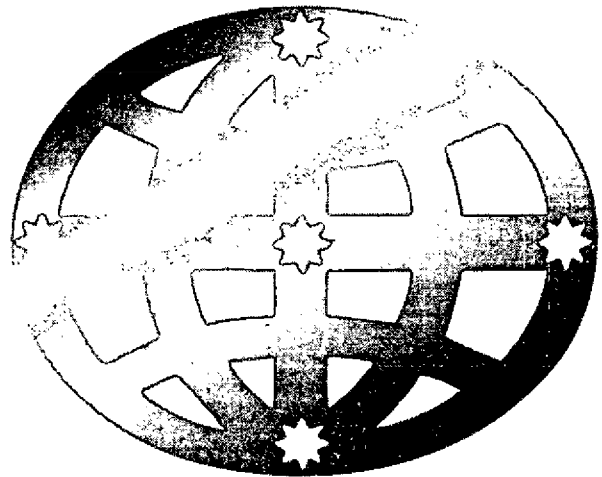


Students Learning about Local Air Quality Issues

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The concept of AirWatch began in Western Australia in 1995 in response to preliminary findings of the Perth Photochemical Smog Study¹ and the Perth Haze Report² published by the Department of Environmental Protection.

These studies demonstrated that the air quality in the Perth urban area was deteriorating and highlighted that much of the pollution was produced by the general community. The reports recognised that part of the solution to these problems would have to involve the Western Australian community as a whole. To address our air pollution problems, the community needed to be aware of the issues and prepared to change their attitudes and behaviours with regard to air quality.

Among other initiatives for WA, it was planned to develop AirWatch as an environmental education program for schools not only addressing air quality as a current and relevant issue but as a mode of learning which would encourage positive attitudes and behaviours in the long term.

AirWatch is a schools' program where students are actively involved in sampling and analysing their local air quality in order to understand air quality issues and are encouraged to find solutions to air quality problems.

The aim of the AirWatch program is to address issues such as:

- the lack of knowledge and consequent actions in the general community about air quality and its issues;
- reducing air pollution through individual / community effort;
- increasing interest of schools within the community to be involved in monitoring their environment, particularly with regards to local air quality; and
- increasing interest around Australia in the question of community involvement in air pollution monitoring and issues from government and educational institutions such as universities, schools and colleges.

Other considerations

While air quality education was the main concern of the Department of Environmental Protection, it was important that the program had to fit within the existing education system taking into consideration the following:

- the heavy reliance on individual educators which meant environmental projects were initiated but often faltered due to lack of support, both financial and in a professional sense;
- the lack of environmental education training and professional development opportunities for educators;
- the lack of materials and resourcing for environmental education in schools;
- the inadequacy of current environmental education materials for air quality issues;
- lack of resources and appropriate space in the curriculum; and
- the lack of definite outcomes and competencies for environmental education in the curriculum and examples of best practice in this area.

Developing AirWatch

After searching, both nationally and internationally, the DEP found that there was no hands-on programs for schools relating to air quality. Therefore, a partnership between three states, WA (Department of Environmental Protection), Victoria (City of Melbourne) and Queensland (Department of Environment) was established in 1995.

Each participating state contributed funds for a technical group at CSIRO's Division of Atmospheric Research to develop a kit suitable to air monitoring by non-technical individuals. These funds were matched by the Institute of Natural Resources and Environment, CSIRO because it was seen as a worthwhile project that takes an approach to an issue which is relevant to the whole nation.

Gains from this partnership included the capacity to utilise available resources more strategically, thereby reducing

duplication and an ability to share information and experiences. The guiding principles for the development of the kit were that it must be

- participatory rather than passive;
- that the data obtained should be meaningful;
- that the tests should be a mix of short and long term duration; and
- that some projects should have a large element of group activity.

From these principles the Division of Atmospheric Research developed equipment for air monitoring which could be used by schools. The kit covers three related topics:-

1. Measurement of Pollutants.

Students are able to measure nitrogen dioxide and particles using a low volume sampler that is cheap and capable of giving useful results. Visibility can also be measured using a protocol that is used in scientific research in the Latrobe Valley and has been adapted for the program. Together with meteorological measurements from the weather station in the kit and with links via Internet to the AirWatch homepage, students get a complete picture of local and regional air pollution on days of measurement.

