# Australian National University

# 2001 Environmental risk assessment and waste snapshot

## Report

**by Su Wild River,**

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**Conducted using the Comparative Environmental Risk Assessment Method.**

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# 1. Executive summary and recommendations

This is the third environmental risk assessment report of this type completed for the Australian National University (ANU). The reports have been undertaken for the ANU's Environmental Management Planning Committee and supported by its Facilities and Services Division. They use the Comparative Environmental Risk Assessment Method (CERAM), developed by this researcher. CERAM quantifies the likelihood and consequences of environmental harm occurring as a result of the ANU's activities. The report also provides a snapshot of waste issues on campus, that were observed while gathering the data for the risk assessment.

Overall, the ANU easily meets most of its statutory requirements for environmental protection. However some minor, localised breaches of the Australian Capital Territory (ACT) Environmental Protection Act (EPA) 1997 were observed during this risk assessment. In addition, activities at many of sites on the ANU campus involve inherent environmental risks that require ongoing management. These include chemical and waste storage, building, maintenance works, and a range of others. The nature, scale, and management of the risks vary according to the following six building types. These are listed in order of the total contribution to campus environmental risk of each type of building.

- Science,
- Food,
- Arts,
- University services,
- Construction, and
- Other buildings.

Science buildings have the greatest contribution to total environmental risk on campus because there are many of them, each with inherent risks. However environmental risks at science buildings also tend to be better managed than at some other types of buildings. Arts buildings have the highest mean environmental risks, and the highest proportion of unmanaged risks on campus. Food buildings also have higher unmanaged risks than the science buildings. The recommendations in this report target all three of these highest-risk building types, as well as suggesting risk reduction actions for the other, lower-risk building types.

This study also highlights the environmental risk issues on campus. These are the environmental qualities and values that could be polluted by ANU activities. The environmental risk issues considered in this report are:

- *air* pollution, including odour problems;
- pollution to Sullivan's Creek, by the release of contaminants to the *stormwater* drains;
- *site contamination*, by releasing contaminants to the soil;
- *noise* pollution to the surrounding area; or
- resource *wastage*, where potentially recyclable materials are instead directed to landfill.

The highest environmental risks are for potential water pollution. This is in relation to total and mean inherent risk, and in terms of the percentage of unmanaged risks. Over half of the stormwater pollution risks on campus are not adequately managed. Waste and site contamination are also important environmental risk issues.

This report builds on the knowledge gained in the previous assessments, to recommend an integrated and cost effective set of pollution prevention actions. These aim first to immediately ensure compliance, and then to continuously improve towards best practice environmental management. The actions to avoid stormwater pollution have been developed in consultation with the Sullivan's Creek Catchment Group, as well as the Facilities and Services Division. The report and its accompanying appendices match specific actions to each building with environmental risk issues. Seven actions are recommended, and these are listed below. Table 1 summarises the buildings that are targeted for each pollution prevention action.

- Take immediate action to ensure *compliance* with the Environmental Protection Act (EPA) in several key areas throughout campus.
- *Check* the destination of drains that are not listed on the campus plans, and that could pose a stormwater pollution risk. Update the campus plans accordingly.
- Undertake *drain stenciling* in locations where stormwater pollution is likely.
- Provide environmental management *training* for site managers from buildings with inherent environmental risks. Group site managers by building-type for the training.
- A component of the training will be for site managers to develop simple *stormwater management plans (SMPs)* to assist the future management of environmental risks on site.
- Develop a simple *brochure* setting out ANUs environmental management policies, and suggesting simple, cost-effective options for general environmental risk reduction. Distribute the brochure to site managers. And
- Where infrastructure makes it easier to pollute than to avoid pollution, consider *retrofitting* to reduce environmental risk.

**Table 1. Pollution prevention actions by type of building**

| Building Type | Compliance | Check drains | Drain stenciling | Training | SMP | Brochure | Retrofit |
|---|---|---|---|---|---|---|---|
| **Science** | ◘ | ◘ | ◘ | ● | ● | ● | ◘ |
| **Arts** | ◘ | ◘ | ◘ | ● | ● | ● | ◘ |
| **Food** | ◘ | - | ◘ | ◘ | ◘ | ● | ◘ |
| **Service** | - | - | ◘ | ◘ | ◘ | ● | ◘ |
| **Construction** | - | - | - | - | - | ● | - |
| **Other** | - | - | ◘ | - | - | ● | - |

**Key to pollution prevention actions.**

● = applies to *all* of this building type.

◘ = applies to *some* of this building type.

\- = *does not* apply to this building type.

The following recommendations are made in relation to waste issues.

- *Provide the right waste services.* Consider what waste types and quantities are produced at different locations. Match these with waste service providers, and ensure the effectiveness of the systems provided in the specific waste areas.
- *Ensure sufficient waste services.* Provide enough bins to cope with peak flows of wastes. Where variation in the waste flows creates difficulties in this, ensure that there are systems to enable extra bins or extra pickups during peaks.
- *Encourage and support waste managers*. Formally recognise a waste manager for each site, and provide a duty statement and management support for waste management.

