

## **Local Environmental Risk Assessment as a Sustainability Education Tool**

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### **Abstract**

Experience in Australia has demonstrated that problems arise when sustainability requirements appear to conflict with individual development rights or local lifestyles. Community partnering between government and the public is therefore of fundamental importance in working towards sustainable development. Unfortunately genuine partnering is only rarely achieved today, and consultation is a poor working alternative.

Research at Sutherland Shire Council has concluded that citizens are prepared to undertake genuine partnering, including personal involvement in understanding and initiating lifestyle changes. However such willingness is subject to being provided with adequate information and with a genuine government commitment to take action.

The paper describes a local environmental risk assessment procedure which successfully informs citizens about local risks and which demonstrates government commitment to openness and facts-based sustainability planning.

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### **Introduction**

Local Agenda 21, a global action programme for sustainable development framed at the 1992 Rio de Janeiro United Nations Earth Summit (UNCED 1992), was rebadged at the 2002 World Summit on Sustainable Development as "Local Action 21". Many of the problems and solutions in sustainability are based in local activities. The LA21 calls upon local authorities in every country to develop better consultative processes with their citizens and to develop sustainability-based local plans.

The recommendation from the United Nations implied that communities would embrace sustainability. Experience since 1992 has demonstrated that problems arise, particularly in affluent countries, when Ecologically Sustainable Development (ESD) may appear to conflict with individual development rights or local lifestyle choices (Hajer and Kesselring, 1999). For example, some Australian communities have criticised aspects of urban consolidation, including even the few well planned and communicated aspects, despite the benefits in reducing urban sprawl, bushland loss and transport distances.

An important step identified in Local Agenda 21 was the need for the formation of local authority and community partnerships (Cotter and Hanan, 1999). Involvement of the community in planning has always been fundamental to successful plan development.

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Local Agenda 21 recognised a need to move beyond community consultation into community partnering to achieve agreement and commitment between a community and its local authority for a plan. The dependence of ESD on individual citizen behavioural change, and the political complexity of land use planning, make genuine community partnering of fundamental importance. Unfortunately genuine partnering is only rarely achieved today, and consultation is a poor working alternative.

A popular dictionary describes a partner as "a person associated with others in business of which he shares risks and profits". The present paper describes the application of environmental risk assessment method to local area planning as a basis for more sustainable planning and for securing community partnerships.

### **What do Citizens Want as Sustainable Planning Partners?**

In 1999 we at Sutherland Shire Council undertook citizen panelling to assess citizen perspectives on local plan alternatives for our large local government area of 200,000 residents south of the Sydney Business District. The exercise was facilitated by an independent community consultation consultant and was overseen and evaluated by students of a university-accredited post-graduate course. The citizens were presented with detailed environmental and related scientific information and with alternative plan approaches aimed at minimising environmental risks to their local areas.

Key outcomes of the panelling process included:

- the presentation of information describing and documenting local environmental risks was readily accepted by the citizens' panel;
- the citizens demanded even more information than was presented in a few hours; and
- citizens exhibited a scepticism over the independence of government information and the resolve of government to implement effective planning.

A strong message from this panelling process is that citizens were prepared to undertake genuine partnering, including personal involvement in understanding complex information related to constraints on plan options and limits to growth and lifestyle. However, such willingness was subject to being provided with adequate information and with a genuine government commitment to take action.

We are confident from this and other work that an understanding and ownership of local area risk is a necessary prerequisite to citizen partnerships with local government.

The present paper describes an environmental risk assessment procedure which has been adapted to local planning to inform citizens about local risks and to demonstrate government commitment to openness and facts-based plan-making. The results of a travel blend project which followed and benefited from the risk work, resulting in reduced motor car use by Shire households, are also presented.

### **What is Local Environmental Risk Assessment?**

The value of a risk assessment approach to determining and communicating desirable limits to given activities is illustrated in the wide number of professional programs which currently undertake some form of risk assessment. This includes the health, finance and insurance industries.

Risk assessment in the environmental context has developed over several decades, including early work in human health outcomes and, more recently, in ecological risk assessment (Smith, 2002; EMA, 2002; Norton et al., 1995).

Risk assessment traditionally involves the following steps ( USEPA 1986):

