PROFILING ESTUARY MANAGEMENT IN INTEGRATED DEVELOPMENT PLANNING IN SOUTH AFRICA WITH PARTICULAR REFERENCE TO THE EASTERN CAPE PROVINCE

By

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3. van Niekerk L, Taljaard S and Schonegevel L (2006) Introductory Course to Estuarine Management in South Africa: Training Course Manual.

Note: Making use of this report

This report comprises three sets of documentation.

1. The final report itself which comprises a summary of three research/technical reports that are appended together with a synthesis of the findings

2. The three appended research/technical reports

3. Two compact discs. The first contains the final report and its appendices together with an electronic copy of *Estuaries and Integrated Development Planning: A Manager's Guide*. The second, produced by the CSIR, contains all the material necessary to run an estuary management training course:

    - Course manual
    - Set of instructor's notes
    - Set of PowerPoint presentations for each module
    - PowerPoint presentation of the short course
    - Certificate of attendance

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Abstract

Estuaries are valuable economic, social and ecological resources supplying a range of goods and services to society. In recent years development at and around estuaries and in their catchments has increased significantly, and trade-offs have to be made in the allocation of resources. As estuaries are public resources, this requires active co-operative management by government, residents, interest groups and the private sector.

Who should be leading in the management effort? As many estuaries in South Africa are relatively small (less than 100 ha) they, together with their catchments, regularly occur in a single municipality. Local government, therefore, has a key leadership role to play in their management. However, a scan of the Integrated Development Plans of Local and District Municipalities in the Eastern Cape indicate that in most instances they are not taken into account.

The responsibilities of local government as detailed in the Constitution, the Municipal Structures Act of 1998 and the Municipal Systems Act of 2000 indicate that Local and District Municipalities exert significant management and administrative responsibilities over activities that impact on estuaries. All these activities are regulated and facilitated through the Integrated Development Planning process of municipalities. Provincial and national government have significant roles to play in supporting municipalities in the development and implementation of Integrated Development Plans.

The main issues effecting estuaries in the Eastern Cape, and the rest of South Africa, include habitat alteration or loss, changes in mouth dynamics, over-exploitation of living resources, sedimentation and siltation, loss of system variability, recreational disturbance, salinity changes, increased turbidity, changed nutrient status and increased water pollution. These are caused by a number of proximate and ultimate factors often working together.

Like other ecosystems, estuaries offer a range of goods, services and attributes that generate value and contribute to human welfare. The measurement of this natural capital provides an indication of the total economic value of an estuary. The total economic value is made up of direct use, indirect use and non-use values with an increase in direct use regularly causing a decline in indirect and non-use values. A suit of methods have been developed to establish economic value and the application of these methodologies indicate that estuaries confer significant benefits to society.

Other than Integrated Development Planning, there are several management tools that contribute to estuary management. These include conservation planning, water resource planning and local estuary management and planning. While the different planning regimes are poorly integrated, a mechanism for developing linkages and integrating estuary values in the mechanism is proposed.

The value of estuaries can be further enhanced through the establishment of biodiversity-based enterprises at estuaries. These might be community-owned enterprises or a variety of partnerships involving communities, the private sector and/or government. There is agreement that community-owned enterprises contribute little to economic development and social welfare, and that partnerships are required to optimise existing capacity.

An assessment of the extent to which estuary and environmental management is incorporated into IDPs indicates that where there is significant municipal capacity (Buffalo City and eThekwini), systems and processes are in place. However in less capacitated municipalities (Ngqusha and Great Kei), little incorporation has taken place.

A social and political process of engaging local government on estuary management is proposed. The approach focuses on the economic value of estuaries and how local government can optimise the benefits that accrue from estuaries for itself and for its residents. The approach focuses on a structured conversation with the full diversity of local government interests and emphasises the similarity between the estuary management and planning process and the IDP process.

As part of this engagement, an estuary management training course has been developed for municipalities and tested in three areas. The course contains modules on economic value, estuary functioning, impacts on estuaries, estuary management and enterprise opportunities that can be derived from estuaries. The response to the training course during tested was very positive.

1. Introduction

1.1 Context and rationale

People are attracted to estuaries. They are aesthetically pleasing; are sources of food and building material; provide recreational, residential, tourism and commercial opportunities; are regularly centres of trade, and are convenient receptacles for waste disposal. In short, they are centres of development. In recent years, development in coastal areas at and around estuaries and in the catchments serving these estuaries has increased dramatically. With this is an increased demand for the goods and services that estuaries supply. At estuaries there are more homes, more boats, more fishermen and more businesses, and in the catchments there is more forestry and agriculture, more infrastructure, more homes and more industry. These developmental activities compete with each other for the goods and services estuaries provide and, in some instances, this competition compromises the value of the estuarine system.

Because the interactions between people and an estuary are often intense and because the different interactions are often competing for the same things, decisions have to be made on allocating the goods and services estuaries provide. This requires active management. However, estuaries are not privately owned; they are public resources so management is complex and requires co-operation between residents, government, interest groups and the private sector.

A key question is who should be leading this management effort? The majority of estuaries in South Africa are small covering less than 100 ha. Many of their catchments are also small. So, all or part of an estuary and its catchment often occurs entirely within a local or district municipality. These municipalities are responsible for managing developmental activities within their area of authority. It is these activities that allow people to realise benefits from estuaries and it is also these activities which impact on the ability of people to realise these benefits. So, it makes sense that municipalities need to take a lead role in estuary management.

However, it is recognised that in many instances the ability of municipalities to engage and lead in estuary management is limited. Local authorities are getting to grips with immediate developmental needs, particularly the provision of housing and basic services such as roads, water and energy supply. A scan of Integrated Development Plans of local municipalities in the Eastern Cape, where over half South Africa's estuaries are located, indicated that few have taken estuaries into account. The implication is that they are not regarded as municipal assets and their management is not planned nor budgeted for. Complicating this further is a history of national control of coastal resources and a perception that estuaries are ecological resources with limited economic and social benefit.

In executing both research and direct support aspects of the Eastern Cape Estuaries Management Programme it became apparent that local government had a key role to play as a participant and leader in local estuary management and that the key to success was the integration of estuary management into the core governance, management and development process of the municipality – the Integrated Development Planning (IDP) process.

This is the final report of the project entitled 'Profiling Estuary Management in Integrated Development Planning with a Particular Reference the Eastern Cape'. The four objectives of this project were the following:

1. Existing policies and current practices and plans with respect to the inclusion of Estuary Management Information in IDPs established.
2. Existing estuary information and knowledge are distilled to easily accessible user-friendly tools that are to be tested in select estuaries. Information and knowledge are structured using a Strategic Adaptive Management approach and are incorporated into the IDP and other related processes.
3. Focused, accredited capacity building programme(s) for local authorities and stakeholders are developed and delivered in the selected municipalities
4. Protocols for estuary valuation, land-use planning and enterprise development established.