# 2. Background

The ANU has developed, and is implementing a comprehensive environmental management plan. The plan establishes a strategic framework to ensure that the university complies with all relevant environmental and safety regulations, as well as moving progressively towards best practice in environmental management.

In addition to developing its own environmental management systems, ANU has also been involved in pioneering work to quantify environmental risk using simple, robust, cost-effective methods. Researchers from the ANU's *Centre for Resource and Environmental Studies*, and the *Statistical Constulting Unit* developed the Comparative Environmental Risk Assessment Method (CERAM) to progress corporate environmental management, and to benchmark outcomes from contemporary Environmental Protection Acts.

In 1998, the Environmental Management Planning Committee, and Facilities Division of the ANU commissioned an environmental risk study, as part of a process to develop the Environmental Management Plan for the ANU. It was conducted by this author, using CERAM, and was followed by two subsequent assessments, on a roughly annual basis. The reports have focused on compliance with the ACT EPA, which regulates potentially polluting activities on campus.

The data for the environmental risk studies is gathered by walking around each building on campus, to identify and assess potential sources of environmental pollution. This process also provides the opportunity to take a 'snapshot' of waste issues on campus at the time of the site walk. Because of this, each of the risk assessment reports is also accompanied by a 'waste snapshot', that aims to provide information and advice to assist related waste management initiatives.

# 3. Study Scope

This report takes a third 'snapshot' look at environmental risk and waste management issues on campus. In relation to the environmental risk issues, it assesses the likelihood that contaminants will be released into the environment, and the seriousness of any such pollution that might occur. The report:

- gives an overview of the environmental risk issues on campus;
- compares inherent environmental risks between buildings, and environmental risk areas, with actual environmental practices in 1998, 1999 and 2001;
- identifies instances of non-compliance with environmental requirements, that were observed during inspections;
- describes the observed use of waste facilities provided on campus.

The appendix accompanying the report provides detailed environmental risk ratings for 35 buildings and sites on campus. It also presents photographic images of many of the observed environmental risk issues.

It is also important to recognise the range of environmental questions that are not tackled in this report, or by this study. In particular, the study does not investigate:

- compliance with environmental licensing requirements under the ACT EPA, since these were detailed in previous risk assessments and remain unchanged;
- the actual environmental impact resulting from the environmental risk issues;
- the context for environmental protection on campus, and whether activities conducted by ANU are consistent overall with the achievement of ecologically sustainable development;
- risk and waste issues occurring within buildings;
- sewage and stormwater infrastructure integrity issues;

- trade waste requirements or compliance with these; and
- resourcing of environmental protection initiatives.

It is worth noting that some related initiatives are tackling some of these issues concurrently with this environmental risk assessment. For instance, ANU compliance with trade waste requirements is being undertaken as part of a 2001 audit into workplace health and safety procedures.

# 4. Methods

This section gives an overview of CERAM, and describes how it has been applied to assess environmental risks on the ANU campus, since 1998.

CERAM was designed to assess compliance with Australia's contemporary environmental protection legislation. It was developed in line with the Australian/New Zealand Standard for Risk Management, in that it considers both the likelihood and seriousness of environmental hazards. But CERAM uses definitions for the different levels of likelihood and seriousness that are adapted for environmental, rather than general risks. These definitions are listed in Table 4.1 In addition, CERAM uses an adapted risk assessment matrix, in that numeric, as well as descriptive measures are used to provide environmental risk ratings. Table 4.2 is the CERAM environmental risk assessment matrix.

### Table 4.1 Likelihood and seriousness definitions for environmental risk

| **Likelihood (How likely is the event to occur)** | | | **Consequence (Significance of associated environmental impact)** | | |
|---|---|---|---|---|---|
| **Rating** | | **Definition** | **Rating** | | **Definition** |
| **A** | **Almost certain** | The event is expected to occur in most circumstances | **5** | Catastrophic | Disaster with potential to lead to collapse |
| **B** | **Likely** | The event probably will occur in most circumstances (e.g. weekly to monthly). | **4** | Major | Critical event, which with proper management , will be endured |
| **C** | **Moderate** | The event should occurs at some time ie. once in a while. | **3** | Severe | Significant Event, which can be managed under normal procedures |
| **D** | **Unlikely** | The event could occur at some time | **2** | Minor | Consequences can be readily absorbed but management effort is still required to minimize impacts |
| **E** | **Rarely** | The event may occur only in exceptional circumstances. | **1** | Negligible | Not worth worrying about: |

Source: Australian / New Zealand Risk Management Standard: As adapted by Su Wild River 1997 and BCC 1999

### Table 4.2 CERAM environmental risk assessment matrix

| **LIKELIHOOD** | **CONSEQUENCES** | | | | |
|---|---|---|---|---|---|
| | **5** | **4** | **3** | **2** | **1** |
| **A (almost certain)** | 128 (E) | 64 (VH) | 32 (H) | 16 (M) | 8 (M) |
| **B (likely)** | 64 (VH) | 32 (H) | 16 (M) | 8 (M) | 4 (L) |
| **C (moderate)** | 32 (H) | 16 (M) | 8 (M) | 4 (L) | 2 (N) |
| **D (Unlikely)** | 16 (M) | 8 (M) | 4 (L) | 2 (L) | 1 (N) |
| **E (Rare)** | 8 (M) | 4 (L) | 2 (N) | 1 (N) | 0 (N) |

N = Negligible L = Low M = Moderate H = High

VH = Very High E = Extreme

Source: Australian / New Zealand Risk Management Standard: As adapted by Su Wild River 1997.