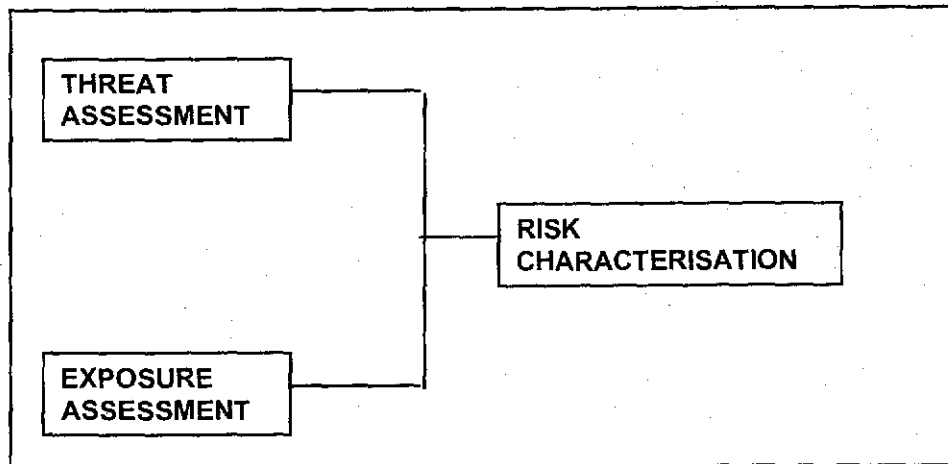


FIGURE 1: The Threat/Exposure Relationship in Risk Assessment

- description of a “threat or hazard” which, for example, may be habitat loss for biodiversity or hard surfaces for land alienation;
- the extent of “exposure” to the hazard, which may be estimated by modelling or direct measurement, such as area of habitat loss or amount of critical habitat linkage loss;
- estimation of a “risk”, due to a combined threat and extent situation, which is a likelihood of a negative effect; and
- consideration and discussion of “uncertainties” which may be inherent in arriving at the risk estimate.

Risk assessment is a useful sustainability education tool because an assessment requires and thereby demonstrates that both a threat and an exposure must be present for a risk to exist (Figure 1).

### Local Environmental Risk Assessment Application in Planning

A local risk assessment was undertaken as a pilot project on the Oyster Bay area, a community of some 10,000 people on the Georges River in Sydney’s south.

Human and ecosystem hazards for Oyster Bay were identified from first principles by assessing local development hazards to air, biodiversity, land and water. For simplicity, representative indicators of human or ecosystem health were used for the analysis. For example, vertebrates were chosen as the indicator species for biodiversity, and impervious surfaces chosen as the indicator for land use. The key biodiversity hazard was loss of habitat, particularly by clearing residential land for development. In order to include social, economic and environmental considerations in the risk assessment, hazards such as traffic safety and congestion were also considered.

Following the consideration of hazard, attention was also given under each environment category to the potential extent of exposure of humans or the ecosystem to the hazards. A risk, categorised as high, moderate or low, was assigned to each hazard/exposure outcome. Finally, uncertainty was assessed for each risk assessment.

The individual risk reports for the different environmental components were published on the internet together with a summary risk assessment. This was done in order to make the risk assessment methods and results publically accessible.

An additional component of the risk summary was a ranking of the environmental risks based on a prioritisation procedure. This ranked the key risks with respect to

TABLE 1: Prioritised Risk Actions Used at Oyster Bay

HIGHER PRIORITY
Reduce large habitat loss
Reduce car ownership and use
Decrease microbials in water
Impervious surface reduction
Avoid waterfront habitat loss
Decrease sediment load in water
Avoid linkage habitat loss
Decrease chemical pollutants in water
Improve local air quality
Avoid soil destabilisation
Avoid climate changing activities
Manage contaminated sites
LOWER PRIORITY

the scale of the risk (e.g., wide geographic significance, large population impacts) and quality of the risk (e.g., well-researched databases, corroboration by independent experts). This prioritisation step was undertaken independent of, and subsequent to, the risk assessment so that the two processes would not influence each other and is consistent with good risk assessment practice (USEPA, 1986). The summary risk assessment and detailed risk reports remain accessible on the internet at [www.suthlib.nsw.gov.au/environmental\\_science](http://www.suthlib.nsw.gov.au/environmental_science). The prioritised risk actions used for workshops with the community at Oyster Bay are listed in Table 1.

The sustainability education which combined the risk assessment process and the planning process was undertaken in a community workshop with the Oyster Bay residents. The risk assessment was posted on the internet to enable detailed examination by residents and summary documents were provided by mail prior to the workshop. A priority in the process was enhancement of community access to the basic risk methods and results as well as support for community consideration and questioning of the material.

Several community workshops were held to discuss the detailed risk assessment approach and results. The workshops identified and discussed the environmental risks affecting Oyster Bay and sought suggestions on how these risks could be managed. The ultimate goal was to include a review of residential zonings, including development of a housing strategy involving consideration of neighbourhood character and neighbourhood centers (Smith and Drinnan, 2004).

An assessment of the application of local environmental risk assessment to the Oyster Bay planning process resulted in the following findings:

- the citizen-identified risks for Oyster Bay showed a good correlation with the Council-identified risks;
- the citizen priorities on risk were slightly different from the Council prioritisation. This was identified as due to:
  - A general citizen concern with the scale of development (notably traffic congestion and bushland loss)
  - A high citizen priority on acute risks such as bushfire;

TABLE 2: Illustration of the Risk Actions Relationship Between the Community and Council in Oyster Bay

<u>Community-Based Action</u>	<u>Council-Based Action</u>
	Reduce large habitat loss
Reduce car ownership and use	
	Decrease microbials in water <sup>1</sup>
Impervious Surface Reduction	Impervious Surface Reduction
Waterfront habitat loss avoidance	Waterfront habitat loss avoidance
Decrease sediment load in water	Decrease sediment load in water
Avoid linkage habitat loss	Avoid linkage habitat loss
Decrease chemical pollutants in water	Decrease chemical pollutants in water
	Improve local air quality <sup>2</sup>
	Avoid soil destabilisation
	Avoid climate changing activities
	Manage contaminated sites
1. Includes State Government responsibilities	
2. Community may minimise solid fuel heater impacts	

- a significant proportion of citizens expressed a willingness to consider lifestyle changes which could be reflected in local plans, consistent with the risks identified by Council and the community; and
- council planners reported the risk assessment approach as very useful with respect to Council and community understanding of environmental issues and any implications of planning choices.