These objectives are addressed in the following way in this report:
1. Section 1 provides an introduction and context (this section)
2. Section 2 details the responsibilities of local government, including the establishment of an Integrated Development Plan, and the responsibilities of other spheres of government in supporting local government. This addresses specifically Objective 1 and Objective 2 and informs Objective 3
3. Section 3 details the impacts of human activities on estuaries, the economic value of estuaries, the various planning and management tools that are available, how these values might be incorporated into planning and management, and how values might be enhanced through sustainable economic development based on estuary resources. This addresses specifically Objective 2 and Objective 4 (in terms of economic valuation and enterprise protocols) and informs Objective 3.
4. Section 4, using two case-studies, assesses the challenges being faced and the progress being made in integrating environmental and estuary management into IDPs. This addresses specifically Objective 1.
5. Section 5 provides recommendations on how estuary management might enjoy an improved profile in the integrated development planning process. This addresses all four objectives.
6. Appendix 3 and the content of the compact disc addresses specifically Objective 3.

Although it was initially intended that a detailed land-use protocol for estuaries and their surrounds would be established as part of this project it did not occur. Particularly in a local government context this is recognised as a priority and needs to be taken up in future research projects.

The report draws primarily on the following information sources:
1. McGwynne L and McKenzie M (2006). Policies and procedures for incorporating information and knowledge on estuaries into the IDP and related processes are established through collaboration between researchers and authorities at local, district and provincial levels (Appendix 1)
2. Turpie J, Sihlophe N, Carter A, Maswime T and Hosking S (2006). Maximising the socio-economic benefits of estuaries through integrated planning and management: a rationale and protocol for incorporating and enhancing estuary values in planning and management. (Appendix 2)
3. van Niekerk L, Taljaard S and Schonegevel L (2006) Introductory Course to Estuarine Management in South Africa: Training Course Manual. (Appendix 3)
4. Previous research conducted under the auspices of the Eastern Cape Estuaries Management Programme
5. Experience and interactions of conducting estuary management support and training sessions with local government and other stakeholders.

2. The Responsibilities of Local Government

(This section is drawn from: McGwynne L and McKenzie M (2006). Policies and procedures for incorporating information and knowledge on estuaries into the IDP and related processes are established through collaboration between researchers and authorities at local, district and provincial levels, Unpublished Water Research Commission Report, K5/1485).

The Constitution Act 108 of 1996 of the Republic of South Africa (the Constitution) defines the objectives of local government (district and local municipalities). They are to provide a democratic and accountable government for local communities; to ensure the provision of services to communities in a sustainable manner; to promote social and economic development; to promote a self and healthy environment, and to encourage the involvement of communities and community organisations in the matters of local government.

2.1 Mandated responsibilities of local government

Schedules 4B and 5B of the Constitution detail the mandatory responsibilities of local government while Schedules 4A and 5A detail those that might be delegated by National and Provincial government depending on the capacity of local government. They are summarised below.

Mandatory municipal responsibilities		**National and provincial responsibilities that can be delegated to municipalities**	
Schedule 4B	**Schedule 5B**	**Schedule 4A**	**Schedule 5A**
Air pollution	Beaches and amusement facilities	Administration of indigenous forests	Provincial planning
Building regulations	Cemeteries, funeral parlours and crematoria	Agriculture	Provincial cultural matters
Local tourism	Cleansing	Cultural matters	
Municipal planning	Control of public nuisances	Disaster management	
Municipal health services	Fences and fencing	Environment	
Pontoons, ferries, jetties and piers	Local sports facilities	Pollution control	
Stormwater management systems	Markets	Regional planning and development	
Water and sanitation services	Municipal abattoirs	Soil conservation	
	Municipal roads	Tourism	
	Noise pollution	Urban and rural development	
	Public places		
	Refuse removal, refuse dumps and solid waste disposal		
	Traffic and parking		

The Municipal Structures Act 117 of 1998 allocates responsibilities between the two tiers of local government (district and local municipalities). These are summarised below.

District municipality	Local municipality
Integrated development planning for the district municipality as a whole including a framework for IDPs of all municipalities in the area of the district municipality	Preparation of IDP for local municipality
Potable water supply systems	Potable water supply systems (where there is capacity)
Domestic waste water and sewage disposal systems	Air pollution
Solid waste disposal sites: (a) determination of a waste disposal strategy (b) regulation of waste disposal (c) establishment, operation and control of waste disposal sites, bulk transfer facilities and waste disposal facilities for more than one local municipality in the district	Local tourism
Municipal health services (environmental health)	Storm water
Municipality roads	Beaches
Establishment, conduct and control of cemeteries and crematoria	Municipal parks and recreation
Promotion of local tourism	Local amenities
	Noise pollution
	Refuse removal, refuse dumps and solid waste
	Public places

2.2 Integrated Development Plans (IDPs)

The Municipal Systems Act 32 of 2000 details the Integrated Development Planning (IDP) process of local government. This is a participatory planning process aimed at establishing a strategic development plan to guide and inform all planning, budgeting, management and decision making in a municipality over a five-year term. It is the mechanism through which it acts out its responsibilities described in Section 2.1 above. The Act states that each municipal council (district and local) must, within a prescribed period after its elected term, adopt a single, inclusive and strategic plan for the development of the municipality which links, integrates and co-ordinates plans and takes into account proposals for the development of the municipality; aligns the resources and capacity of the municipality with the implementation of the plan; forms the policy framework and general basis on which annual budgets must be based; and is compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation.

Section 26 states that an IDP must reflect at a minimum an assessment of existing levels of development including an identification of communities excluded from basic services; a vision for long term development, with emphasis on development and internal transformation needs; the development priorities and objectives including the aims of local economic development; the development strategies which must be aligned with any national or provincial sectoral plans and planning requirements; a spatial development framework including basic guidelines for land use management; operational strategies; disaster management plans; a financial plan including a budget projection for at least the next three years; and key performance indicators and key performance targets. The IDP process must

conform to two principles: planning must be developmentally oriented; and planning must take place within the framework of co-operative governance.

IDPs are legally binding and no single executive decision may be in conflict with it. The Act therefore provides the statutory basis for the compilation of IDPs that demonstrate a municipality's commitment to uphold the principles of the Bill of Rights. They offer the opportunity for integration between sectoral strategies to achieve optimum allocation of resources in a way that supports sustainable development, equity and the upliftment of poor communities.

The purpose, core objectives and key phases of an Integrated Development Plan are described in detail in McGwynne et al. (2006 – Appendix 1). To summarise, the purpose of the IDP is to facilitate appropriate service delivery by providing the framework for social and economic development within the municipality. Through this framework, it contributes towards eradicating the development legacy of the past, puts into practice the ideal of developmental local government and fosters a culture of co-operative governance.

The IDP is a **consultative** process with structured public engagement, institutionalised participation, combines and links top-down and bottom-up decision making, and analysis focuses on those areas affecting service delivery; it is a **strategic** process that makes most use of scarce resources, is innovative, addresses underlying causes of problems, and integrates across sectors; and it is **implementation-oriented** improving service delivery by ensuring that defined and substantive project proposals are designed, planning-budget links are made for feasibility; and organisational capacity to deliver exists.