Some key points need to be made about the risk assessment matrix. First, note that both the descriptive and numeric ratings are consistent across the diagonal lines from lower-left to top-right. This implies that (for instance), the environmental risk is equivalent for a hazard that will rarely cause a catastrophic pollution event (E5), is unlikely to cause a major event (D4), is moderately likely to cause a severe event (C3), likely to cause a minor event (B2), and almost certain to cause an insignificant event. This feature of the matrix works well in practice, since an individual hazard will frequently be less likely to cause a major event, and more likely to cause a minor one. This diagonal relationship has been carried over to this risk matrix, directly from the original matrix in the *Risk Management Standard.*

Second, note that the scale is comparative, rather than absolute. The upper and lower limits are set by the maximum and minimum risks that have been observed during CERAM assessments both on the ANU campus and elsewhere. By comparing the risk ratings between hazards, and from previous years, the ratings can be used to describe the magnitudes and changes to environmental risk in a meaningful, efficient and effective way.

CERAM uses the definitions and the matrix to identify environmental risk issues, and to apply environmental risk ratings for both inherent and actual environmental risks. On the ANU campus, this is done by walking around the outside of each building on campus, and locating any areas where there is the potential to cause environmental harm through the release of contaminants into the environment. These are the places on campus where chemicals are delivered and stored, and where wastes are removed from the site. They also include all of the areas where work involving potential contaminants is undertaken outside. Intentional or accidental release of contaminants through any of these activities has the potential to cause:

- *air* pollution, including odour problems;
- pollution to Sullivan's Creek, by the release of contaminants to the *stormwater* drains;
- *site contamination*, by releasing contaminants to the soil;
- *noise* pollution to the surrounding area; or
- resource *wastage*, where potentially recyclable materials are instead directed to landfill.

It is critical to note that CERAM estimates, rather than measures, both the likelihood and seriousness of environmental contamination. This distinguishes it from most environmental risk assessment methods, which attempt objective, descriptive measurements of environmental impacts that might occur, through clinical and ecological studies. In addition to being time consuming and costly, these methods are fraught with difficulties that reduce their objectivity and can confound their results (see Sullivan and Hunt. 1999).

In contrast, CERAM simply uses the observations, knowledge and collaboration of risk assessors, to describe a level of risk, using CERAM's 5 ordinal categories for both the seriousness and likelihood of an environmental event. The experiences of many CERAM risk assessors, and the results of statistical analysis, have shown that risk assessors will reliably apply the same categories for both likelihood and consequences, based on their knowledge and consideration of an observed environmental hazard[1].

CERAM's logarithmic scale also demands some discussion. This was applied essentially because the magnitude of difference between environmental risk levels fit readily along such a scale. In practice, risk assessors find they can readily estimate risks that are half, or twice one another. So they find it easy to describe environmental risk differences using the CERAM scale as the estimated seriousness and consequences decrease or increase. In addition, logarithmic relationships are commonly found between elements of ecological systems, and their responses to environmental harm. For both these practical and analytical reasons, it seemed sensible for CERAM to adopt a logarithmic scale.

Fourth, note that the 'zero' that appears in the scale does not imply the complete absence of an environmental hazard. Instead, it implies that environmental risk of a zero-rated hazard is so small as to approach zero in comparison to other risks.

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[1] See Wild River, S. 2001 in November edition of Australian Journal of Environmental Management. Forthcoming.

Each environmental hazard that is identified during the site-walk receives a rating for both inherent and actual environmental risk. The inherent environmental risk is *the risk to environmental values if the activity was carried out without environmental management considerations*. Inherent environmental risks tend to be consistent over time, since they relate to the fundamental nature of a hazard, and not the environmental controls that are applied to it.

The actual environmental risk is the *residual environmental risk of an activity, taking account of the risk management measures.* The actual environmental risk rating is equal to inherent environmental risk if no risk management measures are applied. If the observed environmental risks have been reduced through management or infrastructure solutions, then actual environmental risk will be lower than inherent environmental risk.

# 5. Environmental risk findings

This section analyses and presents the results of the 2001 environmental risk assessment. Current actual environmental risks are compared to actual environmental risks that were observed in 1998 and 1999, and to the inherent environmental risks for each building on campus. Note that only buildings with environmental risk issues are included in the analysis. The only observed risk in buildings such as libraries, lecture theatres and faculties where only reading-and-writing research and teaching are undertaken was the risk of wasting, rather than recycling paper waste. This is relatively minor, and environmental issues facing these buildings are better assessed as waste management, rather than risk issues, and these are covered later on.

