| a | agree |
| uc | uncertain |
| d | disagree |
| sd | strongly disagree |

The purpose of your visit to the Jarrahdale Centre is to :

- o study biology in a field situation
- o give you a break from normal class lessons
- o study a number of different environments (ie. stream; Jarrah forest; small country town).
- o enable you to get to know your class members and teachers better
- o introduce a new biology/geography topic
- o show how man can affect the environment
- o let you appreciate the beauty of bushlands

[illegible]

8. For this question please circle the lettering on the right hand side of the page that best describes your reaction to the question. These letters have the following meaning:

sa strongly agree
a agree
uc uncertain
d disagree
sd strongly disagree

The purpose of your visit to the Jarrahdale Centre is to:

- o study biology in a field situation
- o give you a break from normal class lessons
- o study a number of different environments (ie. stream; Jarrah forest; small country town).
- o enable you to get to know your class members and teachers better
- o introduce a new biology/geography topic
- o show how man can affect the environment
- o let you appreciate the beauty of the bushlands

| | strongly agree | agree | uncertain | disagree | strongly disagree |
|---|----------------|-------|-----------|----------|-------------------|
| o study biology in a field situation | sa | a | uc | d | sd |
| o give you a break from normal class lessons | sa | a | uc | d | sd |
| o study a number of different environments (ie. stream; Jarrah forest; small country town). | sa | a | uc | d | sd |
| o enable you to get to know your class members and teachers better | sa | a | uc | d | sd |
| o introduce a new biology/geography topic | sa | a | uc | d | sd |
| o show how man can affect the environment | sa | a | uc | d | sd |
| o let you appreciate the beauty of the bushlands | sa | a | uc | d | sd |

9. Whilst at the Centre did you complete exercises in :

- o biology ☐
- o geography ☐
- o environmental science ☐
- o geology ☐
- o english ☐

(tick any appropriate boxes)

10. Would you like to go to Jarrahdale again? Yes ☐ No ☐

SECTION B

SCALE

Read the first sentence and then circle whether you

strongly agree (sa)
 agree (a)
 are uncertain (uc)
 disagree (d) or
 strongly disagree (sd) with the sentence

Do the same for each of the following sentences. The scale is NOT
 a test and is NOT being used for marking.

| | strongly agree | agree | uncertain | disagree | strongly disagree |
|--|----------------|-------|-----------|----------|-------------------|
| 1. Trail bikes should be allowed in the bush areas because there is plenty of space to ride them. | sa | a | uc | d | sd |
| 2. People can throw some rubbish into streams because natures purifying processes soon return the streams to normal. | sa | a | uc | d | sd |
| 3. We should prevent native animals from becoming extinct unless it means making sacrifices ourselves. | sa | a | uc | d | sd |
| 4. There are enough national parks and bushland areas now for people to use and for native animals and birds to live in. | sa | a | uc | d | sd |
| 5. One person cannot do very much to help the environment and stop pollution. | sa | a | uc | d | sd |
| 6. Soft drinks should only be sold in bottles that can be used again and not sold in cans. | sa | a | uc | d | sd |
| 7. There should be more regulations to make trucks and motor bikes quieter. | sa | a | uc | d | sd |
| 8. Cutting down shade trees and putting free ways through natural bushlands are actions necessary to bring about progress. | sa | a | uc | d | sd |
| 9. A nuclear power station could be built in Western Australia if environmental studies show it would be safe. | sa | a | uc | d | sd |
| 10. Nature has a way to solve water supply problems before they get serious. | sa | a | uc | d | sd |
| 11. All the people of Perth should do something about the water problem. | sa | a | uc | d | sd |

Appendix D

STUDENT SURVEY: PRE-VISIT AND POST-VISIT (PRIMARY SCHOOL STUDENTS)

EVALUATION STUDY OF THE JARRAHDVALE CENTRE

STUDENT SURVEY

Joan Osborne
Biology Department, WAIT/School of
Education, Murdoch University.

INFORMATION :

This questionnaire concerns your intended visit to the Jarrahdale Centre for Environmental Education.

Your answers will be used to improve the Centre. The answers will not be read by your teachers (you put the questionnaire in a sealed envelope) and I will not discuss your answers with the teachers. The answers will not be used to assess you.

INSTRUCTIONS :

This questionnaire is divided into TWO sections and I would like you to answer EVERY question in both sections.