The IDP process comprises six sequential phases: Phase 0 – **Preparation** sets out the process to be followed. It specifically indicates how and when participation by stakeholders takes place, and what organisational arrangements are required for the process; Phase 1 – **Analysis** focuses on an assessment of the existing situation; Phase 2 – **Strategies** where basic decisions are made on the desired future of the municipality and how it will achieve this future; Phase 3 – **Projects** centres on the design of projects that will be implemented in order to achieve the desired future state; Phase 4 – **Integration** reviews the project proposals to ensure compliance with the vision and objectives of the municipality and that the necessary linkages between sectors exist; Phase 5 – **Approval** involves a process of public and municipal ratification of the IDP for implementation.

Located within the IDP is what is commonly referred to as a "package of plans". These include a **Spatial Development Framework (SDF)**, showing desired patterns of land use, directions of growth, urban edges, special development areas and conservation-worthy areas. It also includes a **Land use Management System (LUMS)** recording the land use and development rights and restrictions applicable to each portion of land in the municipality. The SDF is a *guide* to development and should be flexible while the LUMS is *binding*. Environmental issues are cross-cutting, which means that they have to be addressed in IDP. It is important to note that estuaries are particularly cross-cutting, given their linkages with entire catchment areas and the inshore marine environment. Municipalities must incorporate a **Strategic Environmental Assessment** (SEA) into their Spatial Development Frameworks and also take the responsibility for Environmental Impact Assessments (EIAs) in theory to help resolve environmental and planning conflicts (DPLG, 2001). IDPs are thus explicitly required to consider environmental issues and indicate how negative impacts will be resolved and/or avoided. Recognition of the value of estuaries and their appropriate management

could have significant implications for some district and local municipalities and their development planning. The main opening for this in the IDP process is in the State of Environment Reporting during the Analysis phase. It is during this process that issues relating to estuarine values would be identified and included in the issues prioritization. The State of Environment reporting should include a resource economics component which highlights environmental values, including those of estuaries. It should also elucidate the nature of the trade-offs involved in the development issues that affect estuarine health.

2.3 The role of other spheres of government

While it is the responsibility of local government to establish and implement its own IDP other spheres of government are required act in support of this process. These responsibilities are summarised and tabulated below.

Sphere of Government	Roles and Responsibilities
Local Government	To: • Prepare an IDP • Adopt an IDP • Provide support to poorly capacitated municipalities • Facilitate the compilation of a framework that ensures co-ordination and alignment between local municipalities and the district municipality
Provincial Government	To: • Co-ordinate training • Provide financial support • Provide general IDP guidance • Monitor the process in the province • Facilitate co-ordination and the alignment between district municipalities • Facilitate alignment of IDPs with sector department policies and programmes • Assess IDPs • Provide relevant information on sector department's policies, programmes and budgets • Contribute sector expertise and technical knowledge to the formulation of municipal IDPs in the allocation of resources at the local level
National Government	To: • Issue legislation and policy in support of IDPs • Issue Integrated Development Planning guidelines • Provide financial assistance • Provide a national training framework • Establish a Planning and Implementation Management Support System • Provide relevant information on sector department's policies, programmes and budgets • Contribute sector expertise and technical knowledge to the formulation of municipal policies and strategies • Be guided by municipal IDPs in the allocation of resources at the local level

3. Estuaries of the Eastern Cape and their Management

(This section is drawn primarily from: Turpie J, Sihlophe N, Carter A, Maswime T and Hosking S (2006). Maximising the socio-economic benefits of estuaries through integrated planning and management: a rationale and protocol for incorporating and enhancing estuary values in planning and management, Unpublished Water Research Commission Report, K5/1485)

3.1 The status and conservation of Eastern Cape estuaries

Estuaries are acknowledged to be one of the most productive and valuable habitats on earth, yet they are highly threatened because of the demand for coastal development and freshwater supplies. As development of the coastal zone has lagged behind inland areas, South Africans are in the unique position of being able to plan timeously for coastal conservation and development.

Estuaries are dynamic systems which support a rather uniquely adapted biodiversity, which varies between estuaries with biogeographical zonation, estuary type and size, and within estuaries based on changes in salinity and other characteristics. Each estuary is fairly unique in terms of its physiochemical characteristics. This, together with an imperfect understanding of estuarine biodiversity, presents a challenge for conservation planning and management. Nevertheless, as long as understanding of biodiversity is imperfect it makes sense to concentrate efforts on the maintenance of the physical and chemical health of estuarine systems as well as their more conspicuous taxa. The main problems affecting estuaries in the Eastern Cape, as well as the rest of South Africa, are:

- Habitat alteration or loss through, for example, reclamation for development, marinas or harbour construction
- Change in mouth dynamics through changing freshwater inputs or artificial breaching
- Overexploitation of resources through recreational, commercial and subsistence fishing, bait collection, and wood and mangrove harvesting.
- Sedimentation and siltation through catchment erosion and inadequate flushing of silt and/or marine sediments.
- Loss of system variability through management to maintain constant conditions (for example, in estuaries with marinas)
- Recreational disturbance through intense human activity such as boating, swimming and fishing
- Changes in salinity through changes in freshwater inflow or mouth dynamics
- Increased turbidity through siltation.
- Changed nutrient status through increased input of nutrients or increased water retention time within estuaries.
- Pollution particularly from stormwater and waste water discharge

The above threats to estuaries are linked to a number of underlying causes including accessibility, lack of enforcement, inappropriate regulation systems and planning, and can ultimately be traced to market failures and policy distortions, poverty and wealth, consumer attitudes and preferences and human population growth. The relationship between proximate and ultimate causes of biodiversity loss is illustrated in Figure 3.1 (overleaf).

Current policy and legislation does not provide adequate protection to estuaries. They are controlled by a plethora of acts none of which pertain to estuaries in particular. Their

management falls mainly under two government departments: Department of Water Affairs and Forestry and the Department of Environmental Affairs and Tourism, with management being devolved to the provincial level. Water quality and quantity are controlled in both freshwater and marine environments. Living resources within estuaries are subject to the Marine Living Resources Act. Marine Protected Areas will provide additional protection up to the high tide mark. Planning has been relatively ad hoc in the past, but will in future be guided by Integrated Development Plans at local to provincial scale. Development is controlled at the site level by Environmental Impact Assessments (EIAs). In general the level of enforcement of legislation affecting estuaries is weak and EIAs are effectively toothless in the face of inappropriate planning.