The discussion is broken into two areas of environmental risk analysis. First, risks are discussed in relation to each type of building on campus (other than the libraries, and others mentioned above). Second, each environmental risk area is discussed, including water, site contamination and others. Graphs showing total, mean and unmanaged risks are presented for both the buildings and environmental risk areas. The environmental risk scores have been converted to their natural logarithms in the graphs showing total and mean environmental risk ratings. This is the best way to represent those ratings, because of the nature of the environmental risk ratings scale. The graphs for unmanaged risks show the proportion of actual risk, to inherent risk. The risk reductions are calculated as the proportional change in actual environmental risks between 1998 and 2001. Both of the risk reduction scores are calculated using the raw risk ratings, without conversion to logarithms.

## 5.1 Building type

Environmental risk issues on campus can readily be described in relation to the types of activities that are undertaken in different buildings. The following sets of buildings all have similar inherent risks to one another within the set, and these differ between the sets.

- *Science* buildings have delivery bays where chemicals used in experiments are delivered, stored, and where wastes are stored for removal. All of the delivery bays at science buildings drain to stormwater, although there are separate, bunded areas for liquid waste storage at some sites.
- *Food* buildings all have delivery and waste areas that drain to stormwater. Most of them store a large drum of waste oil ready for pickup, which are lidded and unsealed, and generally very close to a stormwater drain. Other wastes are also stored and often sorted.
- *Arts* buildings include the two theatres on campus, and the school of art. Art supplies and wastes are stored and used, and equipment is cleaned.
- *University services*, were not specifically investigated as a building-category until this year. These are the buildings that provide gardening, maintenance and other services to other parts of the campus. In these sites, vehicles and other equipment are cleaned, and chemical products and wastes are stored.
- *Construction*, activities were again not specifically investigated as a building-category until this year. These are temporary building sites, and all of the environmental risks observed are short-

term issues.

- Other buildings comprise the remaining buildings at which environmental risk issues were observed.

Appendices 1-6 detail the environmental risk ratings for all sites in each type of building in turn. The appendices also present photographic images of key environmental risk and waste issues across campus.

Figure 5.1 shows total environmental risk by building type. This is the total contribution to campus environmental risk by the different types of buildings. Science buildings make the biggest contribution, partly because there are so many of them. 14 science buildings were identified as having environmental risks, compared with three arts buildings and seven food buildings. Total actual environmental risk increased at science buildings between 1998 and 1999, but has now reduced to a level below the 1998 level. Total actual environmental risk at food buildings has reduced at all other building types, and for the campus overall, has reduced since 1998. Since construction activities and the remaining other buildings were detailed for the first time in this risk assessment, there is no previous data to compare the 2001 risk scores with.

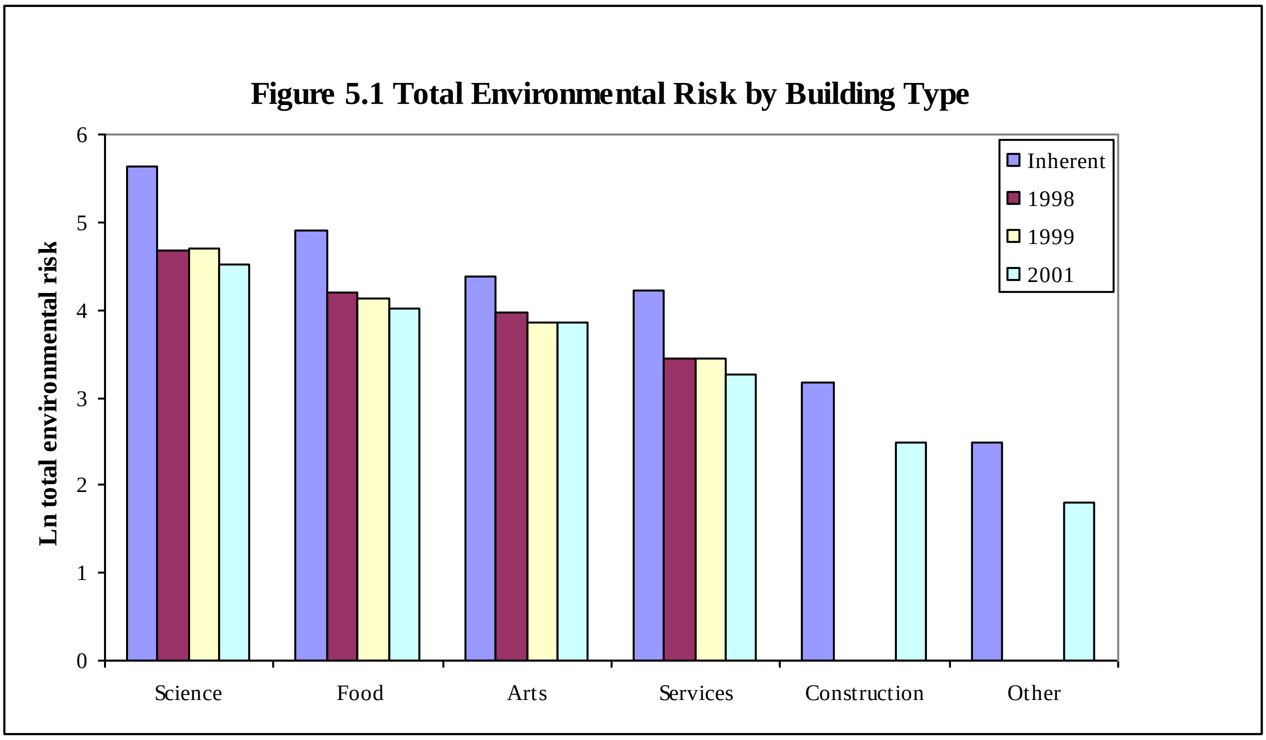


Figure 5.2 shows mean environmental risk by building type. This graph shows that individual arts buildings tend to have higher inherent and actual environmental risk than individual science buildings. Although mean inherent environmental risks are slightly higher at science buildings than in food areas, the mean actual environmental risks are higher at the food areas. Service areas have lower mean inherent and actual environmental risks than these other building types.