These results are important in the light of the need for plans to be based upon good information and the willingness of citizens to participate in plan making and implementation.

In previous international work on risk assessment and risk perceptions, the US Environmental Protection Agency (EPA) identified significant disagreement between human and ecosystem risks identified on a scientific basis versus those normally identified by communities (USEPA, 1987). In the Oyster Bay case, it was clear that the publication of the risk assessment and its analysis in a planning workshop format led to significant agreement on risk issues and priorities for the local authority and the community.

### Opportunities Provided by a Risk Assessment Approach to Local Area Planning

Harding (2000) has noted that factors which contribute to high levels of uncertainty and ignorance in environmental risk management include lack of understanding of important cause-effect relationships, lack of scientific theory for exploring these, and poorly understood models.

A particularly important outcome of the risk assessment planning process is the opportunity for joint community and Council understanding of, and commitment to, clear risk-based planning actions relevant to the case at hand (Smith and Drinnan, 2004). An important opportunity in sustainability education resulting from the risk

assessment process results from the illustration of actions which are principally addressed by one or other of the parties, or which may be jointly addressed (Table 2).

Other opportunities identified by the pilot exercise process and the workshop outcomes include:

- enhanced equity for the community in the planning process;
- better understanding of planning options and pathways in light of risk information;
- enhanced trust between the local authority and citizens based upon clear discussion of risk and planning issues;
- enhanced capacity for committed partnering between community and the local authority with respect to planning options; and
- an opportunity for the local government authority to plan for appropriate infrastructure to address sustainability associated risks.

### **Summary of The Oyster Bay Travelblend Project Outcomes**

The Risk Assessment Study for Oyster Bay confirmed that the residents of Shire peninsula suburbs have high dependency on motor vehicle use and car ownership levels. To address the various risks identified, a partnering process between the local community and Council was established to demonstrate that travel improvement can be achieved, even in a car-based high socio-economic situation. The 'Oyster Bay Trip Substitution' project provided one of the first opportunities for Council and local community to jointly tackle the impacts associated with high car use in the area. Oyster Bay was chosen as the location for the study in light of the established risk dialogue developed in the earlier planning process, and of the subsequent ongoing interaction between the Council and the community.

The key objectives of the Oyster Bay Trip Substitution project were to:

- reduce motor vehicle emissions (reactive organic compounds and oxides of nitrogen);
- increase community awareness and education regarding transport, air pollution and personal responsibility for the environment;
- encourage greater community interaction;
- assess the potential of using household travel behaviour tools to reduce the demand for car trips; and
- assess the potential to replicate the project in other areas of the Sutherland Shire.

To undertake the project a grant was provided by the NSW EPA to Sutherland Shire Council as part of the EPA Local Air Improvement Program.

The pilot project resulted in 25 households changing their travel behaviour and dependence on the car. The Oyster Bay project demonstrated the potential benefits of targeting travel behaviour as a means of reducing car use and its potential application on a larger scale. The results are consistent with other major travel behaviour projects undertaken in Gloucester and Frome in the UK and Perth in Western Australia where much larger household sample sizes, ranging from 600 to 15,000 households, were used.

Analysis of the results using the ICLEI 'Cities for Climate Protection' analysis program, showed that even the 47 persons who completed the project would make collectively the following annual savings:

- 53,700 km reduction in equivalent travel;
- 14 tonnes CO<sub>2</sub> reduction; and
- \$ 24,200 reduction in vehicle fuel and maintenance costs.

TABLE 3: Change in % Mode Share of All Trips Using Travel behaviour tools

Area	Oyster Bay (Travel Blending)	Perth (Travel Smart)	Gloucester UK (Travel Smart)	Frome UK (Travel Smart)
Car as Driver	-13.5%	-6%	-4%	-3%
Car as Passenger	+2.5%	+1%	-1%	-2%
Public Transport	+30%	+1%	+1%	+1%
Walking	+9%	+2%	+3%	+3%
Cycling	0	+2%	+1%	+1%

The project results (see Table 3) show that addressing travel behaviour can have a positive impact on reducing the use of motor vehicles and emissions produced. Significant changes in travel choice will be needed if it is to have a significant impact on our roads and the environment.

The Oyster Bay project has provided an important insight into the travel behaviour of households in the peninsula areas of the Sutherland Shire. It also shows that building on risk and travel behaviour methodologies can help address the issue of motor vehicle usage patterns.

*Keywords:* Local Government; Environment; Risk; Partnerships; Sustainability.

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