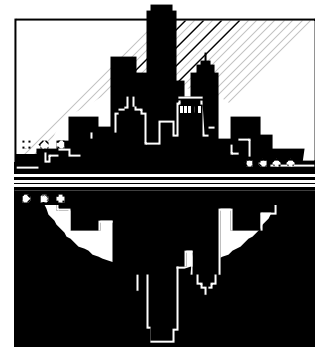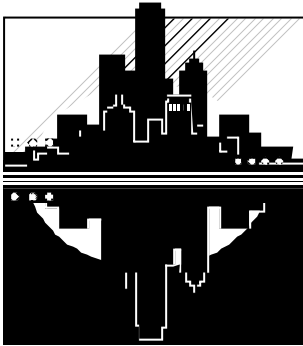# STATE OF THE ENVIRONMENT REPORTING: A Review of the Concept and its History, and its Application to the City of Gold Coast

Evan Thomas

May 1997

Environmental Research Studies No. 1

Summary

To achieve its vision of a sustainable city the Gold Coast needs to establish a system of regular monitoring and reporting on the environment (both built and natural), and to develop appropriate responses. Commitment to this vision will move the Gold Coast toward ecologically sustainable development (ESD) and underpins the Councils emerging Local Agenda 21 program. Local Agenda 21 seeks to achieve ESD at the local scale in the 21st century. This paper reviews the background to ESD and environmental reporting, identifies current achievements and identifies a staged strategy for environmental reporting on the Gold Coast.

State of the environment reporting (SoER) is now a widely used and recognised process to quantify the current state of the environment, the pressures it faces, to review the performance of current responses, and to identify the actions required to meet future goals. SoER aims toward ESD and it, or its equivalent, is often a major component of Local Agenda 21 programs.

SoER has been done by a number of countries including Australia. Many Australian States have done reports and all are now doing reports. Local Governments in NSW have begun doing regular SoERs as a requirement by their Environment Protection Agency. In Queensland there is no specific legal requirement for local government to do SoERs, but larger councils like Gold Coast and Brisbane, are beginning. Current initiatives in south-east Queensland, as part of SEQ2001, are attempting to establish benchmarks and monitor progress toward environmental and social goals. This provides further impetus for local SoERs by member Councils.

The most successful SoERs at the local level used extensive consultation within the council and outside with the community. Increased ownership of the process and resulting report can be achieved by encouraging active participation and collaboration by contributing groups.

A SoER for the City of Gold Coast should aim to produce a document that will assist in planning and policy decisions. The report should follow the Pressure-State-Response model most commonly used in SoER. This model helps identify benchmarks, goals and data gaps, and compares the performance of current responses against the benchmarks and goals, and may suggest new initiatives to help address any negative findings or increased pressures being faced.

The strategy, proposed for the Gold Coast's first SoER, has a strong emphasis on internal consultation with community participation through the Committees. This recognises the need to make more use of the considerable amount of environmentally relevant information held by the Council; the need to involve all sections of the Council in the production of the report using an open and participatory method for consultation aimed at increasing ownership of the SoER; the need for community consultation as early as possible using existing Council committees. This strategy also allows the Council to test and refine the process for consultation and the reporting structure as a basis for more effective public consultation on future the SoERs.

The first report is expected to be published in July 1997 but could not be considered definitive because of the limited input from the community. Future SoERs will need to consult more to develop and improve the report and its relevance to Council and community alike.

Subsequent reports should be produced every 2 years. This time frame will allow for policy and practice changes that are adopted by Council and the community to show results. The time scale for observable change on many environmental issues is longer that one year and is often longer than ten years.

To date the SoER process has involved four phases. The first phase was to identify the major themes. These were Air, Land, Water, Biodiversity, Noise, Waste, Heritage, Socio-economic. The second phase was to use an open process within Council to identify and include lead sections and to refine the indicators that are most relevant to the Gold Coast within each theme. The third phase was to set up working groups of relevant staff for each theme to assist each lead section in contributing to the report as described in the Appendix . The final stage is to facilitate and coordinate the production of the first report. As well as contributing to sections of the report, this will be the function of the Research Unit.

However, a successful SoER process will not just produce a report on a regular basis. It will engender improved communication within Council, and with the community, on a broad spectrum of environmental issues. The report, although valuable in itself as a planning and monitoring tool, also acts as a focus for communication.

The initiation of an SoER for the City of Gold Coast puts the Council in the still small group of Local Governments around the world that are moving toward ESD. Improved environmental understanding and dialogue will be an essential part of this process.

Table of Contents

1. INTRODUCTION

The vision for the City of the Gold Coast, as expressed in the Corporate Plan, is that of a world *city recognised for its worlds-best-standard sustainable environment, and its facilities and services* (Gold Coast City Council 1996). This is a considerable commitment to ecologically sustainable development (ESD). This commitment follows a general and increasing level of environmental awareness and concern by the community, both domestically and internationally. This is shown through studies such as 'Our Common Future' often referred to as the Bruntland Report (WCED 1987) and more recently in the United Nations Earth Summit at Rio in 1992 which produced Local Agenda 21. Agenda 21 strives for ESD in the 21st century, Local Agenda 21 brings this ideal to the local and regional scale.

The City of the Gold Coast, like all other local governments in Australia, is addressing ESD and Local Agenda 21 in conjunction with the Inter-Governmental Agreement on the Environment (IGAE) (Commonwealth of Australia 1992a) and in the accord between the Commonwealth of Australia and Local Government (Commonwealth of Australia 1994a). Australia was one of 178 nations that committed to Agenda 21 at the Rio summit. The IGAE and the accord, while not strictly binding on local government, bring these commitments on ESD from the international to the local level.

But what does ESD really mean? WCED (1987) defines this as *'development that meets the needs of the present without compromising the ability of future generations to meet their needs'*. The Commonwealth Government (Commonwealth of Australia 1994c) defines ESD as *'Development that improves the total quality of life both now and in the future, in a way that maintains the ecological processes on which life depends'*. Both of these definitions are consistent and correctly identify ESD as a process for achieving sustainability not an end in itself (Cotter and Wescott 1996). All recognise that there is no point at which ESD can be said to have been achieved.

ESD is based on five principles: Inter-generational equity, intra-generational equity, the precautionary principle, conservation of biological diversity, and internalisation (or recognition) of all environmental costs (Commonwealth of Australia 1992b). Hare *et al*. (1990) identified 13 principals which were more specific, but are largely reflected in the more general principles listed above.

ESD does not preclude economically sustainable development but it is different from it. ESD is based on ecology, which is the study of organisms, including people, and their relationship with the environment. It is these relationships which must be understood and sustained to achieve ESD. Economically sustainable development refers to sustaining economic growth and has a shorter-term focus than ecologically sustainable development. Development and growth are often confused when discussing ESD. The principle of qualitative growth is said to be more in-tune with ESD as opposed to quantitative growth which is restricted to economically sustainable development (Hare *et al.* 1990, Daines 1996).

It has been recognised that unless something was ecologically sustainable, ie. in the long term, then it would not be economically sustainable (Cotter and Wescott 1996). This means that the costs of supporting a landuse or development style that runs counter to fundamental principals of ecology would eventually outweigh the benefits. Society may choose to fund these costs but must also account for them (internalisation of costs). Consequently ESD must involve a process of balance. This balance needs to reflect the three different parts of human communities; ecology, economy and society. These parts are not mutually exclusive and are important. Hence the balance point is in the middle where due attention is paid to each as shown in Figure 1.
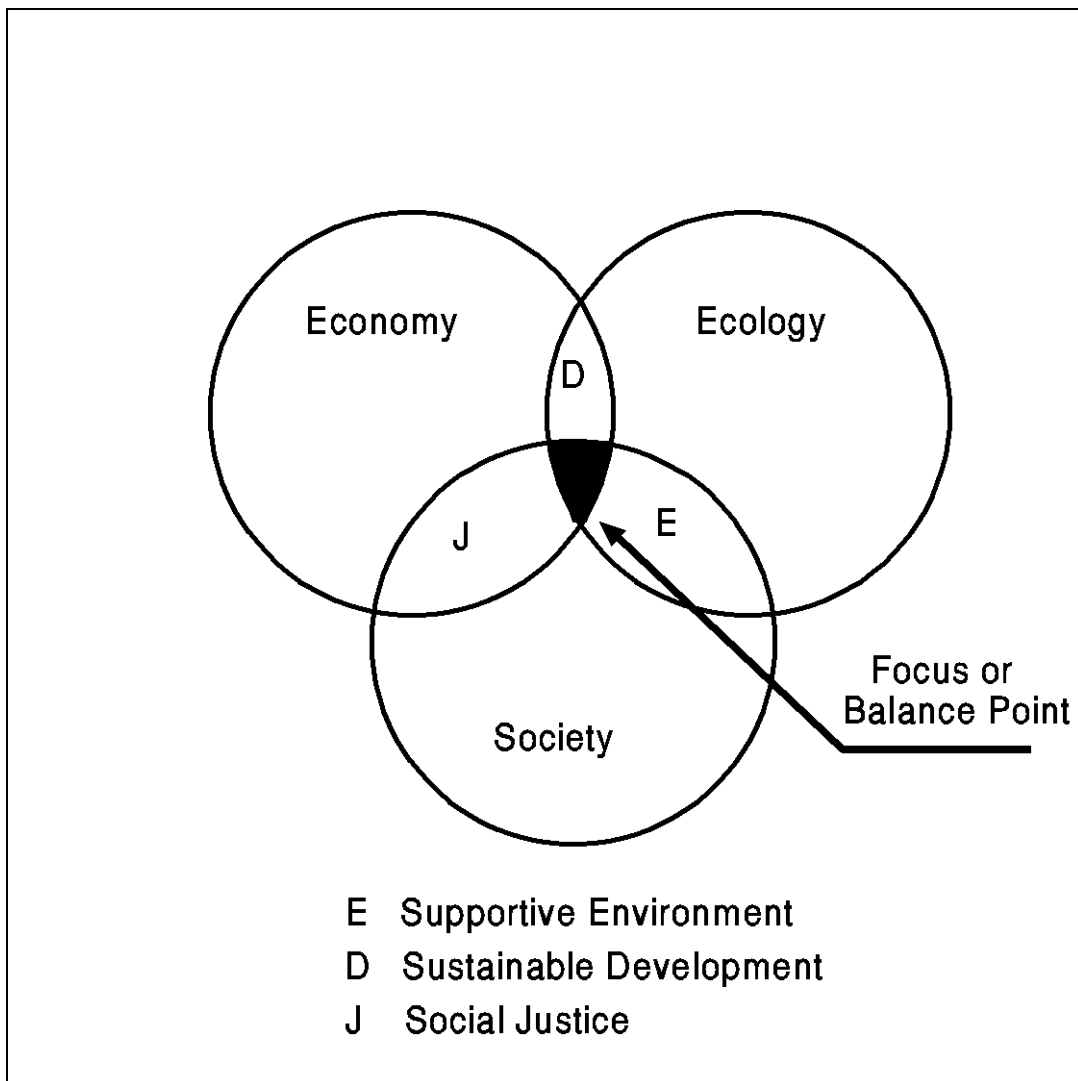
Figure 1.0 Focus of Integrated Local Area Management. (adapted from Brown 1995, (p 11)