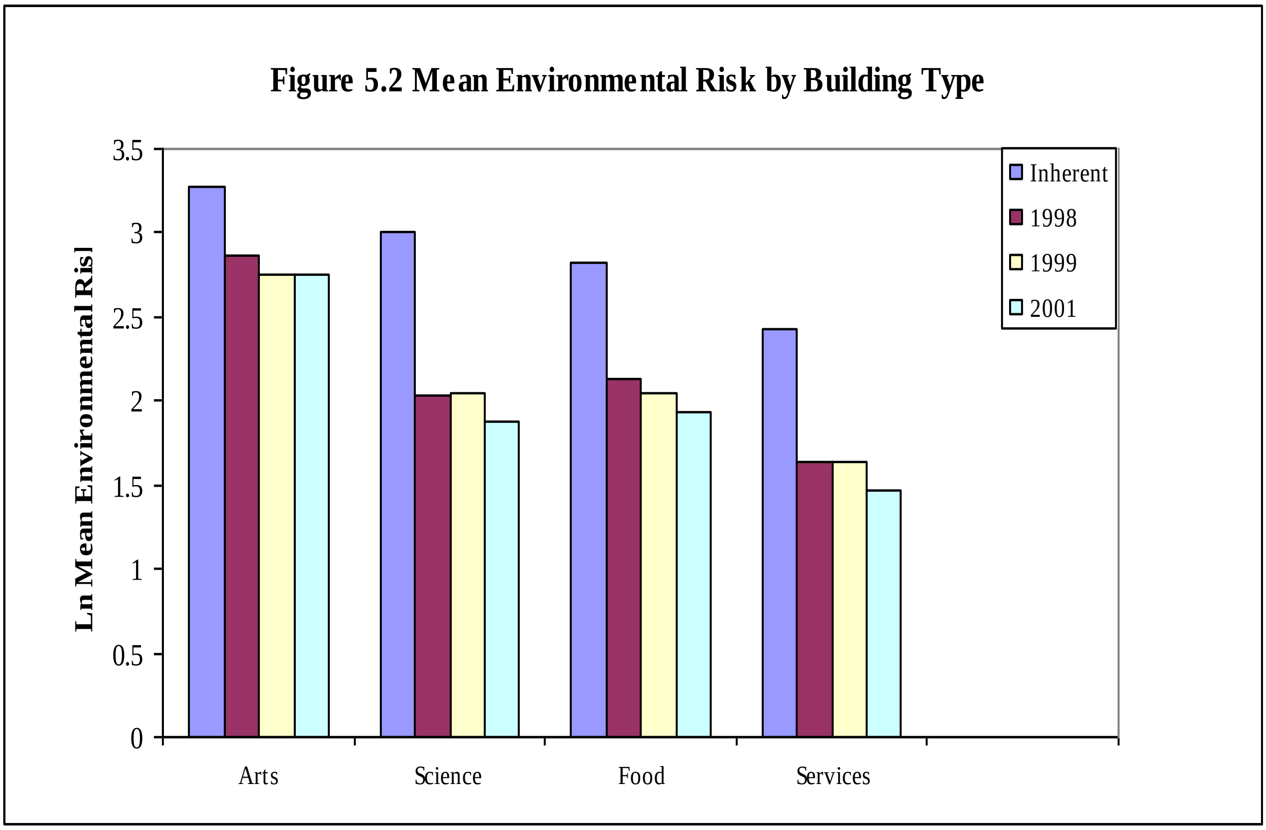
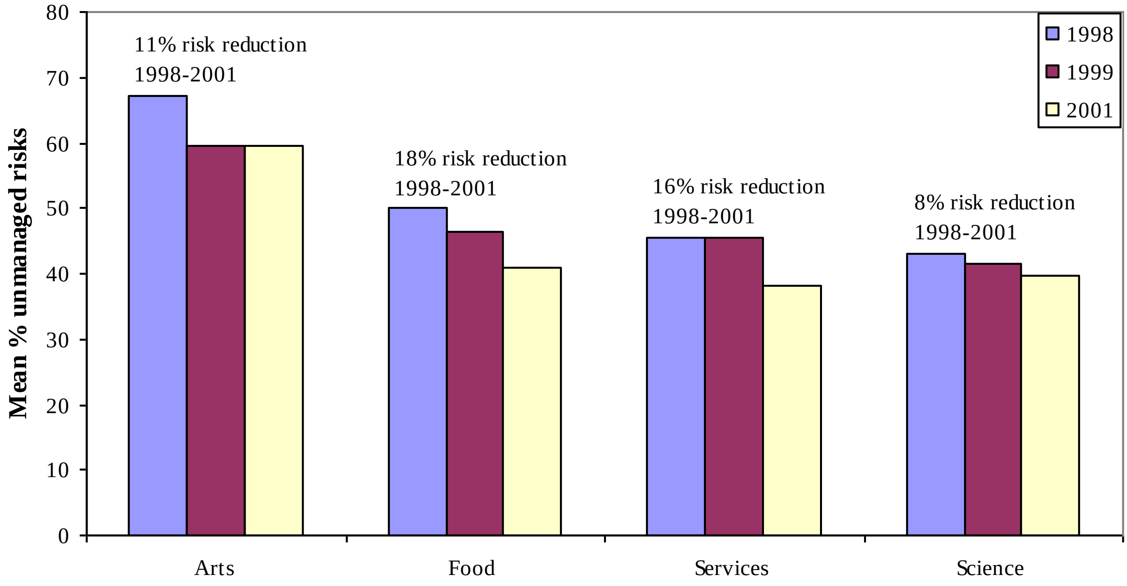