2. Measurement of meteorology

To put monitoring data into context, weather conditions must also be measured. The kit has a commercial weather station which measures data continuously and has computer interface that allows for storage and analysis of the data. There is also a low cost helium-filled tethered balloon system which allows you to calculate, (using software which is included), the wind speed and direction up to a height of a few hundred metres from the ground.

3. Identification of sources of pollution

In some cases the source of pollution is not always obvious. There are methods described with associated computer software which will allow participants to identify these sources.

AirWatch Objectives

Airwatch delivers a comprehensive program for students including the:

- delivery of local air quality readings for nitrogen dioxide (NO₂), particles, visual distance, weather conditions;
- collection of social survey information on topics such as indoor air quality, community attitudes, transport usage etc;
- provision of a data base and homepage on the Internet;
- development of skills in air sampling and monitoring in schools;

- provision of on-going support for teachers implementing studies in air quality; and
- links for schools with community groups, government and other organisations involved in air monitoring.

To ensure a complete program that enables students to cover the theory and the issues relating to air quality a curriculum package was developed which teachers can use as a resource and guide. Students' air quality monitoring is enhanced by the use of class activities and experiments, raising issues especially related to individual and local action.

The Pilot

A pilot program was run in Term 1, 1996. There was four senior high schools and one community group in both WA and Victoria trialing the program for one term (ten weeks) to assess the kit and associated materials.

These groups had two in-service sessions in preparation for the start of the project in Feb, 1996 and on-going assistance throughout the pilot in the form of technical, scientific and administrative backup.

Participants were involved in monitoring their regional air quality, accessing agency data and interpreting their findings. Equipment and methodologies were tested and curriculum materials in schools were used extensively at the same time to present students with a complete unit of work involving air quality.

Results from the pilot indicated that AirWatch was a flexible program which could be integrated into the National school curriculum at various year levels (Years 8-12) and in various subject areas (Science, Society and the Environment, Senior Science, Technology).

Improving AirWatch

Project Hotspot

In WA, a partnership has formed between AirWatch and the Main Roads Department. The Main Roads Department has sponsored the production of the curriculum manual and an air quality booklet. They have also allocated one day per week of an officer's time to involve schools in a special air monitoring program which monitors roadside emissions.

This project called Project Hotspot asked students to gather data on NO₂ and particle levels at various distances from major roads in Perth. This data was then included in a roadside emissions model being developed by the Main Roads Department for Perth.

The Web-Site

An Internet homepage was also developed for the AirWatch program which allowed students to enter data, research information and use a chat page for communication between schools.

The Internet site contained the following elements:

- up-to date data from the DEP
- data from schools' monitoring around Perth
- educational resources relating to air pollution
- a quiz to test air quality knowledge
- links to other sites around the world
- a place for discussion with other schools around Perth
- information on how to develop your own air monitoring program
- contact with people who can help you

The Primary Program

At this point, AirWatch was working only with secondary schools. It was decided in 1997 that air pollution issues were relevant to primary schools and so a primary school program was born. Called "Who cares about our air?" it consisted of a workbook and folder of information plus a simple kit of materials which help implement the activities in the workbook.

The primary curriculum materials were written and tested in four primary schools and then printed in early 1998. The problem of getting teachers to know about and use these materials was overcome by gaining more sponsorship - this time for the primary program in particular. This included the development of a primary school 'kit' which contained all the materials necessary to implement the activities in the student workbook. Because of the level of sponsorship a coordinator was employed for four days per week.



Other States

In Melbourne, the program was supported by the City of Melbourne where some employee time was allocated to the program. Unfortunately, lack of funding and someone to drive the program has meant that the program has faltered in this state.

In NSW, the EPA has developed their own Airwatch program but it has not been implemented through the state.

Queensland Department of Environment has used the Airwatch material to develop an action-research program for schools program, to be implemented in 1999.

The National Program

The success of Airwatch in WA and the interest from other states encouraged the DEP to put forward a proposal to the Natural Heritage Trust to fund Airwatch on a national basis. The proposal was to turn the AirWatch program of air quality

monitoring presently being run by some schools in some States into a national network, based on a similar model to the GLOBE program.

The Proposal directly addressed Option 2 and contributed to awareness raising as discussed in Option 30 of the recommendations of the Urban Air Pollution Inquiry report³. This report was written at the request of the Minister for the Environment, Senator Hill for an independent inquiry into urban air pollution in Australia and suggestions for measures that would improve and maintain air quality in the future. From the Inquiry, the Natural Heritage Trust⁴ funded many projects around Australia to help improve urban air quality, including AirWatch.