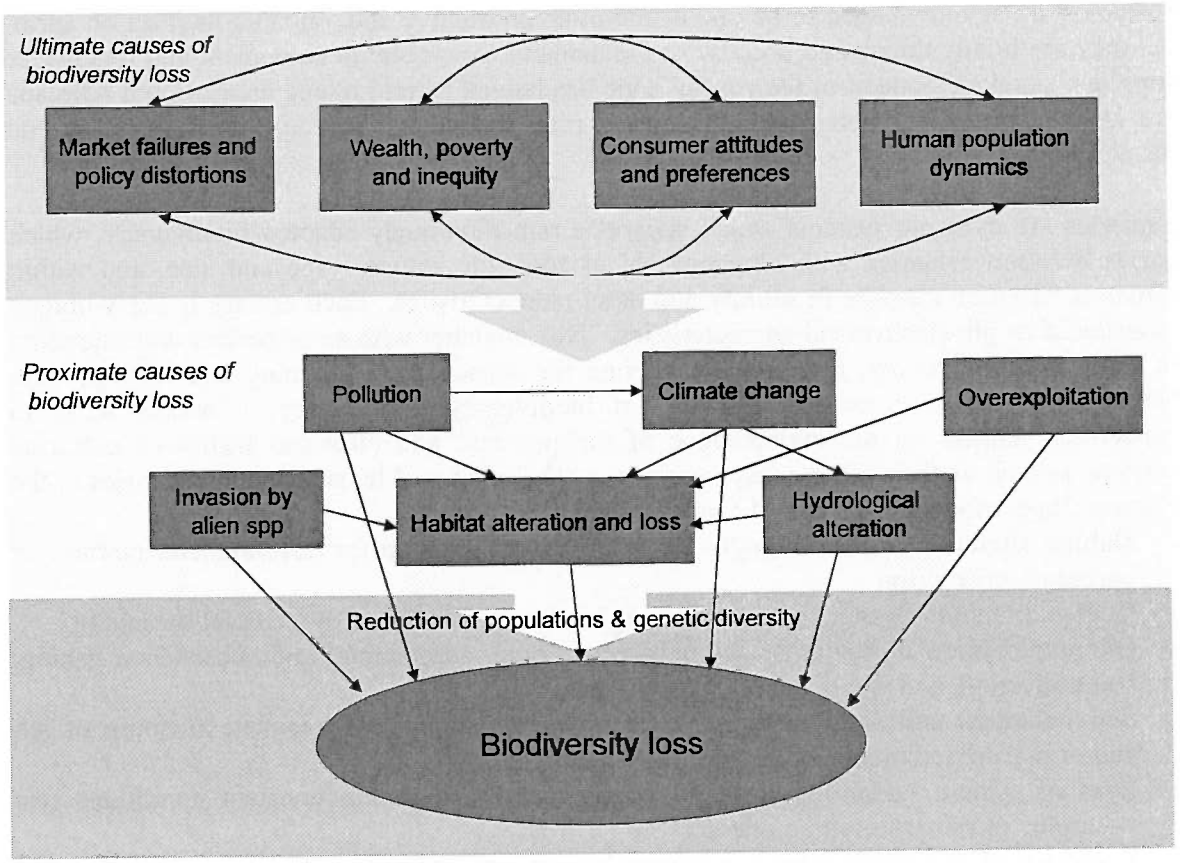

Figure3.1. Proximate and ultimate causes of biodiversity loss.

Guidelines for a conservation strategy have already been developed, with the following goals in mind: maintain/restore the ecological **integrity** of estuaries, by ensuring that the ecological interactions among estuaries and those between estuaries, their catchments and other ecosystems are maintained; and maintain/restore the **health** of estuaries in/to a good to excellent condition, assuring that a representative set of estuaries is maintained in as close to their pristine state as possible. This includes the maintenance of the natural magnitude, variability and frequency of **natural physical processes** within estuaries; the maintenance of the natural characteristics and variability of estuarine **populations and communities** in terms of size, structure and functioning, through sustainable utilisation, and the maintenance of the natural **taxonomic diversity** of all estuaries, without loss of indigenous taxa from any estuary other than by natural processes, and without the introduction of alien species. The strategy

includes (i) research and knowledge management, (ii) regulation and enforcement, (iii) creation of conditions and incentives that support conservation, (iv) monitoring and adaptive management and (v) rehabilitation. Elements of the strategy will be informed by conservation, development and water resource planning.

3.2 The economic value of South African estuaries

Estuaries, like other ecosystems, offer a range of **goods, services and attributes** that generate value and contribute to human welfare. The concept of ecosystem goods and services, popularised in the ecological-economics literature, stems from the perception of ecosystems as natural capital which contributes to economic production. Goods are harvested resources, services are processes that contribute to economic production or save costs, and attributes relate to the structure and organisation of biodiversity. Environmental and resource economics typically uses a typology of values described as the Total Economic Value concept. The Total Economic Value of an ecosystem comprises Direct Use, Indirect, Option and Non-Use values. Direct use values may be generated through the consumptive or non-consumptive use of resources. In the case of South African estuaries, most, if not all, of this use is recreational, and includes both consumptive (fishing and bait collecting) and non-consumptive (e.g. boating, bird watching) activities. Indirect use values are values generated by outputs from estuaries that form inputs into production by other sectors of the economy, or that contribute to net economic outputs elsewhere in the economy by saving on costs. These outputs are derived from ecosystem functioning such as water purification and nursery functions. Non-use values include the value of having the option to use the resources (e.g. genetic) of estuaries in the future, and the value of knowing that their biodiversity is protected. Although far less tangible than the above values, non-use values are reflected in society's willingness to pay to conserve these resources, sometimes expressed in the form of donations. The relationships between biodiversity and goods services and attributes are illustrated in Figure 3.2 below.

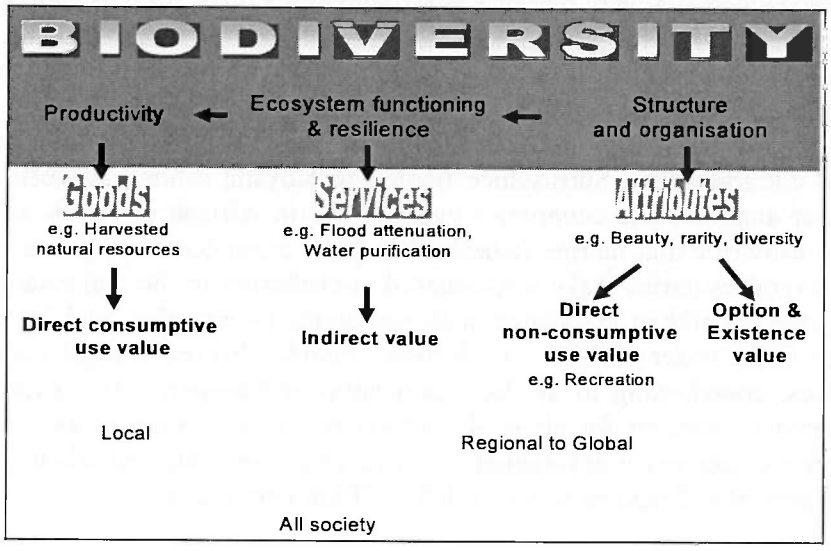

Figure 3.2. The relationships between biodiversity, the concept of 'ecosystem goods and services' and 'total economic value' typology of values (based on Turpie 2004c)