Figure 5.3 shows the mean percentage of unmanaged risks by building type. This graph shows that arts buildings have the highest proportions of unmanaged risks on campus, with two-thirds of environmental risks unmanaged. Arts buildings have reduced their environmental risks by 11 per cent since 1998. The proportion of unmanaged risks at food buildings has reduced since 1998, by 18 per cent, from over half, to just over 40% of risks unmanaged in 2001. Service and science buildings have consistently managed over half of their environmental risks since 1998, and are continuing to improve.

**Figure 5.3 Mean percent unmanaged risks by building type**



# 5.2 Environmental Risk Areas

Environmental risk areas refer to the types of environmental values that would be threatened as a result of pollution events on campus. The five environmental risk areas covered in this study are:

- *Water* pollution, which is usually caused by the disposal of contaminants into the stormwater system, where they will flow untreated to Sullivan's Creek during the next rain event;
- The risk associated with *waste*, which refers to the risk that potentially recyclable materials or regulated wastes might be deposited to landfill, rather than being recycled, or disposed of at approved regulated waste facilities;
- *Site contamination*, which is caused when contaminants are left on the soil, so that they will cause ongoing pollution on that site. There is usually a trade-off between site contamination and stormwater risks, in that sites that are covered in gravel tend to have site contamination issues, whereas areas covered in bitumen or concrete will tend to flush wastes into the stormwater drains;
- *Air* pollution, including odour, occurs when contaminants are released into the atmosphere; and
- *Noise* pollution occurs through releases into the acoustic environment, especially when noisy sites are near noise-sensitive areas, or when noise is produced at otherwise quiet times of the day.

Figures 5.4 shows the total environmental risk on campus, relating to these five environmental risk areas. The risk of water pollution is higher than any other risk issue, followed by waste, site contamination, air and noise. The same pattern holds for mean environmental risk for all buildings, as is shown in Figure 5.5.