Other representations of this show the economy as a part of society, which in turn is a part of the larger environment. This concept has been recognised as a central pillar of Integrated Local Area Planning (ILAP) (Brown 1995). While there is a wealth of literature about social issues in general there is little attention paid to socially sustainable development in particular. This aspect of ESD appears to be assumed to flow-on from economic growth. However, ESD must also provide for social cohesion otherwise excessive self-interest could undermine

the broad initiatives, such as restricted access to natural resources, that may be required in the future.

There is an increasing need for integration between levels of government when dealing with local area management (Brown 1995). There is also a recognition by all levels of government that improved local data, and analysis, is required to improve decision making. An example of such integration was achieved by the State Departments, Authorities and Councils of Northern NSW.

Under the Direction of the Department of Planning they produced a series of strategies on physical services, natural resources and environmental issues and human services, and water supply for the North Coast of NSW (NCUPS 1992 a, b, c and d). In Queensland, the Regional Organisation of Councils (ROCs) and the SEQ2001 process strive toward similar levels of integration (SEQ2001 1995). The SoER will also contribute to the availability and quality and integration of local environmental data

Working toward the Council's vision will be no simple task. Decision making will necessarily become more difficult as more issues of a more complex nature are considered together. To address the principles of ESD, decision makers will need to err on the side of caution when there is insufficient understanding of an issue (the precautionary principle).

The National strategy for ESD (Commonwealth of Australia 1992) states that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. Court *et al.* (1996) identify this lack of knowledge, and institutional impediments, as being key problems in pursuit of ESD.

Therefore to achieve the Council's goals, and satisfy its commitments to regional planning, systems will be needed that increase communication and provide objective information to decision makers and the community about their environment. Better information will lead to improved decisions and outcomes. Benchmarking is one such system. It establishes where you are against others. However, of equal importance is its capacity to identify where you are headed, and where you want to go.

State of the environment reporting (SoER), or its equivalent, is a key component of Local Agenda 21 and is recognised as one of the most powerful tools for informing the public about their environment (Faulkner 1994 Court *et al.* 1996). It does this by providing an objective framework for deriving baseline data and establishing benchmarking systems to measure the impact of decisions that effect the environment (Brown 1994). SoER uses community involvement to help link government and community more closely with shared visions. There are many other benefits reported to arise from SoER including improved awareness and communication on environmental issues within government. SoER places broad-scale environmental performance and monitoring into a strategic framework.

This review is the first part of the SoER process for the City of the Gold Coast and sets out to provide background to the topic, demonstrate the chronology of development of SoER,

review past and existing SoER structures and methods, and identify a structure and method for SoER on the Gold Coast.

2. A HISTORY OF STATE OF THE ENVIRONMENT REPORTING (SoER)

Environmental reporting has developed in parallel with the concept of ESD. Both recognise the need for governments, industry, and community to make better decisions leading to more ecologically sensitive outcomes. Both of these concepts require that environmental, economic and social objectives be considered together as described earlier.

2.1 International Experience of SoER and ESD

Since the 1950s and 1960s there has been a growing awareness of the large scale, and sometimes global, environmental impacts of human activity. In 1972 these issues came to the fore with the publication of the book *The Limits to Growth* by the Club of Rome and were recognised by policy makers at the United Nations Conference on Human Environment in Stockholm.

Bell (1994) provides a chronology of the ESD debate and here it is combined with the milestones in the development of SoER initiatives focussing on Australia from 1980-1996 (Table 2.1).

The pace of events appeared to quicken through the 1980s with the establishment of a number of major international initiatives including the formation of the World Commission on Environment and Development (WCED) in 1983 and its publication of Our Common Future (the Bruntland Report) in 1987 (WCED 1987). The Worldwatch Institute produced a State of the World report in 1985 and Canada produced its first SoER (Commonwealth EPA 1993) in 1986, the Netherlands in 1987 (Hammond *et al.* 1995) and the United States of America followed in 1988 (Commonwealth EPA 1993).

Over the period 1985-1992, other countries, including Australia, Hungary, Italy, Japan, Kuwait, the Philippines, the Scandinavian nations and Turkey published reports on national environmental conditions. However, these early reports were plagued by data-overload due to the large quantities of scientific information gathered that were not easily understood by decision makers, or the public (Hammond *et al.* 1995).

Pioneering work by the Canadian and Dutch Governments from around 1987 began the development of environmental indicators to improve the interpretation of the large environmental data sets and to make the information more accessible to decision makers (Commonwealth EPA 1993). After an economic summit of the seven most economically powerful nations (G-7) in 1989 the participating nations asked the Organisation for Economic Cooperation & Development (OECD) to develop a suite of environmental indicators (OECD 1993, Hammond *et al.* 1995). From these indicators a series a reports and work followed from the Canadians, the Dutch and the OECD.

Table 2.1: A chronology of Ecologically Sustainable Development (ESD) and State of the Environment Reporting (SoER) focussing on Australia from 1980 to 1996 (adapted from Bell (1994), Commonwealth EPA (1993), Hammond *et al.* (1995))

1980-89:

1980- *World Conservation Strategy-Living Resource Conservation for Sustainable Development* by International Union for the Conservation of Nature (IUCN): First major international milestone after 1972

1980- Establishment of the United Nations Environmental Program (UNEP)

1980- Establishment of the World Wide Fund for Nature (WWF)

1983- Establishment of the World Commission on Environment and Development (WCED)

1983- The National Conservation Strategy for Australia

1985- State of the World Report by the World Watch Institute

1986- Australia's first State of the Environment Report

1986- Canada produced its first State of the Environment Report

1987- Our Common Future (the Bruntland Report) by WCED in 1987

1987- Netherlands State of the Environment Report

1988- United States of America State of the Environment Report

1989- Australia's Statement on the Environment *Our Country Our Future*

1990-96:

1991- Better Cities Program

1991- Australian Environment Issues and Facts

1992- Australian Inter-Governmental Agreement on the Environment (Federal, State and Local)

1992- United Nations conference on Environment and Development at Rio de Janeiro

1992- Australia's National Strategy for Ecologically Sustainable Development

1992- Australia's National Greenhouse Response Strategy

1993- Australia's Biodiversity Series

1996- Australia's National Strategy for the Conservation of Biodiversity

1996- Australia's second State of the Environment Report

This activity culminated in the United Nations conference on Environment and Development at Rio de Janeiro in 1992. The declaration from this conference emphasised the need for sustainability into the 21st century (Agenda 21), acceptable indicators for reporting and respect for the precautionary principle to protect the environment. Local Agenda 21 seeks to bring these initiatives into the sphere of Local Government.

SoER is now common in most industrialised countries and is endorsed by the OECD. However, there is considerable diversity in reporting styles and methods between, and within, countries making international comparisons and benchmarking difficult. Most SoER being conducted in the world focuses at the national level not the local or regional level.