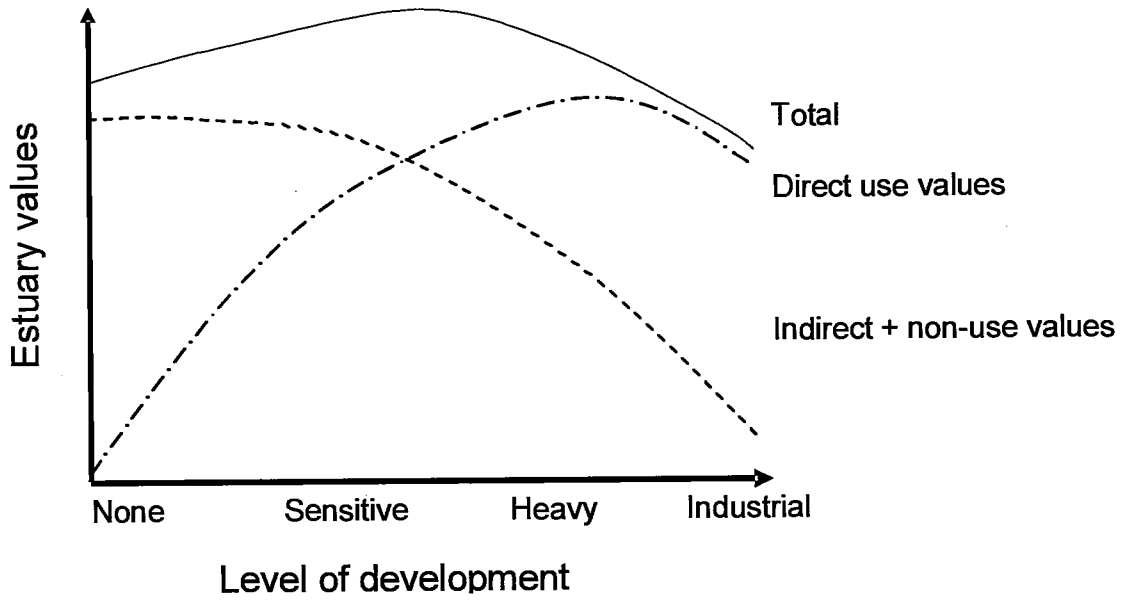

Figure 3.3 Hypothetical relationship between the level of estuary development and the magnitude of direct versus indirect and non-use values. Note that the shape of the total value curve is dependent on the relative scales of the other two curves, but is likely to be roughly hyperbolic. Note that the development scale could be logarithmic

Important to note is that there tends to be an inverse relationship between direct use values and indirect and non-use values (Figure 3.3 above). As the level of direct use increases at an estuary so does the indirect and non-use values decline. This is the classic challenge facing most municipalities – how much development is allowed without compromising ecological integrity.

A suite of methods is available to measure environmental values, each of which is suitable for different components of value and under different contexts or circumstances. These have been applied to various estuaries over the past 25 years, with research on the value of South African estuaries still only in its infancy. For example, the subsistence value of mangrove harvesting in Mngazana estuary is estimated to be worth some R3.4 million (net present value) to local communities. Subsistence fishing in Knysna estuary is worth some R0.7 – R1.1 million per annum. The economics value of South African estuaries in terms of their contribution to estuarine and marine fisheries has been estimated to be just under R1 billion per annum. Several estuaries make a substantial contribution to the real estate sector due to the property price premiums associated with proximity to estuaries, and in Knysna this is estimated to be in the order of R1.4 – R2 billion. People also spend a substantial amount in visiting estuaries, contributing to the local and national economy. In Knysna, the estuary itself is estimated to account for about R1 billion per year in tourism expenditure. South Africans in general express a substantial non-use value for estuarine biodiversity, with an estimated total annual willingness to pay of R93 million per annum.

3.3 Planning and Management Tools for Estuaries (other than IDPs)

Conservation planning: The protection of estuarine biodiversity is already provided for to some extent by the commitments that South Africa has made to the international community, such as the UN Convention on Biodiversity, Agenda 21, the Ramsar Convention, the Nairobi Convention, the Abidjan Convention, the World Heritage Convention, the World Conservation Union Policy framework and the UN Framework Convention on Climate Change. Backed by these, conservation planning sets the bottom-line in terms of defining minimum areas to be protected. There is provision in legislation to mandate these plans though the formalisation of protected areas of various categories. Conservation planning has become increasingly systematic, and now typically involves setting targets for conservation, gap analysis which assess the extent to which targets are already being met, and the selection of new sites. The latter step involves varying levels of sophistication, and increasingly considers not only representation but also maintenance of ecological and evolutionary processes. In addition, it is becoming increasingly recognised that conservation planning cannot take place in isolation of an understanding of socio-economic pressures and values. There has been a flurry of conservation planning in the Eastern Cape recently, including the Subtropical Thicket Ecosystem Planning (STEP) project and the Wild Coast Conservation and Sustainable Development Project. In addition, there have also been several national level initiatives specifically on estuaries which inform conservation planning for estuaries in this province. Ultimately, conservation planning pertaining to estuaries will need to consider the trade-offs between conservation and development In general there is essentially a trade-off between direct use values (involving residential developments, fishing, etc.) and other types of value, such as the export of fish to the marine environment, and option and existence value of biodiversity. The challenge lies in identifying the optimal spread of conservation and development among and within estuaries that maximises the sum of these values to society.

Water resource planning: Water resource planning is governed by the National Water Act of 1998, and involves resource directed measures (defining a reserve for each estuary, river, etc.), source directed controls (to control impacts on water resources), demand management and monitoring. The country is divided into 19 Water Management Areas, and the reserve will be determined following the classification of each water resource into a class which denotes the future desired state of health of that resource. The system for doing this is under development. Classification, which will secure a certain amount of water for each estuary, will involve consideration of the trade-offs inherent in water allocation. The higher the level of protection of an estuary (i.e. the greater proportion of natural flow that is reserved for the ecosystem), the less water can be allocated to water using activities. The trade-off is between the economic value generated by those activities and the economic value and people's wellbeing generated by estuaries in different states of health. Catchment management can affect these trade-offs, for example by providing incentives for more efficient use of water. The optimum freshwater flow into estuaries may be defined as the flow at which the marginal benefit of water use is equal to the marginal cost due to reduction in estuarine quality.

Local estuary management and planning: Processes for local estuary management and planning are detailed in Hay and McKenzie (2005). To summarise, the management process involves visioning, setting goals and objectives, carrying out the necessary planning, implementing actions and then monitoring and auditing to refine the process. This takes place with the support of a facilitation agency that provides co-ordination, learning and, where necessary, the required leadership. Planning components include the legal and institutional context, a description of the estuary and its surrounds, a strategic plan, a spatial plan, various

sector plans and an implementation plan. Protocols for governance, knowledge management, estuary valuation, living resource use, biodiversity protection, rehabilitation and enterprise development support the implementation of the plan.