**Figure 5.4 Total environmental risk by risk area**

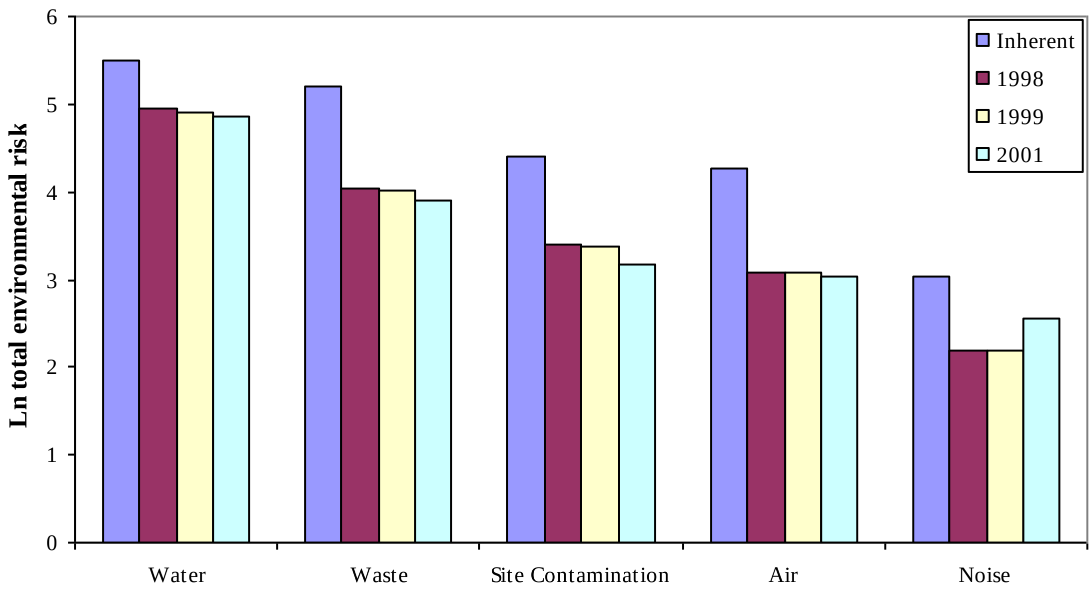


**Figure 5.5 Mean environmental risk by area**

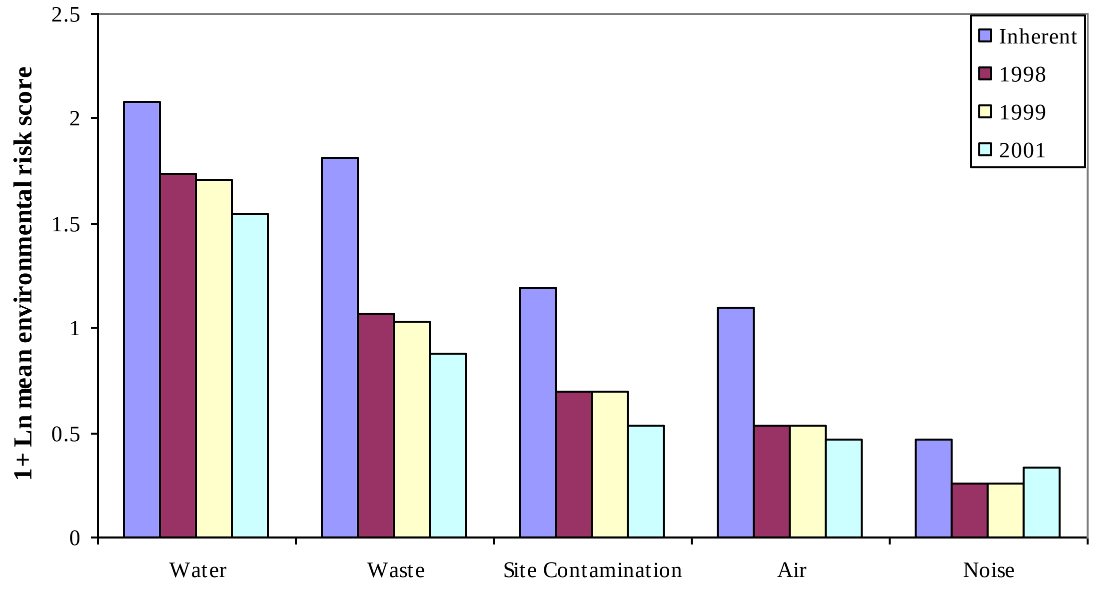
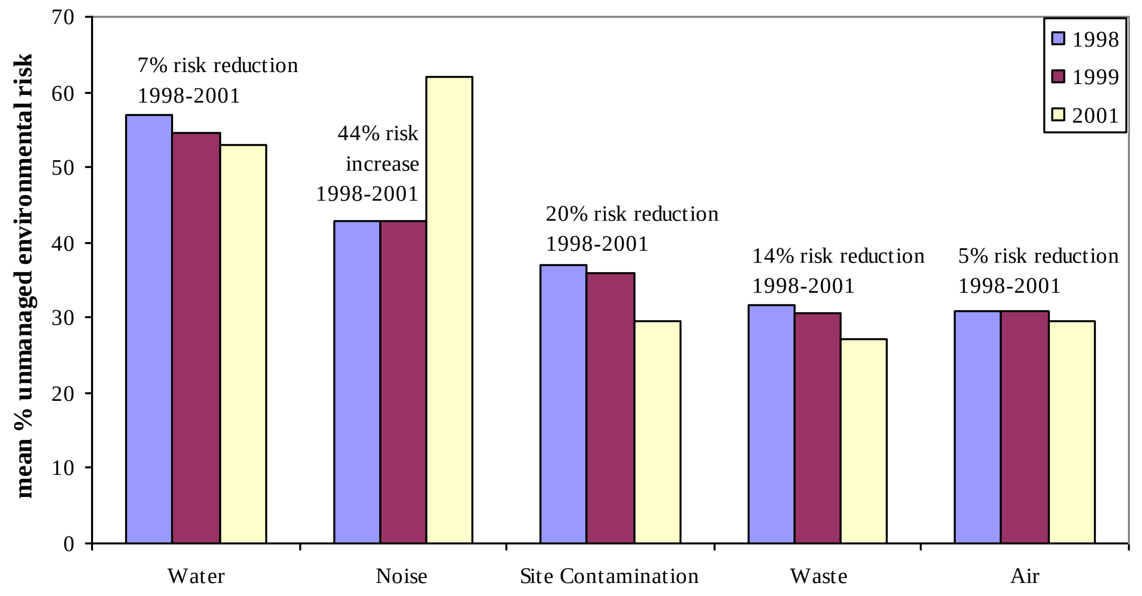



Figure 5.6 shows the mean percentage of unmanaged risks by environmental risk area. Again, water has the highest level of unmanaged risks, and these have been reduced by 7% between 1998 and 2001. While noise pollution is shown to have increased by 44% since 1998, this is partly because construction activities have been reported for the first time in this report. Construction activities are inherently noisy, and this accounts for the apparent increase.

**Figure 5.6 Mean percentage unmanaged risk by environmental risk area**



# 6. Non-compliance

As with previous years, several minor environmental offences under Section 23 of the ACT EP Act were observed. These offences can incur on-the-spot fines. There are two levels of offence under Section 23. The first is more serious, and relates to direct pollution of the stormwater system by paint, automotive fuels, oils or greases, cooking fats or oils, degreasers, detergents, or by animal, food or other wastes. Five specific breaches of this were observed, or identified by site managers.