2.2 SoER In Australia

Table 2.1 also shows that over this same period there has been considerable activity in Australia. *The National Conservation Strategy for Australia* was published in 1983 as was *Australian Urban Environmental Indicators*. Australia published its first SoER, *State of the Environment in Australia 1985* in 1986, and a second more technical report based on the same information in 1987. Australia was planning to publish a third in 1990 but for many reasons this was delayed (Hammond *et al*. 1995). The report was published in 1996 (State of the Environment Advisory Council 1996)

In 1989 the then Prime Minister, R.J. Hawke, made a significant statement on the environment entitled *Our Country Our Future*. In 1990 nine working groups were established by the Commonwealth Government to examine ESD issues. These groups released a discussion paper in June 1990. A joint commentary on the discussion paper was jointly released by the Australian Conservation Foundation, Greenpeace (Australia), The Wilderness Society and The World Wide Fund for Nature - Australia (Australian Conservation Foundation *et al*. 1990).

The final report was released in 1991 and identified the goal of the strategy as *development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends* (Commonwealth of Australia 1992b*).*

In 1991 the Better Cities program was begun and the Australian Bureau of Statistics compiled *Australia's Environment Issues and Facts*, (ABS 1992) a compendium of available statistics. In 1992 State and Federal Governments endorsed the five principals of ESD as part of an inter-government agreement on the environment and released the National Strategy for Ecologically Sustainable Development (Commonwealth of Australia 1992b) and the National Greenhouse Response Strategy (Commonwealth of Australia 1992c). In 1993 publication of Australia's Biodiversity Series began with the first of the seven reports from the Commonwealth (Biodiversity Unit 1993, 1994, 1995, Graetz *et al*. 1995, Moreton *et al*. 1995, Preeze *et al*. 1995, and Rose 1995). In 1994 Australia produced a national report under the United Nations Framework Convention on Climate Change (Commonwealth of Australia 1994). `Other related initiatives are the National Waste Minimisation and Recycling Strategy and the Commonwealth Major Projects Facilitation Initiative and the National Forest

Policy Statement. Australia is also signatory to a number of international environmental agreements (Commonwealth EPA 1993).

Australia made various commitments on the environment and ecologically sustainable development at the United Nations Conference on Environment and Development, the Rio Earth summit, in Brazil in 1992. These included Agenda 21 which aims to achieve sustainability in the 21st century. The concept of Local Agenda 21 brings this philosophy to local and regional government and while not compulsory, has been agreed to by 178 nations, including Australia. The philosophy encourages community participation and holistic consideration of ecological, economic and social issues in ESD. SoER is considered a fundamental part of this process.

After the Rio conference in 1992, momentum was regained for a national SoER framework in Australia. This framework was established in 1994, and was entitled *State of the Environment Reporting: Framework for Australia.* It was comprised of 7 panels of experts to complete each thematic chapter (Atmosphere, Marine and Estuarine, Inland Waters, Land Resources, Biodiversity, Human Settlements, Natural and Cultural Heritage) and to develop indicators for each area. The panels, in conjunction with the Federal Government, published the third SoER for Australia in 1996.

2.3 SoER by Australian States, and Local and Regional Governments

SoER has been adopted by most state governments, including Victoria (1986), South Australia (1986, 1987), Queensland (1995), New South Wales (1993), and the Australian Capital Territory (1995). Queensland is set to produce its first SoER in 1998 and every four years thereafter, as required under the Queensland Environment Protection Act of 1994 (Lloyd 1996).

At Local Government level, NSW legislated for annual local SoERs in 1993 as part of its environmental protection legislation. To date NSW is the only state to have done so. However, the need for such reports at the local level was recognised in 1992 by the project team looking at the role of local government in Environmental Management (TASQUE 1992). There is no requirement in Queensland for local SoER as yet, although the Queensland Environmental Protection Act does require local authorities to submit annual reports on specific environmental parameters under the devolution of responsibility arrangements.

As NSW local government has moved fastest into SoER , compared to other states, it is useful to review their experiences. However, prior to this legislation, Shoalhaven Shire Council began its own SoER system in 1991 in response to local community pressure. It had produced 3 reports, 1991, 1992 and 1993 prior to reports being required by law (Jamieson 1994).

The process adopted by Shoalhaven recognised four key elements of a good SoER namely:

- environmental benchmarking;
- knowledge-gap identification;
- improved decision-making;
- communication and community consultation.

The first round of NSW local government SoERs from 1993 were reviewed by Brown (1994). She concluded that most SoERs were treated as simple data gathering exercises and only resulted in inventories of environmentally relevant data. However, some undertook analysis of the data, and a few moved on to make recommendations to respond to environmental needs that were identified. Twenty councils chose not to produce a separate SoER but to incorporate it in their annual report.

A study of around twenty SoERs from NSW Local Governments confirmed Brown's earlier findings, but also identified some other points:

- all reports used the State-Pressure-Response model (recommended by the NSW EPA);
- only some of the reports discussed the performance of existing activities and policies, and what future responses were required;
- many of the first reports recognised the limits placed on such a report and put most effort into establishing baseline data for future benchmarking;
- subsequent reports from most councils appear to have followed the lead of the better early reports in trying to identify strategies to deal with problems.

The NSW local authorities saw the process of regular SoERs as having specific value to them, independent of any legislative requirement. Interestingly, these values were mainly recognised by council officers and not by hierarchies (Local Govt. and Shires Assoc. of NSW 1995).

The benefits included:

- improved communication on environmental matters and performance of the local community, industry and council;
- better quality debate on economic and environmental issues;
- identification of significant information gaps which can be used to refocus council priorities and future research needs;
- environmental benchmarking to assess progress toward ESD.

A significant part of the improved communication occurred through increased liaison and team building between council departments. Other benefits to councils were improved data management and recording and improved community consultation (Local Govt. and Shires Assoc. of NSW 1995). This led to a more integrated and considered approach to environmental issues and Council planning in general.

SoERs can become useful planning tools for local authorities by providing objective information and analysis.   However, their conclusions need to be incorporated into

management plans. There was some scepticism expressed by NSW council staff that the results from the SoER were being used (Local Govt. and Shires Assoc. of NSW 1995). Hence it is imperative that the SoER includes the active support and participation of all council departments.

In their report to Brisbane City Council, Mary Maher Associates (1995) also concluded that SoER is not just a data collection and reporting exercise. It is a process that fosters a range of benefits to councils. This experience is common across the world as discussed in a number of papers at the Fenner Conference on Tracking Progress in 1996 (Ditz and Ranganathan 1996, Peterson 1996). Brisbane City Council have recently published their first SoER and have already begun work on improvements for the next.

Mary Maher Associates (1995) summarised the benefits of SoER as follows:

- SoER provides the public, decision makers, and government with regular, analysed and interpreted, scientifically sound information about the environment by:
     * reporting environmental pressures and stresses and trends;
     * assessing the present and future impacts of these stresses;
- SoER assesses progress toward achieving ecologically sustainable development;
- SoER comments on the effectiveness of policies and programs developed in response to environmental change, including progress towards achieving environmental standards and targets;
- SoER provides input into the development of long-term, ecologically sustainable economic and social policies by all levels of government;
- SoER can identify gaps in our knowledge of environmental conditions and trends.

A fundamental part of SoERs and Local Agenda 21 is community consultation (Jamieson 1994, Brown 1995). Community consultation ensures the issues addressed by the SoE are relevant to the community and helps prioritize issues. Hence community consultation should be begun as early as possible (Local Govt. and Shires Assoc. 1995).

However, too strong an emphasis on community consultation before the SoER process is well understood by Council could be counter productive if poorly planned. The need for careful planning to achieve effective consultation is essential for SoER in the long-term and is well described (LGAQ 1996). Further, the experience from NSW local government shows that it is a significant task to get the local authorities own environmental data-systems working credibly and properly. Hence a staged approach to community consultation that initially invited community input via groups and committees, in conjunction with the council developing its own internal databases, followed by broader consultation provides a sensible basis for future SoERs.

3. REPORTING FRAMEWORKS AND MODELS, INDICATORS AND THEMES

3.1 Reporting Frameworks and Models

One problem with many early attempts at SoER was the lack of a consistent approach to follow, when using information to review policy performance and suggest appropriate responses (Lloyd 1996). There have mainly been two frameworks used for environmental reporting, the Pressure-State-Response model (PSR) and its variants, and the Population-Environment-Process (PEP) model. The PSR model was adopted by the OECD around 1990 (Lloyd 1996). The PEP model was developed by Statistics Canada in 1994 (ABS 1996).

The PSR model (Figure 3.1) implies simple causal relationships between human activity and the environment. However, such simplification can be misleading, and ignore the complexity of the underlying processes and variability in the system (Commonwealth DEST 1994). Nonetheless, this approach is able to discuss all natural resources not just those of direct economic benefit and has been most widely adopted for SoER, particularly in Australia (Lloyd 1996).

The PEP model (Figure 3.2) is described as "*a conceptual framework of how modern society interacts with the natural environment*" (ABS 1996). This model describes how resources and services flow from the environment to the population and the economy. The population and the economy restructure, or impact upon, the environment resulting in changes to natural assets and natural processes. (Commonwealth DEST 1994).