Thank you for your help.

Joan Osborne.

SECTION A : PRE-VISIT GENERAL

Please write your response in the space provided or put a tick in the box which has the best answer for you.

Name: _____

Age : 10 years ☐ 11 years ☐ 12 years ☐ 13 years ☐

Sex : male ☐ female ☐

1. When was the last time you went to the beach? _____

2. When was the last time you went to the bush? _____

3. How many times did you go to the bush last month?

didn't go ☐

once ☐

twice ☐

3 or more times ☐

4. Would you like to go to the bush more often? Yes ☐ No ☐

Please explain your answer _____

5. Did you go away from Perth during the August holidays?

Yes ☐ No ☐

If you did go away, where did you go to?

6. What did you do with the rest of your time during the August holidays (eg. pictures; T.V.; into Perth etc.)? _____

7. For this question please circle the lettering on the right hand side of the page that best describes your reaction to the question. These letters have the following meaning:

sa strongly agree
a agree
uc uncertain
d disagree
sd strongly disagree

The purpose of your visit to the Jarrahdale Centre is to :

- o study science out in the bush
- o give you a break from normal class lessons
- o study a stream, bushland and a small country town
- o let you get to know your class members and teachers better
- o introduce a new science topic
- o show how man can affect the bush
- o let you enjoy the beauty of the bush

[illegible]

SECTION A : FOLLOW-UP GENERAL

Please write your response in the space provided or put a tick in the box which has the best answer for you.

Name : _____

Age : 10 years ☐ 11 years ☐ 12 years ☐ 13 years ☐

Sex : male ☐ female ☐

1. Did you make new friends during your stay at the Jarrahdale Centre? Yes ☐ No ☐
2. Did you get to know other students better? Yes ☐ No ☐
3. Did you get to know your teachers better? Yes ☐ No ☐
4. What particular activities at the Centre did you enjoy the most?

5. What particular activities at the Centre did you enjoy the least?

6. What did you learn the most about during your stay at the Centre?

7. Did you find the activities at Jarrahdale more enjoyable than being back at school? Yes ☐ No ☐

8. For this question please circle the lettering on the right hand side of the page that best describes your reaction to the question. These letters have the following meaning:

sa strongly agree
 a agree
 uc uncertain
 d disagree
 sd strongly disagree

The purpose of your visit to the Jarrahdale Centre is to:

- o study science out in the bush
- o give you a break from normal class lessons
- o study a stream, bushland and a small country town
- o let you get to know your class members and teachers better
- o introduce a new science topic
- o show how man can affect the bush
- o let you enjoy the beauty of the bush

| | strongly agree | agree | uncertain | disagree | strongly disagree |
|----|----------------|-------|-----------|----------|-------------------|
| sa | a | uc | d | sd | |
| sa | a | uc | d | sd | |
| sa | a | uc | d | sd | |
| sa | a | uc | d | sd | |
| sa | a | uc | d | sd | |
| sa | a | uc | d | sd | |
| sa | a | uc | d | sd | |

9. Would you like to go to Jarrahdale again?

Yes ☐ No ☐

SECTION B

SCALE

Read the first sentence and then circle whether you

strongly agree (sa)
 agree (a)
 are uncertain (uc)
 disagree (d) or
 strongly disagree (sd) with the sentence

Do the same for each of the following sentences. The scale is NOT a test and is NOT being used for marking.

| | strongly agree | agree | uncertain | disagree | strongly disagree |
|--|----------------|-------|-----------|----------|-------------------|
| 1. Motor bikes should be allowed in the bush because there is lots of space to ride them. | sa | a | uc | d | sd |
| 2. People can throw rubbish into streams because nature can clean the streams up again. | sa | a | uc | d | sd |
| 3. We must do all we can to stop native animals dying out. | sa | a | uc | d | sd |
| 4. There are enough bush parks for native birds and animals to live in. | sa | a | uc | d | sd |
| 5. One person cannot do very much to stop pollution. | sa | a | uc | d | sd |
| 6. Soft drinks should only be sold in bottles that can be used again and not sold in cans. | sa | a | uc | d | sd |
| 7. There should be laws to make trucks and motor bikes quieter. | sa | a | uc | d | sd |
| 8. To save water the people of Perth must not use as much water. | sa | a | uc | d | sd |
| 9. It is better to weed the garden than to use a garden spray to kill the weeds. | sa | a | uc | d | sd |
| 10. A new oil refinery could be built in Western Australia if scientists say it would be safe. | sa | a | uc | d | sd |
| 11. Smaller cars are the best because they use less petrol. | sa | a | uc | d | sd |