The second level of offence is less serious, and relates to leaving any of the same substances unattended within 10 metres of a drain, if they are exposed to rain or runoff. Two instances of this offence were observed.

There is also a general issue that can make it easier to breach, than to comply with the environmental requirements. The issue occurs in most of the science, food and art buildings on campus. The problem is that all of the loading bays drain to stormwater, and many of the specified substances are delivered to, and stored within the drain area. Liquid wastes are also often kept in the same loading bay, awaiting pick-up. Similarly, many of the waste facilities on campus drain to the stormwater. These areas make up all of the areas on campus with high environmental risks. If spills occurred in any of these areas, it could be difficult for site managers to avoid polluting the stormwater system, and breaching the EP Act. Although large spills are unlikely, they could occur at some time, and if they did, they could cause a high-level consequence. In addition, small spills are likely, such as when unsealed waste containers are emptied or removed. When these small spills occur, workers sometimes clean them up by hosing the site, thereby flushing the accumulated substances into the stormwater system.

This risk assessment report is recommending that ANU management address this issue through the stencilling, drain-checking, brochure, training, stormwater management plans and considering retrofitting several areas. Management solutions and simple, standard equipment can significantly reduce environmental risk in these areas.

Instances of non-compliance are detailed in Appendix 7, which also includes photographic images of most of the instances.

# 7. Waste findings

Waste issues on campus were relatively unchanged since previous years. Photographs and commentary on the main waste issues that were observed are provided in the appendix. But rather than dwell on the detail, the author offers the following observations and recommendations about waste management practices on campus.

The quality of waste management and recycling systems and practices varies considerably across campus. This variability applies as much between buildings with similar waste issues, as between those with differences. But the management regimes observed at each site on campus have been relatively consistent, in that well managed sites have remained well managed, and poorly managed sites remain poorly managed. The following recommendations are made in light of this.

- *Provide the right waste services.* Consider what waste types and quantities are produced at different locations. Match these with waste service providers, and ensure the effectiveness of the systems provided in the specific waste areas.

- *Ensure sufficient waste services.* Provide enough bins to cope with peak flows of wastes. Where variation in the waste flows creates difficulties in this, ensure that there are systems to enable extra bins or extra pickups during peaks.

- *Encourage and support waste managers*. Formally recognise a waste manager for each site, and provide a duty statement and management support for waste management.

# 8. Recommendations

This section provides a brief commentary on some of the key recommendations made as a result of this study. It focuses on the proposals for environmental management training, stormwater management plans (SMPs), drain checking and stenciling and a brochure on environmental management. The goal here is to stimulate discussion and debate about these recommendations, and to suggest how they might be integrated to achieve significant outcomes efficiently and effectively.

The recommendation for environmental management training targeting at least 24 site managers may seem onerous and daunting to ANU management. However the author does not intend for this to be the case. The training would aim to cover some simple concepts, in brief, highly applied and practical sessions. The SMPs that are also recommended for most of the sites where managers would receive training are also intended to be simple and practical. In addition, the brochure is intended as a document that would support both the training and the SMP development, as well as providing information to a broader community of campus environmental managers, who would not necessarily receive the training.

Essentially, it is envisaged that site managers be invited and encouraged to attend an initial two-hour training session, along with others facing similar risk issues. So site managers from science buildings would attend together, as would those managing arts, food areas and so on. General preparation for the initial two hour session would include stenciling of stormwater drains in the loading bays and other high-risk sites, and checking of drains which might receive contaminants, and that are not shown on the campus map. Specific preparation would include the printing of site maps for each manager, showing all sewage and stormwater drains, and any other environmental risk issues specific to the site that each trainee is responsible for. The training sessions would then cover:

- Environmental management concepts, especially the impact of contaminants on ecosystems;
- Ways that contaminants can enter ecosystems, especially through the stormwater drains;
- Requirements under the ACT EPA;
- ANU environmental policies; and
- Management and infrastructure pollution solutions.

The brochure would also cover many of these topics, and would be used as a guide during the training session. The above would all be described in simple terms, and could take around one and a half hours.

Training participants would then be issued with the site map related to their building, and be given instructions for developing a simple stormwater management plan. Plan components would be based around the scope of SMPs that is required by current New South Wales Environmental Protection Legislation (see www.epa.nsw.gov.au/stormwater/smp.htm). Suggestions for each potential plan component would be provided, and these would include:

- Management objectives;
- Identification of management problems and issues;
- Management practices and infrastructure solutions to address the identified problems and issues;
- An implementation schedule;
- A monitoring program to identify and address SMP shortfalls;
- A mechanism for reporting the effectiveness of the SMP to appropriate ANU management; and
- A program for revising the plan.

It is envisaged that a first draft of the SMPs would be developed during the training session. Participants would then go back to their work areas and consider the environmental management issues further. A short follow-up session would then be held about a month later, to provide the opportunity for feedback on the training and the SMPs, and for further assistance to the site managers in SMP implementation.

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