This approach is similar to materials flow accounting (Adriaanse 1996), Green National Accounting (Sheng 1996) and Ecologically adjusted Domestic Products (Adriaanse 1996). This model reflects some of the complexity in the relationship between environment, society and economy. However, it does this from a strong economic perspective looking at the relationships between the economy and the environment (Hamilton 1996).
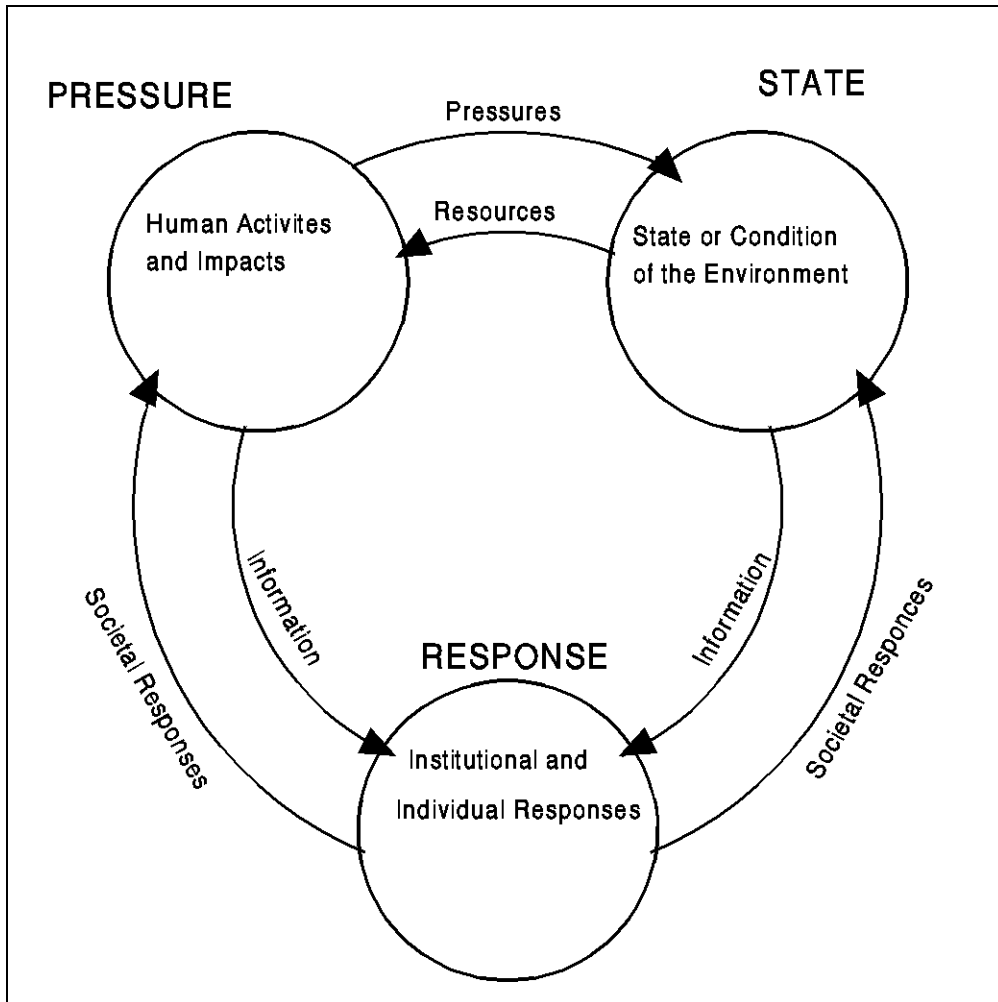
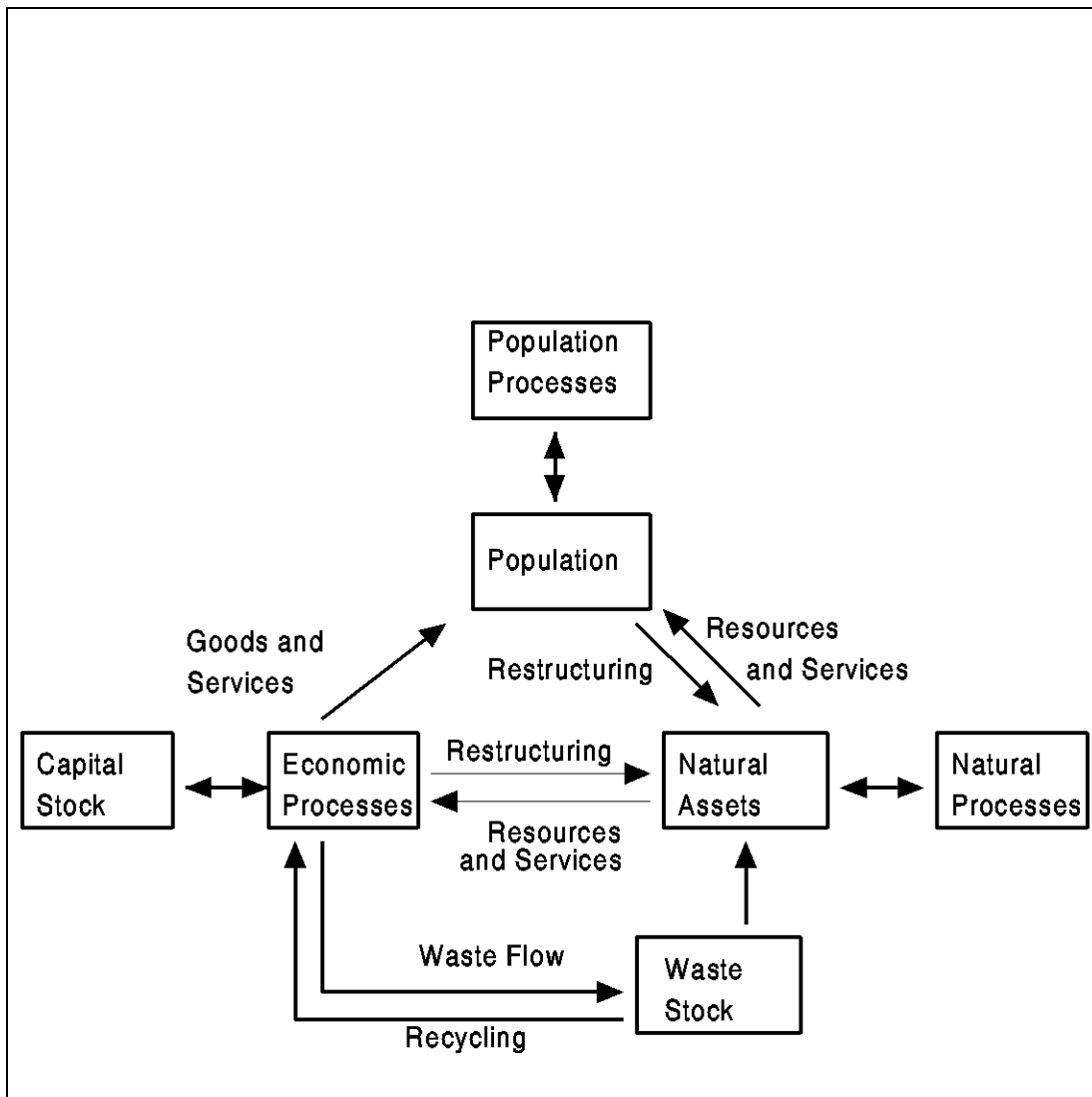**Figure 3.1 Pressure State Response Model (adapted from OECD 1993, p 10)**

Figure 3.2 Population-Environment-Process Model (adapted from ABS 1996)

Lloyd (1996) describes a third model, the static model, which simply reports the condition of environmental sectors such as land, air, water, biodiversity etc.. He describes the PSR model above as being dynamic. The PEP model, while not discussed by him, would also be dynamic, based on Lloyd's definition.

The sectors described in the static model are not restricted to this model. The PSR uses sectors (themes) with linkages between sectors identified. The PEP model necessarily crosses over between sectors (themes) as it accounts for resource flows.

The PEP model, while more realistic than the PSR model is more complex and consequently will be more difficult to apply. In addition, the PEP model only captures natural resources that are used in economic processes. Consequently, where less tangible resources, like biodiversity, are involved the PEP model is not likely to adequately represent them.

However, the PSR model being simpler is the easiest to explain and apply. The PSR model can also more readily represent the breadth of environmental issues facing society. Despite the problems associated with its inherent simplicity, the PSR model also attempts to reflect the dynamic nature of human impacts on the environment and vice versa.

3.2 Themes

It has been common practice in SoERs to review environmental performance in the context of a set of themes (sectors). This approach has also been extended to consider industrial issues and their relative environmental impacts (Ditz and Ranganathan 1996, Lloyd 1996).

Such an approach has both advanatages and disadvantages. The difficult task of understanding the environment is made easier by breaking it up into key natural resource sectors. Such segmentation obscures the relationships between segments. However, the benefits of the approach outweigh this problem, which can be controlled by vigilance (Commonwealth of Australia 1994c). For example, the impact of socio-economic issues such as transportation planning on water and air need to be recognised and the linkages between them considered when developing the SoER.

The first round of SoERs discussed 10 themes and reflected those of the National SoER framework (NSW EPA 1995). These were reduced to 8 in 1995 as listed below:

- land;
- aquatic systems;
- biological diversity;
- air;
- waste and toxic hazards;
- noise;
- aboriginal and non-aboriginal heritage; and,
- environmental management plans and special projects.

The first 7 themes form a sound basis for all levels of SoER using the PSR model. The 8th theme seeks to describe specific plans and projects that are part of the responses to particular

issues. As such, it would be logical for them to be included within the sections that they relate to, and for inter-conections between themes to be explored in an overview section.