3.4 Integrating estuary values into planning and management

The different types of planning are all on a trajectory of being increasingly integrated in the sense of considering both environmental and socio-economic goals, although Integrated Development Planning does not have a provision to specifically link with conservation planning and is only poorly linked to water resource planning, despite the fact that water is a prerequisite for both development and conservation. Development and water resource planning embodies the goals of economic efficiency, ecological sustainability and social equity, whereas conservation planning does not necessarily seek to achieve economic efficiency. The schematic below (Figure 3.4) proposes how the different types of planning should ideally fit together, and how environmental valuation (e.g. pertaining to estuaries) informs the process.

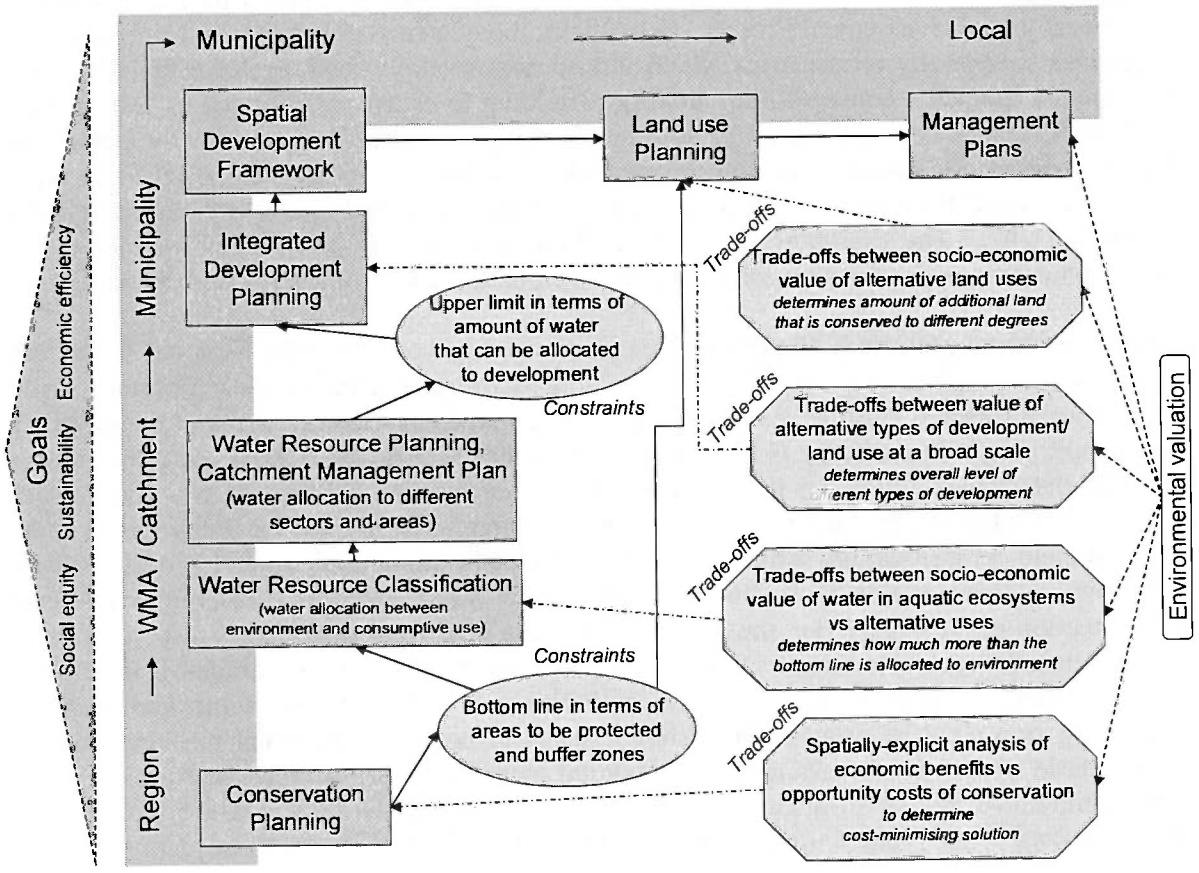

Figure 3.4: The relationship between different planning regimes and estuary valuation

This requires defining a hierarchy of constraints, with conservation planning providing the bottom line in terms of the constraints on other types of planning. Water allocation will provide one the main constraints for development planning. Management plans are then guided by the goals set by conservation and development planning processes. Decision-

making within management structures is enabled by the process of strategic adaptive management but is nevertheless constrained by the aforementioned goals and plans, and takes place at a highly localised scale. All decisions involve making trade-offs. This is particularly pertinent to biodiversity conservation where the lack of understanding of ecosystem or biodiversity values can lead to distorted decision-making. In general, while there are certain checks to meet minimum biodiversity conservation requirements, any conservation beyond that is optional and will only occur if it is deemed economically worthwhile. Ideally, we need to determine the optimum level of conservation for society, rather than the minimum level that is set out in most conservation planning exercises. This involves analysing the trade-offs between the benefits of additional conservation and the opportunity costs in terms of the most valuable alternative form of development. At the very local scale, trade-offs are also made in management decisions such as where to locate conservation zones in an estuary. Valuation is necessary to inform these trade-offs as well as to design effective incentive measures and financing mechanisms to achieve conservation goals. The sorts of planning and management decisions that are likely to maximise the economic value of estuaries include the following:

At least 20% of the estuarine area within each biogeographical area should remain conserved in a largely natural state, providing opportunities for maintaining the valuable services that they provide such as nursery area function, as well as providing opportunities for wilderness experience, spiritual enrichment and research. Where estuaries are developed, property values would be enhanced if one side of the estuary remains undeveloped, preferably as a nature reserve. This is a highly successful model that exists in many South African estuaries, and can successfully combine development and conservation needs. Since the recreational value of estuaries is derived from multiple consumptive and non-consumptive uses which are often incompatible, their value can be maximised by zonation, which prevents one type of user's utility from impacting on another's. It also provides the opportunity to achieve some conservation goals while not prohibiting consumptive use altogether. Zonation is also a far easier way of limiting consumptive use than bag or effort limits.

3.5 Enhancing the value of estuaries through biodiversity-based enterprise development

The provision of livelihood support is commonly asserted to be one of the most pertinent ways of providing incentives to communities to protect natural resources in Africa. Out of this has grown the development of Community-Based Natural Resource Enterprises (CBNREs) which strive to reach a symbiosis between nature conservation, sustainable development and nature tourism. These enterprises can benefit the local community members, private sector operators, NGOS, government and civil society.

CBNREs vary considerably, with the size of the enterprise being determined by many factors. These include the size of the resource, its sensitivity to impacts and conservation significance, the size of the market, level of infrastructural development, the skills of the community, availability of investment funds or investment partners, and the level of connectedness with national and international marketing agents, the size of beneficiaries, property rights arrangements and community cohesion. Most of these are poorly developed at Eastern Cape estuaries where this kind of arrangement would be desirable.

A combination of factors such as institutional design, legitimacy, livelihood support, and subsidy have implications for the CBNRE in relation to economic, ecological, political and

social sustainability. The success or failure of the CBNRE feeds back into the international and state level social-political systems directing change in policies, procedures and practices for conservation and development support.