12. There should be laws to stop unwanted kittens becoming wild cats in bushland areas.
13. Money should be spent now to buy more bushland and parks for people to use.
14. It won't matter if native animals and birds are killed because all things balance out in nature.
15. Nature will solve the problem of shortage of water in Perth.
16. If native kangaroos need a safe place to live in it would be best to put them in the Perth Zoo.
17. One person cannot do much to stop pollution.

[illegible]

Appendix E

MATERIALS CHECKLIST

Kent Street
Bentley
Western Australia 6102
Telephone (09) 350 7368
Telex AA 92983



School of Biology

Western Australian Institute of Technology

File No.:

Reply to:

Your Ref.:

31st October, 1979.

Dear

The "Materials Checklist" I have enclosed is part of an evaluation study of the Jarrahdale Centre for Environmental Education. From the "Materials Checklist" I will be able to determine teachers' reactions to the work sheets that are provided at the Jarrahdale Centre. I have collected questionnaires from teachers who have used the Jarrahdale Centre and those attending the inservice course. Students' attitudes towards the Centre have also been collected.

I have enclosed work sheets from the Centre and the "Materials Checklist". I would be grateful if you would complete the checklist and return it to me in the self addressed envelope provided before the 20th November. If you have any queries at all please contact me in the evening on Ph.330 4978. You may keep the work sheets or I will collect them from you personally at a later date.

The current evaluation study has been approved by members of the Environmental Education Committee (Dr.H.Pearson, Mr.K.Betjeman, Mr.K.Anderson). This committee co-ordinates the Jarrahdale Centre. Findings of the evaluation will be utilized by its members. The "Materials Checklist" survey in particular will be used to modify and improve the provided work sheets.

Your responses to the "Materials Checklist" will remain entirely confidential. Only group results will be supplied to the Education Department.

Thank you very much for your time and assistance.

Yours sincerely,

(Mrs) Joan Osborne
Senior Tutor,
Biology Department,
WAIT.

EVALUATION STUDY OF THE JARRAHDALE CENTRE
MATERIALS CHECKLIST

Joan Osborne
Biology Department, WAIT/School of
Education, Murdoch University

INSTRUCTIONS:

Please respond to all points on the checklist and return the checklist in the self addressed envelope provided. The number of the work sheet refers to the hand-written biro number.

Title of work sheet _____ Number _____

- (1) Which year level(s) do you think this work sheet has been written for?

Year 3 ☐ ; 4 ☐ ; 5 ☐ ; 6 ☐ ; 7 ☐ ; 8 ☐ ; 9 ☐ ;
10 ☐ ; 11 ☐ ; 12 ☐

In each of the points listed below circle the number that gives the best indication of your judgement. Please use the following scale:

NOT AT ALL 0 1 2 3 4 A GREAT DEAL

- (2) Readability of the work sheet for your 0 1 2 3 4
selected year level(s)

Additional comment : _____

- (3) Interest level of the work sheet for 0 1 2 3 4
your selected year level(s)

Additional comment : _____

- (4) Content difficulty of the work sheet for 0 1 2 3 4
your selected year level(s)

Additional comment : _____

- (5) Content range of the work sheet for 0 1 2 3 4
your selected year level(s)

Additional comment : _____

- (6) Practicality of the work sheet i.e. 0 1 2 3 4
could the exercise be completed in
another location?

Additional comment : _____

- (7) Relevance of the work sheet to

| | | | | | |
|---|---|---|---|---|---|
| o primary school science | 0 | 1 | 2 | 3 | 4 |
| o environmental education | 0 | 1 | 2 | 3 | 4 |
| o lower/middle secondary school science | 0 | 1 | 2 | 3 | 4 |
| o biology (upper secondary) | 0 | 1 | 2 | 3 | 4 |
| o geography (upper secondary) | 0 | 1 | 2 | 3 | 4 |
| o social studies | 0 | 1 | 2 | 3 | 4 |

Additional comment : _____

- (8) Please list any other non-included points you wish to make about the
work sheet.

Thank you very much for your time and assistance.