For the SoER to provide a balanced view of the environment, as discussed by Brown (1995) socio-econmic issues, such as energy consumption, human health, economy, employment and crime, need to be considered as well as physical environmental issues. Australian Capital Territory SoER (ACT 1995) included these as a number of other topics related to the urban development. It could be more sensible to include all of these topics under a single theme such as 'Socio-economic' which may also include heritage related issues.

3.3 *Indicators*

The word indicator is derived from the Latin *indicare,* meaning to announce, point out or to estimate. Hence indicators communicate information about progress, or otherwise, toward specific goals (Hammond *et al.* 1995). These goals can be economic, environmental or social.

There are a number of economic indicators which are constructed by aggregating and summarising a number of other economic statistics. These indicators allow forecasters to predict, with some certainty, future economic movements. There has been less work done on the development on widely accepted social or environmental indicators.

There is only one major difficulty with the development and use of environmental indicators. This difficulty is the confident understanding of the environmental processes that indicators represent. There is increasing concern as to the current level of understanding on natural processes to enable useful indicators to be derived (OECD 1993, Bradbury 1996, Nix 1996).

While agreeing with the difficulties identified with indicators, others believe that the greater danger is to wait for perfect knowledge before beginning (OECD 1993, Brown 1996, Ditz 1996). However, in general it is better to begin than to wait, as improvements to indicators and techniques will only come with use of SoER and applied research.

Nonetheless, all SoERs rely on well chosen indicators. However, most work in the development of indicators has only been done at a national scale for policy development, including the pioneering work of the early Dutch and Canadian SoER from the 1980s. For example, Hammond (1995), Adriaanse (1993) and Walz *et al.* (1995) all discuss indicators for national policy development. Within Australia, National and State sets of indicators are currently being established. However, there has been little research on regional or local indicators.

The relevance of an indicator also changes with time and scale (Fresco and Kroonberg 1992). This means that only some indicators that are relevant, at International, National and even State levels, will also be relevant at the local level. Sometimes this is because some indicators rely on statistics that are only available at a state or national level, or only apply to major industries. The local level (Local Government) is necessarily more focussed on its own, sometimes unique, issues. Local Government is the arm of government closest to the people

and with direct influence on the local environment (Wright 1995). Consequently the indicators gathered and used by national and state governments are often of limited relevance to local government.

Early SoERs from local governments in NSW showed little consistency with the choice of indicators. This made benchmarking between councils difficult and aggregation into State and Federal reports impossible. This was addressed through a series of local government workshops in NSW which developed a more consistent and relevant suite of indicators from which to select.

In 1995 the NSW Environmental Protection Agency in association with NSW local governments produced a set of guidelines and indicators for local government (NSW EPA 1995). This work evolved from the experience of the NSW local authorities in doing SoERs and forms a valuable first cut for other local authorities looking to doing SoERs. Sydney Water also produced draft indicators in 1995 (Sydney Water 1995) and had an earlier set of indicators for rivers and streams produced in 1991 (Consulting Environmental Engineers 1991).

It cannot be assumed that the indicators adopted for NSW Local Governments will be appropriate for others, but they do provide a useful starting point. In fact the need to use the indicators listed as a guide only is explicitly stated in the guidelines (NSWEPA 1995) However, some consistency in indicators used between local governments and state and federal governments would be extremely useful. This would allow credible comparison of environmental performance between areas and sensible aggregation of data from a local through to a state and national level. Therefore, it is simplest to learn from the NSW experience and to use this knowledge as a basis for the initial development of local SoERs in other areas.

4. STATE OF THE ENVIRONMENT REPORTING FOR THE CITY   OF GOLD COAST

This section seeks to capture the lessons from past SoER experience around the world as discussed in the previous sections and to use them as the basis for an SoER for the Gold Coast.

The vision of the Gold Coast City Council is for a world city, recognised for its world-standard environment, facilities and services (GCCC 1996). This vision is supported by the seven corporate goals dealing with the Environment, Local Character, Culture and Diversity, Prosperity, Equity, Transport and Communications, and City Management. These goals, while not embracing ESD, are in keeping with its principles and those of Agenda 21.

The environment of the Gold Coast, while the focus of a single corporate goal for the Council, affects all of the other goals to a considerable degree. For example much of the local character of the Gold Coast greatly depends on the environment and much of the City's management seeks to minimise the impacts of the City on its environment. Wright (1995) recognised the significance of this role of local govenrment. Hence SoER must consider the breadth of issues related to the greater environment of the Gold Coast.

To move toward its goals, the City needs to understand the systems and relationships with which it is dealing. It also needs to be able to assign environmental cost-penalties and benefits, when comparing development options. There is no doubt that development is essential to accommodate the growing human population of the world and the movement of people. It is equally clear that future developments can not be simple extensions of past practices. Past developmental paradigms worked on the premise of no limits to growth, and no environmental damage that we could not manage or that would impact on our ability to survive.

In adopting a theme of a sustainable city and establishing goals consistent with Local Agenda 21 and ESD, the Council has taken a significant step forward in recognising our dependence on the environment. However, it is not likely that anyone could say when, and if, ESD is acheived, or if the goals established by the Council have been reached. The challenge in the future will be to maintain commitment to these complementary ends that should lead to a healthy society and a viable economy within a sustainable, quality environment.

4.1 A Definition of 'Environment' for SoER on the Gold Coast

The issues considered in relation to the environment depend on its definition. However,
the term environment is now so commonly used that its meaning has become ambiguous.
Environment is defined *as the collective term for the conditions in which an organism lives* (Abercrombie *et al.,* 1973-Penguin Dictionary of Biology) or more recently as *the aggregate of surrounding things, conditions, or influences* (Delbridge and Bernard 1994 - MacQuarie Dictionary).
In recent times, the popular use of the term environment has been to refer mainly to natural areas, fauna and flora. Consequently, when referring to the environment we live in, the terms

urban or *built* environment have been coined. Unfortunately, such usage of the word reinforces the perception of many people that the environment is external to their existence and not fundamentally involved with their quality of life.

It is clear, however, that no such distinction is inferred by the definitions as was recognised by the NSW Planning Act 1979 which defines the environment as *all aspects of the surrondings of man, whether affecting him as an individual or in his social groupings.*

This definition is reflected in the Queensland Local Government (Planning and Environment) Act 1990 which defines environment to include, among other things, ecosystems and their constituent parts including people, communities, natural and physical resources, biodiversity and social economic and cultural conditions.

The concept of an ecosphere places humans and human activity as one component in a large ecosystem. This is a key theme of *People in their Place* by Brown (1994). Brown (1995) extends this further and recognises the social and economic aspects of human life in addition to the physical environment. It is useful to broaden the usual concept to include people as part of the environment for the purpose of developing a SoER. Hence the definition adopted here for the environment is ***The total of all surrounding things, conditions, or influences in which the people and visitors of the Gold Coast live and recreate***.

Such a definition does not dismiss the need to consider the natural environment but places these issues in context with people-centred socio-economic issues. There are many terms that are commonly used when discussing the environment. These are defined in a variety of references, such as Odum (1971), Abercrombie *et al.* (1973) and Miller (1992).

4.2 Past Environmental Reporting on the Gold Coast.

While there has never been an SoER for the Gold Coast there has been much information gathered on the environment. However, this is often not published or readily accessible, nor is it often at a scale that is useful. This body of work is comprised of internal reports and compilations (eg Woods 1978), theses from university students, reports from government departments, universities and consultants, and community group information. Environmental information reported in most Environmental Impact Statements (EISs) is usually derived from existing sources and does not contribute much new information. However, the potential of these reports for data on specific areas can not be ignored.

By far the greatest amount of available information, relevant to the environment, comes from within the Council itself. These data arise from the records kept by the Council as it goes about its day-to-day business, such as water quality monitoring, waste disposal licensing and land-zoning decisions and development approvals. Much of this information has not been recognised for its environmental value. This is consistent with the lack of recognition placed by government and the community on the role of Council as an environmental management agency. For example, a significant proportion of the City's budget, at least one third, is spent on environmental management. This expenditure serves the environment within the built up area but also the greater environment through prevention of impacts, remediation of damage, or protection of habitat and open space.

Unfortunately, much of the data that has been gathered has been collected in an uncoordinated way or was gathered for a specific purpose. Consequently, as staff change, the total body of information is never recognised. The extra value the data has when combined with data from other areas is also never realised. Adding to the problem is the difficulty in retrieving these data from existing systems.

5. CONCLUSIONS: A PROCESS FOR SoER ON THE GOLD COAST

An SoER for the Gold Coast City should produce a report that can be used in making planning and policy decisions. The SoER should also increase the positive dialogue regarding the environment between Council, developers, and the community. To do this it will need to be built upon the successful elements identified from other reporting exercises. The most relevant in scale and location are the reports prepared by NSW local governments.

NSW local governments identified four key elements to a successful SoER (Jamieson 1993). These were environmental benchmarking, knowledge gap identification, improved decision making and communication and community consultation.

Local Govt. and Shires Assoc. of NSW (1995) also identified one further element of success, commitment. Commitment is required by government and community to make real improvements in environmental standards. This can help be achieved by aligning the process of the SoER to the vision and corporate goals of the Council and the community.