The National Project has students across Australia monitoring their local air quality at nominated times of the year. The monitoring includes :

- a 24 hour particle levels
- b 3 hour nitrogen dioxide levels
- c Visual distance information
- d Local weather conditions at time of monitoring. (eg. Temperature, rain, wind speed, wind direction).

The overall intention is to gather indicators across Australia to give a national snapshot of urban air quality in different seasons.

The National AirWatch program is coordinated by a National Facilitator. Her role is to:

- Involve schools/community groups in the National Monitoring Project.
- Run workshop /in-services to give participants the practical knowledge and skills in sampling and monitoring of designated indicators.
- Access and supply kits to project groups and other air monitoring groups.
- Assist participants in developing understanding of air quality and its related issues.
- To promote interaction between agencies and groups interested in air quality to enhance community involvement.
- Interact with scientific staff to continually develop their own skills and knowledge in air monitoring.
- Help air monitoring groups to be effective; help with problem solving whether practical or logistical.

The role of the National Facilitator is seen as essential to the success of AirWatch. The best examples of community environmental monitoring programs such as Waterwatch, Saltwatch and Watertable Watch are dependent on having someone to supply continuous support and training to ensure maintenance of current skills, knowledge and the reliability and credibility of data. A Facilitator ensures program participation and quality performance.

Boosting AirWatch

In the same year (1999) as AirWatch became a national program, it was also awarded by the Australian Museum the Allen Strom Eureka Prize for Environmental Education Programs. This was recognition of the value of the program and the work that had been done to develop it.

It was also a great boost to AirWatch as it was given exposure on the ABC's Quantum program and covered extensively in the print media. This type of exposure is essential in marketing the program to more people and gaining and keeping sponsorship to ensure the continuation of the program.

AirWatch on TV

AirWatch students are now involved in WA in regular weather reporting to the local Channel 7 TV station. Using the sophisticated weather station which is part of the AirWatch kit, five schools a week send in temperature and rainfall statistics for their local area.

Initially, there were only 18 schools reporting. There has been such interest in involving the students in this project that now there are over 50 schools and a waiting list to join. Both primary and secondary schools are participating in the weather reporting project and soon schools will be adding their pollution monitoring to complement their weather reporting.

This development has caused a lot of activity for the AirWatch coordinator in WA and yet again highlights the need for assistance in implementing environmental education programs in schools.

AirWatch in the Future

Other air quality monitoring techniques are planned for inclusion in the AirWatch program. These are currently being developed by CSIRO and include measuring carbon monoxide (CO) concentrations, spores and pollen levels and house dust mite numbers.

Evaluation of AirWatch

The AirWatch program is evaluated in four ways:

- 1 the level of activity of schools (number of groups engaged in National Monitoring Project and number of kits bought by groups);
- 2 the amount and quality of data (number and type of data collected);
- 3 the level of knowledge and attitudes of the community (survey of participants before and after involvement in the program); and
- 4 the performance of the WEB site for data collection (hits at WEB site and ease of use).

Summary

Air quality is fast becoming a major issue for the community

as shown by recent Australian Bureau of Statistics (ABS) surveys where 94% of people put air quality as their number one environmental concern. There is also a general lack of air quality information, in coherent form for the general public and schools in particular.

AirWatch ultimately aims at protection of air quality throughout Australia by having an educated and aware community which values clean air and is prepared and knowledgeable about appropriate actions to ensure this.

Many believe that economic, policy and regulatory measures can address such environmental issues. AirWatch (and other programs) recognise that environmental education is an essential tool in achieving environmental protection.

Environmental education gives people the skills to become fully participative in achieving environmental protection and ecologically sustainable development through their work, domestic and recreational activities.

Airwatch is an environmental education which enhances the students' skills in technology both through hands-on experience in monitoring and the use of Internet as a means of data storage and communication around Australia and the world.

It is a program which focuses on relevant local and global issues, achieving not only a theoretical understanding of the issue of air pollution but also developing a sense of citizenship within their community to encourage action in the form of behavioural change for the benefit of the environment.

It also results in a community which is aware of the issues and can understand changes in environmental legislation, policy development and program implementation in different spheres of the community. 🌍

For further information

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