There are three main types of business model. **Community owned and operated** enterprises are characterised by lack of institutional capacity, clarity on roles, responsibilities and accountability, and often a lack of secure property rights over the resource. **Community-private sector partnerships** combine the sound business acumen and access to capital that private sector operators possess with the community's resources to optimise the balance between wise use of natural resources and economic development for the rural poor. **Community – public sector partnerships** operate in a similar way. There is overwhelming agreement among authors on nature-based enterprises that establishment of CBNREs contributes to the reduction of poverty in rural communal areas, although there is little evidence that they contribute to conservation goals. The economic and ecological sustainability of these projects is highly variable. Therefore, a need still remains to find enterprise models that will demonstrate success on all four dimensions of sustainability described in this document.

4. Integrating Estuary Management into the IDP Process – An Assessment

(This section is drawn from: McGwynne L and McKenzie M (2006). Policies and procedures for incorporating information and knowledge on estuaries into the IDP and related processes are established through collaboration between researchers and authorities at local, district and provincial levels, Unpublished Water Research Commission Report, K5/1485).

A preliminary scan of the IDPs of several municipalities on the Eastern Cape Coast indicated that in most instances estuaries were either not mentioned at all or only in passing. This meant that estuaries and their management were not viewed as municipal assets, were not budgeted for nor were any mechanisms in place for their management. It was also apparent that environmental management issues in general also enjoyed a low profile in these IDPs.

In order to establish in more detail to what extent estuaries specifically and environmental issues generally were being profiled in the integrated development planning process a comparative assessment of three coastal municipalities took place. These were Ngqusha, Buffalo City and Great Kei in the Eastern Cape. A separate assessment of eThekwini (Durban) in KwaZulu-Natal was also conducted. These four case-studies were diverse ranging from a well resourced urban metropole (eThekwini) to poorly resourced emerging rural local authorities (Great Kei and Ngqusha).

4.1 The Eastern Cape Assessment

Although the three Eastern Cape municipalities whose IDPs were assessed generally followed the legally prescribed IDP procedure the priorities and projects that emerged from the process were significantly different. A tabular comparison below highlights the core features.

Feature	Ngqushwa	Buffalo City	Great Kei
Defined environmental policy	No	Yes	No
Environmental management as a municipal function	No Environmental Manager.	Yes. Strategic Head of Integrated Environmental and Sustainable Development Unit (IEM & SD) who reports directly to the Municipal Manager. Amenities Department has operational coastal management capacity.	No functional Environmental Manager. Post has been created and filled but incumbent does not perform this task.
Environmental management added on to existing function	Added on to an existing post	No. Integral part of the IEM & SD and Amenities Department functions.	No
Role of the Municipal Manager	Has influential position and appears to experience little if any environmental lobbying.	Takes direction from the IEM and SD Unit and the Head of the Amenities Dept.	Has influential position and appears to experience little if any environmental lobbying.

Feature	Ngqushwa	Buffalo City	Great Kei
Environmental capacity of IDP Representative Forum	No specific capacity. No environmental or related NGOs.	The Head of the IEM & SD Unit and the Head of the Amenities Department lobby for environmental and coastal issues.	No specific capacity. No environmental or related NGOs.
State of the Environment Reporting (SoER)	No, although there is an Amathole District SoER that could inform the municipality on general issues.	Yes. State of the Environment Report, State of the Coastal Zone Report. State of Sanitation Report.	No, although there is an Amathole District SoER that could inform the municipality on general issues.
Current environmental or coastal projects	None	Integrated Environmental Management Plan (IEMP) and Integrated Coastal Management Plan (ICZMP)	Environmental Management Strategy
Awareness of legal environmental responsibilities	Poor. IDP stated that coastal forests and estuaries are the responsibility of DEAT.	Excellent. Highlighted in the IEMP and ICZMP.	Unknown
Ranking of environment in issue prioritisation process	Rated number 10 of 10 priority areas. Votes 4.54%.	Ranked 3 of 5 priority areas. Awarded 12% of votes.	Not listed as a priority issue. No votes.
Most important municipal issue	Agricultural development (15.5% of votes)	Spatial and infrastructure (50% of votes)	Infrastructure development (ranked 1)
Environmental management projects in IDP	None	Development of an IEMP Development of an ICZMP	Environmental Strategy for Great Kei
Budget allocated to environmental projects	None	R1.2m over 3 years	R100 000
Awareness of value of environmental goods and services	Poor - deduced from the absence of the environment in the list of priority areas	Good	Poor - deduced from the absence of the environment in priority listing
Extraordinary funding to support IDP	None	Significant funding. SIDA supported the development of the IEMP and ICZMP	None
Comparison between municipalities (1=most aware, 3=least aware)	3	1	2

The inclusion of environmentally related issues (and by extension estuary management issues) into municipal IDPs is related to a complex interaction between several factors:

Availability of guideline documents: Although the IDP Guide Pack (2001) does provide localised environmental guidelines, these are strategic and need to be translated into area-specific actions that can be implemented by local municipalities. The absence of specific guidelines leaves municipalities individually responsible for drafting the terms of reference for consultants that often support them in the IDP process. Insufficient knowledge can lead to

inadequate environmental criteria to guide planning and development activities. Consequently there is a need to develop national guidelines that clearly outline the environmental requirements of an IDP and provide minimum standards that need to be met for IDP approval (CSIR 2004). The pathway described by Urquhart and Atkinson (2002) to integrate Local Agenda 21 principles and activities into the IDP process is a good starting point for municipalities to investigate and consider specific environmental issues. There are also several environmental research initiatives currently underway that can feed into the IDP process by assisting municipalities to identify their conservation priorities. Guidelines are needed on how to incorporate these priorities into IDPs and even SDFs. Useful guidelines should include the following: legal requirements for protecting key coastal ecosystems and biodiversity; principles of coastal management, conservation planning and LA 21; and an outline of local initiatives and data to support these processes (CSIR 2004).

Absence of a defined environmental policy: An environmental policy presents the approach, priorities and intentions of an organisation in broad terms and acts as the framework to guide management direction and action. It reflects an awareness of environmental issues and the level of commitment to address these issues. Environmental policy should be showcased prominently in an IDP since environmental issues cut across all municipal sectors and policy provides the core guiding statement. At the time of writing this report, of the five coastal municipalities in the Amathole district, none had yet formulated an environmental policy although that of BCM was in progress (Alan Carter, pers. comm.). Policy development is likely to follow from an awareness of legal obligations and in its absence, environmental management is bound to be reactionary and *ad hoc,* if it occurs at all.

Municipal environmental management capacity: Most Eastern Cape municipalities are without a post (or even a shared post) dedicated to environmental management (post of Environmental Manager would precede that of Coastal Manager). A well capacitated and motivated Environmental Manager (EM) would play a central role in raising the profile of environmental (and coastal) issues in the IDP process and his energy is critical for the successful inclusion of priority environmental projects into the |IDP.