Others (OECD 1993, Commonwealth EPA 1993, Mary Maher and Assoc. 1995, Lloyd 1996) recognised the need for a framework when doing SoERs that allows information to be better appreciated by non-technical decision makers as an essential part of the process. The most common, comprehensive and easy to apply, framework is the Pressure- State- Response (PSR) model with the environment considered under different sectors or themes. Each theme having a suite of indicators that can be selected to represent the environment.

The PSR model is recommended along with the 7 themes and their indicators adopted by the NSW EPA (1995). In addition to these a theme covering socio-economic factors is also required. Because the PSR model treats issues as simple cause-effect relationships, interrelationships between themes and indicators must be identified.

Local Govt. and Shires Assoc. of NSW (1995) recognised that the SoER should not just produce a report on a regular basis. It should engender improved communication within Council, and between Council and the community, on the spectrum of environmental issues. The report, although valuable in itself as a planning tool, acts as a focus for groups and sections to communicate. It is this improved and focussed communication that is the real value of SoER.

Consultation on the spectrum of environmental issues is essential to a successful SoER. Consultation, properly conducted, can lead to increased ownership by Council and Community of the process and the outcomes of the SoER. The partnerships that are forged can result in real change. A chief stakeholder in all these partnerships is the Council as it, like all governments, strives to accommodate the long and short-term needs of the community. However, initiating a new process and conducting effective community consultation is no simple task. This is particularly important for the SoER as it seeks to establish an ongoing partnership between the Council and the community. Hence, the Council needs to understand

SoER and its operation before it can adequately convey this to the community. From here the community can have confidence that its contribution will be recognised and valued. This means that it is necessary to begin the process internally with limited input from community. Initially input can be achieved through existing advisory committees. This approach allows Council and Council staff to become familiar with SoER, its requirements and difficulties. The first report will then provide a focus and structure to assist the community make their contribution.

One issue recognised from NSW is the importance of creating a sense of ownership of the report and process. For the first report it is important that the Council staff are given the power to recommend the most appropriate structure for them which reflects their understanding of how the environment operates and is managed. This procedure has been applied within Council and the resulting framework for the first SoER identified lead agencies within Council for each theme (Air, Noise, Water, Land, Biological Diversity, Waste, Socio Economic and Heritage), contact officers for particular data and issues were also identified. The data required may not be readily accessible and this finding in itself is of use to the SoER. The detail of this framework is given in the Appendix.

Developing these data sets, and the first report, should be done with input and consultation from the Council's existing committees. This will form the first part of a staged aproach to community consulation.

The first SoER will be limited because it will not include broad community input. This is not a problem if the report recognises this limitation and is promoted as the beginning of a process rather than the final statement about the environment of the Gold Coast. Ownership of the SoER by the community is as important as the ownership of the SoER by the Council.

Each report generated by the SoER process should be of value to decision makers and interested parties. However, a greater value lies in the report's ability to help focus debate and discussion on the environment. This will lead to increased awareness of issues, increased partnership between the Council and the community in environmental monitoring, and improved understanding of goals and values leading to ESD on the Gold Coast.

After the first SoER, annual reporting would not allow enough time for many new initiatives to show identifiable results. Therfore, it is proposed that reporting every two years would be a more appropriate time frame. The first report is proposed for publication in July 1997.

A successful SoER process will be one of the cornerstones for the foundations of an ecologically sustainable city that fulfils the vision and aspirations of the Council and community alike.

6. REFERENCES

Abercrombie, M., Hickson,C.J., and Johnson, M.L. (1973*) The Penguin Dictionary of Biology (sixth edition*), Penguin.

ABS (1992) *Australia's Environment: Issues and Facts,* Cat. no. 4140.0, Australian Bureau of Statistics.

ABS (1996) *Australians and the Environment*, Cat. no. 4601.0, Australian Bureau of Statistics

ACT(1995) *ACTSET `95: Australian Capital Territory State of the Environment Report,* Australian Capital Territory.

Adriaanse, A. (1993) Environmental Policy Performance Indicators: A Study on the Development of Indicators for Environmental Policy in The Netherlands, Sdu uitgeverij Koninginnegracht, mei.

Adriaanse, A. (1996) *Integration of Economic and Environmental Data for Policy Purposes - The Netherlands Experience,* proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems., UNSW October 1996.

Biodiversity Unit (1993) *Biodiversity and its Value,* Biodiversity Series Paper No. 1, DEST, Commonwealth of Australia.

Biodiversity Unit (1994) *Australia's Biodiversity: An Overview of Selected Significant Components,* Biodiversity Series Paper No. 2, DEST, Commonwealth of Australia.

Biodiversity Unit (1995c) *Native Vegetation Clearance, Habitiat Loss and Biodiversity Decline,* Biodiversity Series Paper no. 6, DEST, Commonwealth of Australia.

Bradbury, R. (1996) *Are Indicators Yesterday's News?,* proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems, UNSW October 1996.

Bell, F.C. (1994) *ESD From A To Z*, Earth Foundation Australia Ltd.

Brown, V.A. (1994) *People in Their Place: Monitoring the Impact of People on Their Urban Environment and of Their Urban Environment on People*, in Urban and Regional Quality of Life Indicators for Cultural Policy Studies, Griffith University. Pp41-54.

Brown, V.A. (1995) *Turning the Tide - Integrated Local Area Management for Australia's Coastal Zone*, Department of Environment Sport and Territories.

Christoff, P. (1995) *Environmental Guidelines: State of the Environment Reporting by Local Government,* New South Wales Environment Protection Agency.

Clarke, W.C. and Munn, R.E. (Ed's) (1986) *Sustainable Development of the Biosphere*, Cambridge University Press.

Commonwealth of Australia (1992a) *Inter-Governmental Agreement on the Environment,* Commonwealth of Australia.

Commonwealth of Australia (1992b) *National Strategy for Ecological Sustainable Development,* Commonwealth of Australia.

Commonwealth of Australia (1992c) *National Greenhouse Response Strategy,* Commonwealth of Australia.

Commonwealth of Australia (1994a) *An Accord between the Commonwealth and Local Government*, Commonwealth of Australia

Commonwealth of Australia (1994b) *Climate Change: Australia's National Report Under The United Nations Framework Convention on Climate Change*, Commonwealth of Australia

Commonwealth of Australia (1994c) *State of the Environment Reporting:Framework forAustralia*, Department of Environment Sport and Territories, Commonwealth of Australia.

Commonwealth of Australia (1994d) *Local Agenda 21, Managing for the Future :A Local Government Guide*, Dept of Env. Sport and Territories, Commonwealth of Australia.

Commonwealth EPA (1993) *Developing A National State of The Environment Reporting System*, Dept. of Art, Sport, the Environment and Territories.

Consulting Environmental Engineers (1991*) Environmental Indicators for Rivers and Streams*, Sydney Water Board

Court, J., Wright, C., and Guthrie, A. (1996) *Environmental Assessment and Sustainability: Are We Ready for the Challenge?,* Aust. J. of Env. Man. 3(1):42-57

Daines, D. (1996) *Sustainable Cities: The Australian Experience*, in Procedings of APEC Conference on Sustainable Cities, Monterey, USA Sept. 1996.

Ditz, D. and Ranganathan, J. (1996) *Corporate Environmental Performance Indicators - Bridging Internal And External Information Needs*, in proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems, UNSW October 1996.

Delbridge, A., and Bernard, J.R.L. (Ed's) (1994) *The Macquarie Concise Dictionary, Macquarie Library*

Cotter, B., and Wescott, W. (1996) *Local Action: A Training Guide*, Environs Australia

Faulkner, J (1994) *Foreword in State of the Environment Reporting: Framework for Australia*, Commonwealth of Australia.

Gold Coast City Council (1996) *Gold Coast City Council Corporate Plan 1996-2001*, Gold Coast CityCouncil

Graetz, R.D., Wilson, M.A., and Campbell, S.K. (1995) *Landcover Disturbance Over The Australian Continent,* Biodiversity Series Paper No. 7, DEST, Commonwealth of Australia.

Hamilton, C. and Attwater, R. (1996) *Measuring the Environment: The Availability and Use of Environmental Statistics in Australia,* in proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems, UNSW October 1996.

Hammond, A., Adriaanse, A., Rodenburg, E., Bryant, D., and Woodward, R. (1995) *Environmental Indicators: A Systematic Approach to Measuring and Reporting on Environmental Policy Performance in the Context of Sustainable Development*, World Resources Institute.

Hare, W.L.(ed), Marlow, J.P., Rae, M.L., and Gray, F., Humphries, R., and Ledgar, R. (1990), *Ecological Sustainable Development: A Joint Report by the Australian Conservation Foundation, The Wilderness Society, and The World Wildlife Fund For Nature-Aust.*, ACF/Wilderness Soc./WWFN

Jamieson, P. (1994) *State of the Environment Reporting - The Shoalhaven Experience*, in Proceedings of Achieving Sustainable Communities, Melbourne, October 21-22, 1994 Municipal Conservation Association.

LGAQ (1996) *Getting Started: A Consultation Guide for Queensland Local Government,* Local Government Association of Queensland.

Local Govt. and Shires Assoc. of NSW (1995*) State of the Environment Reporting Workshops: Summary.*, Local Government and Shires Association of NSW

Lloyd, C.R. (1996) *State of the Environment Reporting in Australia: A Review,* Aust. J. of Env. Man. 3(3), 151-162

Mary Maher Associates (1995) *Brisbane City Council State of the Environment Consultants Report*, Brisbane City Council.

Miller, G.T. (1992) Living in the Environment (7th ed.), Wadsworth California.

Morton, S.R., Short, J., Barker, R.D. (1995) *Refugia for Biological Diversity in Aird and Semi-arid Australia,* Biodiversity Series Paper No. 4, DEST, Commonwealth of Australia.

NCUPS Working Party (1992a*) Natural Resources and Environmental Issues Report of The Working Party,* North Coast Urban Planning Strategy, NSW Dept. of Planning.

NCUPS Working Party (1992b) *Physical Services Report of The Working Party*, North Coast Urban Planning Strategy, NSW Dept. of Planning.

NCUPS Working Party (1992c) *Water Supply Report of The Working Party*, North Coast Urban Planning Strategy, NSW Dept. of Planning.

NCUPS Working Party (1992d*) Human Services Report of The Working Party*, North Coast Urban Planning Strategy, NSW Dept. of Planning.

Nix, H. (1996) *Information Technology For "Tracking Progress" - How Useful Are European Initiatives in the Australian Context?,* in proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems, UNSW October 1996.

NSW EPA(1995) *SOE Reporting Guidelines for Local Government*, EPA NSW

Odum, E.P. (1971) *Fundamentals of Ecology (3rd ed),* W.B. Saunders Company, Philadelphia

OECD Group on the State of the Environment (1993) *Environmental Indicators: Overview of Work Programme and Publications*, OECD.

OECD Group on Environmental Performance (1993) *OECD Core Set of Indicators for Environmental Performance: Synthesis Report by the Group on the State of the Environment*, OECD.

Peterson, P. (1996) *Meeting The Needs Of Policy Makers In Rapidly Industrialising Countries: The Challenge for Indicators/Indices Development*., in proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and   accounting systems, UNSW October 1996.

Preece, N., and Van Oostrezee, P., and James, D. (1995) *Two Way Track: Biodiversity, Conservation and Ecotourism,* Biodiversity Series Paper No. 5, DEST, Commonwealth of Australia.

Rose, D.B. (1995) *Country in Flames: Proceedings of the 1994 Symposium On Biodiversity and Fire in North Australia,* Biodiversity Series Paper No. 3, DEST, Commonwealth of Australia.

SEQ2001 (1995) *South East Queensland Regional Framework for Growth Management*, Qld. Dept. of Housing Local Government and Planning.

Sheng, F. (1996) *Making Green National Accounting A Tool For Policy Change*, in proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems, UNSW October 1996.

State of the Environment Advisory Council (1996) State of the Environment, Australia 1996, Dept. of Environment Sport and Territories, Australia.

Sydney Water (1995) *Draft Environmental Indicators for Sydney Water*, Sydney Water Authority.

TASQUE (1992) *The Role of Local Government in Environmental Management*, TASQUE, Uni. of Tasmania.

Thomas, E.C. (1996) *Gold Coast State of the Environment Monitoring Unit,* in proceedings of 1996 Aust. Academy of Sci., Fenner Conference on the Environment: Tracking progress, linking environment and economy through indicators and accounting systems, UNSW October 1996.

Walz, R., Ostertag, K., Block, N. (1995) *Synopsis Of Selected Indicator Systems For Sustainable Development*: Report for the Research project "Further Development of Indicator Systems for Reporting On The Environment" of The Federal Ministry For The Environment, Fraunhofer Inst. for Systems Innovation Research, Karlsruhe.

WCED (1987) *Our Common Future,* World Commission on Environment and Development, Oxford University Press, Australian Edition.

Woods, R.M. (1978) *Environmental Information For The Gold Coast*, Environmental Section, Gold Coast City Council.

Wilkes, G.A. and Krebs, W.A. (Eds) (1982*) Collins Concise English Dictionary Australian Edition*, Collins

Wright, I. (1995) *Implementation of Sustainable Development by Australian Local Governments,* Environmental and Planning Law Journal, 12(1):54-61

7. Appendix

GCCC State of the Environment Report: Draft Themes, Indicators, Lead and Contributing sections, and Contact Staff.

Notes: The Research Unit is not specifically listed as a contributor in each theme as it will make a contribution to all work.
Input will also be sought from public groups such as environmental groups and Historical societies.

Description of City of Gold Coast and systems: Lead Section- Research
(This includes all subsequent descriptions in other themes)

Table 2.1:   A Chronology of Ecological Sustainable Development (ESD) and State of the Environment Report (SoER) focussing on Australia

Sub-Theme	Indicator	Section
Physical	Physical Boundaries and area of LGA, location in Qld., Climate including rainfall,, topography, geology, geomorphology Landform, Catchments, Dominant soil-type Land-use history incl. transport. Air-shed and Circulation with seasonal variations, Groundwater Streamflow, Estuarine, Marine Species diversity (no. of different native species in the LGA/sections. Ecosystems diversity (no. of different major ecosystems in LGA Remnant native veg'n communities	Research Env. Protection Entomology Bulk Water Dev. and Env. Coastal.Man.
Social	Current population (number, demographic features), Urban/non-urban location, Employment, income. Env.Impacts on People and perceptions of people on env. Number and nature of identified local/state/national) heritage-listed Aboriginal and non-Aboriginal sites, structures and landscapes	Research Cult/Soc. Coord Dev. & Env
Economic	Industry structure (no. of enterprises and type), Employment by sector, council annual budget (total turnover per capita), Council employment and expenditure on environmental tasks.	Econ. Dev.

Air: Lead section - Environmental Protection

Sub-Theme	Indicator	Section
State- ⇒ industrial, commercial, domestic and mobile sources	Particulates, Nox, Sox, Toxics, lead in air. Est. emissions (total weight) by sources including Council facilities. Upper atmospheric conditions and climate change.	Env. Protection
Pressures- ⇒ Stationary industrial sources	Location of licensed emissions (by type, total annual volume) including Council facilities	Env. Protection
Pressures- ⇒ Traffic	Traffic flow, volume	Trans. Plan., Dev. and Env.,
Current Responses- ⇒ Traffic restriction zones	Location and nature of zones including land-use patterns eg mixed zones	Trans. Plan. Dev. and Env.

Current Responses- ⇒ Public transport and council-provided transport routes	location of routes	Trans. Plan. Dev. and Env.

Noise: Lead section - Environmental Protection

Sub-theme	Indicators	Section
State- ⇒ Noise from transport	Monitored ambient noise readings for major roads (by time of day)	Trans. Plan. Dev. and Env.
State- ⇒ Monitored readings from industrial sites and point sources	Monitored readings for major industrial sites and point sources Noise from ERAs	Env. Protection
State- ⇒ Noise from other sources	Workplace noise levels Complaints to council and DEH	Env. Protection
Pressure- ⇒ transport	Traffic volume and location	Trans. Plan.
Pressure- ⇒ Industrial sources	Location of known point sources	Env. Protection
Pressure- ⇒ residential sources		Env. Protection
Current Responses- ⇒ traffic noise barriers	Areas where barriers constructed	Trans. Plan. Dev. and Env.
Current Responses- ⇒ State or Council codes	Areas where codes apply	Env. Protection

Land: Lead Section-Research Unit

Sub-Theme	Indicators	Section
State- ⇒ Degradation	Area(ha) by severity: eg. Soil erosion (wind, water) ,Salinity, Acidification ,Acid sulfate soils, Water logging /raised water tables Degradation of remnant vegetation	Env. Protection
State- ⇒ Urban open space	Total area Area of Individual sites Time-trend in area	Com.&Rec.Fac. Stat. Plan.
State- ⇒ Non-urban open space	Total area Area of individual sites Time-trend in area	Com.&Rec.Fac. Dev. and Env. Stat. Plan.
Pressure- ⇒ Major land use	Area of use (ha, trend) by sector eg. Transport, Urban , Agric & Industry Native veg'n, Canal dev's,Waste disposal	Trans. Plan. Econ. Dev.
Pressure (also state)- ⇒ Contaminated sites	Area (ha) and severity of contamination of individual sites Total area (ha) of waste disposal sites.	Env. Protection
Pressure- ⇒ Land clearing and drainage	Proposals, by area and intended use	Stat. Plan.
Pressure- ⇒ Specific dev's/plans likely to affect comm./env.	Number and list, by year and location	Stat. Plan.
Pressure- ⇒ population	Changes in total number Population density	Research
Pressure- ⇒ Urban construction	Area of open space under threat	Stat. Plan. Strat. Plan. Com.&Rec.Fac.
Pressure- ⇒ Transport	Activities to increase public transport use or decrease car use	Trans. Plan. Com.&Rec. Fac.
Current Response-	Activities to increase public transport use or	Trans. Plan.

⇒ Transport	decrease car use	Com.&Rec.Fac.
Current Response- ⇒ Zoning of land	Restrictive zoning and land use classification	Stat. Plan. Strat. Plan.
Current Response- ⇒ Open-space programs	Expenditure on maintenance, enhancement and extension	Com.&Rec.Fac.

Water: lead Section- Environmental Protection

Sub-Theme	Indicators	Section
State- ⇒ Surface water env. flows	Flow and modification to flow , including quality and trends	Bulk water Env. Protection Water/W.Water
State- ⇒ Groundwater recharge	Rate of recharge	Research
State- ⇒ Surface and gr'dwater quality	Temperature, suspended solids, Rubbish and weeds in canals and lakes	Env. Protection
State- ⇒ Stream bed conditions	Heavy metals in sediments Faunal diversity	Env. Proctection
State- ⇒ Drinking water Quality	E.coli, pathogens,pH, Salinity, nutrients, chemicals	Env. Protection Laboratories Bulk Water
Pressure- ⇒ Surface and groundwater use	Volume of water extracted, Dams, Deliberate stormwater detention/channelling /disruption to stream flow due to urban development, Recreational use of canals, rivers, beaches and reefs.	Bulk Water Design Coastal Man.
Pressure- ⇒ Licensed discharges?	Sites of points source discharge Volume and type of effluent released (For Council Waste and Waste Water see Waste Theme)	Env. Protection
Pressure- ⇒ Clearing of riparian zone	Cleared or highly modified major stream banks (km, %of total) and proposed clearing	Env. Protection Stat. Plan. Coastal Man.
Pressure- ⇒ Grazing and other uses of rip. zone	Major stream banks available for grazing (km, %of total)	Env.Protection
Pressure- ⇒ Polluting events	Sewer overflows, accidental discharges (severity, loc'tn, dur'tn)	Env. Protection Water/W.Water
Current Response- ⇒ audit/inspection /monitoring programs for non-scheduled premises	Nature, Number conducted, Estimated percentage coverage, Cost	Env. Protection
Current Response- ⇒ Riparian zone rehabilitation programs	Extent and condition of riparian vegetation	Env. Protection Com&RecFacs
Current Response- ⇒ Industry pollution reduc'tn prog's	no. and type /effectiveness	Env.Protection
Current Response- ⇒ Prop. and catch. planning (incl. use of rainwater)	no. and style of groups/plans etc. Cleaner production-storm water	Env. Protection
Current Response- ⇒ Environmental flow strategies	no. and type	Env. Protection Bulk Water
Current Response- ⇒ Stormwater management and control works	cleaner production issues related to works	Env. Protection Design
Current Response- ⇒ Conservation orders for riparian zone	Annual expenditure and area rehabilitated	Com.&Rec.Fac. Coastal Man.

Biological Diversity: Lead Section - Development and Environment

Sub-Theme	Indicators	Section
State- ⇒ Current diversity, range, abundance and conservation status of native species.	Local native plants and animals (list and chart by category eg. vulnerable etc.) Natural vegetation cover (total ha, and % remaining, no and size of fragments). Corridors and high sensitivity habitat (total ha, no. and size of fragments, condition and integrity, conservation status. Indicating changes over time	Dev. and Env. Local Law Personal Cont.
Pressure- ⇒ Introduced species	Species diversity (no. and % of total species, range and abundance of introduced, naturalised plant (weed) and pest animal species.	Local Law Bulk Water Env. Protection
Pressure- ⇒ Land Clearing	Area of native vegetation proposed for clearing Disturbance of wildlife corridors	Dev. and Env.
Pressure- ⇒ Hunting/ fishing/ harvesting of native species, river dredging, Wetland draining, recreational activity, noise etc.	Annual catch/harvest (by estimated total no. / area affected)	Entomology Env. Protection
Pressure- ⇒ Fire	Fires (cause/extent/intens./freq./ man.)potential impact on native vegetation and fauna	Local Law Dev. and Env. PDT-Dir Supp.
Current Response- ⇒ Reservation and planning controls	Listed areas of local, state, national or world heritage significance Area protected by planning controls as a % of total. Area not yet protected under threat from development	Dev. and Env.
Current Response- ⇒ Recovery plans	Funds for species/habitat conservation, by source, annual total and area	Dev. and Env. Com&Rec Facs
Current Response- ⇒ Fire management plan	Areas affected by fire management plans methods of hazard reduction used	Local Laws Dev. and Env.
Current Response- ⇒ Introduced species control plan	Annual funding and area affected	Local Laws

Waste: Lead Section - Waste Management

Sub-Theme	Indicators	Section
State- ⇒ Waste disposal or treatment facilities	Current capacity and projected longevity of site by type of waste received Condition of sites Compliance with DoE Environmental Authority	Waste Man. Waste Water
Pressure- Solid waste generation ⇒ Domestic ⇒ Commercial/industrial ⇒ Construction/demolition	Composition of solid waste stream by category and annual weight for domestic waste, construction /demolition, commercial waste, industrial waste. Total annual weight of solid waste to landfill. Estimate of green waste/organic wastes for possible composting. Licensing of waste collectors/transporters.	Waste Man.
Pressure- Solid waste generation ⇒ Regulated waste	Weight and type of regulated waste generated (specify by type and source). Information from DoE waste tracking system (when introduced) Licensing E.R.A.s	Waste Man. Env.Protection
Pressure- Solid waste generation ⇒ Litter (Parks, streets, bins, waterways etc.)	Category and annual weight of litter collected. Cost and frequency of service.	City Cleaning Waste Man.
Pressure- Liquid waste generation ⇒ Sewage	Total liquid waste disposed to sites (specify by type of waste and site)	Waste Water
Pressure- Liquid waste generation ⇒ Interceptor traps (including night soil)	No. and type of trade waste permits Licensing of collectors and transporters of liquid waste	Waste Water Waste Man.
Pressure- Liquid waste generation ⇒ storm water	Refer to SoE theme on Water (aquatic systems)	
Pressure- Gaseous waste generation ⇒ Landfill Gases	Amount and type of gases produced	Waste Man.
Pressure- Gaseous waste generation ⇒ Industry emissions	Licensing of E.R.A.s	Env.Protection
Pressure- Gaseous waste generation ⇒ Open or pit Burning	No. of complaints received No. of authorities-to-burn issued	Env.Protection Dev. & Env.
Pressure- Gaseous waste generation ⇒ other air issues	See SoE theme on Air	
Current Responses- ⇒ Waste Minimisation ⇒ Kerbside recycling ⇒ Other recycling ⇒ Strategies for Commercial and Industrial Premises	Cost and freq. of collection. Total quantity of recyclable material collected. Total weight of recyclable materially actually recycled, by category and destination . % of total waste stream recycled . Cleaner production and Waterwise programs	Waste Man. City Cleaning Waste Water Bulk water Env.Protection
Current Responses- Clean-up programs	Cost, nature and site remediation (contaminated lands) Cost and nature of spill cleanups	Env.Protection

Heritage: Lead section Development and Environment included in Socio-Economic

Sub-Theme	Indicators	Section
State- ⇒ Heritage listing for Aboriginal and non-Aboriginal heritage	Number, nature, condition and percentage of total and non-Aboriginal sites and structures, those listed under local/state/national Estate legislation or codes.	Cult/SocCoord Dev. & Env
Pressures- ⇒ Agriculture, forestry and mining, roadworks, urban construction and development	Number of identified heritage-value aboriginal and non-aboriginal sites and structures, those listed under local/state/national estate legislation or codes	Cult/SocCoord Dev. & Env Stat. Plan
Current Response- ⇒ Surveys	Areas of the LGA investigated for Aboriginal sites, structures, and artefacts Areas of LGA investigated for non-aboriginal heritage structures and sites	Cult/SocCoord Dev. & Env Strat. Plan
Current Response- ⇒ Programs for heritage conservation	Types of program, annual expenditure, by source of funds, and total LGA expenditure.	Cult/SocCoord Dev. & Env

Socio-Economic: Lead Section - Research

Sub-Theme	Indicators	Section
State- ⇒ Energy	Energy consumption per capita and as a ration with the gross domestic product of the LGA	Research
State- ⇒ Economy/employment	GDP and industry split over time, employment history and prospects by industry, wage levels, cost of living/housing, housing standards, travel to work times, traffic flow and safety , visual pollution	Reg.Ec.Dev.
State- ⇒ Human Health	Mortality rates, Epidemiology, and morbidity, service needs for age groups by location, living space(persons per room) yard size (m2) and persons/m2 by area.	Health Prot.
State- ⇒ Crime	Crime stats. for different locations	Research
State- ⇒ Access to/participation in facilities/education, recreation, parks, scenic beauty,	Weighted average distance between C.D.s and facilities etc. for different locations. No of people using facilities.	Research
Pressures- ⇒ Demographics/area	age, sex, ethnic background, employment, expectations	Research
Pressures- ⇒ Population growth/density	population growth and density trends including age groups	Research
Current Responses- ⇒ Energy use initiatives	rate of uptake of energy conservation measures by domestic and industrial users and designers, State and local govt. initiatives/education programs	Research
Current Responses- ⇒ Developing a wider industrial base	Council and state initiatives to attract new industry to Gold Coast	Reg.Ec.Dev.
Current Responses- ⇒ improve access and participation in facilities	Council initiatives that will encourage people to access and use public facilities. Planning for improved access to key facilities and transports nodes	Com&RecFac Transp.Plan