Role of an Environmental Manager: Whether a full or shared Environmental Manager portfolio, achieving municipal support for environmental initiatives will depend to a large extent on the awareness the Manager creates of legal responsibilities (once these have been formally delegated), the economic value of environmental goods and services, and the potential impact of municipal activities and those of civil society on these goods and services. To further support environmental initiatives, the EM should ensure that key interest groups are included in the IDP Representative Forum during the process of IDP development. The commitment and energy of the EM is vital for the success of budget allocations to priority environmental projects.

Awareness of legal responsibilities: With no formal delegation of environmental responsibilities from national agencies, municipalities are unsure of their legal coastal management duties. They are confused about the relative responsibilities of national departments, such as DEAT and DWAF, provincial authorities and the role of the district municipality. Clear delegation of responsibility through a co-operative process is a fundamental requirement to impress on municipal decision makers that inclusion into the IDP of measures to protect natural ecosystems, including estuaries, is not an optional extra but mandatory. This awareness needs to be promoted among all role players in the IDP process i.e. Municipal Manager, Mayor, Municipal Council, IDP Steering Committee, Cluster teams

and Representative Forum. Legal obligations also present the imperatives for encouraging a cross-sectoral approach to dealing with environmental concerns.

Awareness of the link between environmental health, socio-economic wellness and the functionality of management institutions: The low priority of the environment in most Amathole municipalities indicates a lack of awareness of the economic value of natural systems and the monetary cost and cost to the quality of human life of slow but systematic degradation of these systems. Municipal decision makers need to be made aware of the need to protect the goods and services natural systems provide to the communities they serve. The critical function of municipalities as effective management institutions needs to be impressed upon decision makers. They should understand how their style and efficiency determines the way natural systems are managed which in turn affects the socio-economic benefits of these systems to local communities. The pivotal role of municipalities should be emphasised to political role players especially councilors and the Mayor who are often involved in strategic decision-making.

Communication between municipal sectors: To mainstream biodiversity and conservation issues into municipal planning processes, there should be good communication between all municipal sectors. Development planners and conservation planners need to understand the key principles and processes used in each other's fields (CSIR 2004). This understanding should also extend to other sectors such as water services development, sanitation, environmental health, waste management and local economic development. Achieving real understanding needs broad training that focuses on cross-sectoral relationships.

Inclusion of environmental special interest groups: Special environmental interest groups (e.g. Wildlife and Environment Society of Southern Africa, Marine Working Group of the East London Museum, Estuary Management Forums, and various Friends groups) play an important part in highlighting specific needs and raising the profile of environmental issues. The IDP Representative Forum is the platform for these groups to engage the process. The municipal Environmental Manager should ensure that interest groups are informed of the opportunity to participate in the IDP process and they should be encouraged to do so.

Influence of the Municipal Manager and IDP Steering Committee: In Ngqushwa Municipality, for example, the Municipal Manager (MM) and IDP Steering Committee (seven members including the MM) have central roles to play in guiding and managing the IDP process. The Committee sets the terms of reference for the IDP Representative Forum meetings, considers and comments on input from sub-committees and can recommend research. The Mayor chairs the Forum meetings and is also a member of the Steering Committee. The MM and Committee are thus in strong positions to influence the outcome of the IDP process. For environmental (coastal/estuary) issues to be addressed by the municipality, it is critical that the MM and committee are informed on the municipality's environmental obligations and the threats to environmental health and economic growth that can result from insensitive human activities.

Supplementary funding: BCM has recently received significant donor funding to support its IDP process and to implement an Integrated Environmental Management Plan and System and an Integrated Coastal Zone Management Plan. It is therefore not surprising that this municipality is well ahead of its peers in terms of natural resource management (it was the only municipality that received financial support). Efforts to improve the capacity of lesser municipalities will need adequate funding.

District municipality leadership: Local municipalities that either have or are without the post of Environmental Manager look to the district municipality for guidance in terms of sector planning. District municipalities are in many cases ahead of their local counterparts and have an important role to play in ensuring that core sector plans are developed and aligned with district plans. District environmental management strategies (e.g. Integrated Environmental and Coastal Management Plans) can in effect lead local planning initiatives. District municipalities should also co-ordinate policy and strategies between local municipalities and between national environmental regulatory bodies (i.e. promote horizontal and vertical alignment). DIMAFO (District Mayoral Forum) has a co-ordination role to play between municipal tiers, which further emphasises the importance of the EM in ensuring that the Mayor is informed about environmental issues. In the Amathole district, limited manpower and capacity restrict the involvement of the district Environmental Manager in local municipal activities.

Role of provincial and national government: Most Amathole municipalities for example are poorly informed about the division of environmental responsibilities between the different tiers of government. Although there is generally a willingness to address environmental concerns, there is confusion about legal mandates. Although the onus is on the local municipality to identify its role, responsibility also lies with provincial and national government to clarify their respective obligations. There appears to be a serious lack of communication between levels of government, which is hampering efforts to find and maintain optimum levels of natural resource use.

Mentorship: Well-capacitated and relatively well-funded municipalities, such as BCM, that are busy implementing key environmental projects should actively support less capacitated municipalities through a constructively designed mentorship programme. If coastal management is to be effective in optimising resource use, common initiatives should be identified and co-coordinated along the coastline. Municipalities such as BCM are in a position to support 'lesser' municipalities and take a lead position in setting the trends and encouraging best practice.

State of the Environment Reports: Knowledge of the state of coastal resources can help identify and prioritise issues of concern. Coastal municipalities in the Amathole district (with the exception of BCM) have little understanding of the state and economic value of their coastal resources, and the level of local community dependence on these resources (Arcus Gibb 2005b). BCM is the only municipality that has produced a State of the Coastal Zone report that will inform its Integrated Coastal Zone Management Plan (ICZMP) and will direct action to protect the health of coastal ecosystems, particularly estuaries. Other Amathole municipalities are dependent on the Amathole State of the Environment report (CES 2003) that describes coastal issues from a district perspective.

Political factionalism: Widely reported in various media and encountered directly by the research team is political factionalism that exists within the ANC in the Eastern Cape. This plays itself out in provincial and local arenas and compromises the overall functioning of both spheres of government.

Judging from the content of the IDPs of Great Kei and Ngqushwa municipalities, environmental issues are largely overlooked in favour of infrastructure, skills and agricultural development, and manufacturing. This is the case for almost all the eight local municipalities

in the Amathole District of the Eastern Cape (Arcus Gibb 2005a, 2005b). The only exceptions are BCM, where environmental management was relatively high on its IDP agenda in 2004 and resulted in the development of integrated environmental and coastal management plans (CES 2005), and ADM, which is currently implementing its EMP/S and ICZMP finalised in 2005 (Arcus Gibb 2005a, 2005b). The general neglect of environmental issues has meant that not a single municipality has yet developed an environmental policy to guide the approach to environmental management and lay the foundation for management activities (BCM's is currently being prepared).

There are many reasons for poor municipal environmental management performance in the Eastern Cape. The root causes are complex and relate in part to the absence of formal delegation of responsibility from national government. This could be equated to a "catch-22" situation whereby municipalities are not delegated responsibilities because they have no manpower to exercise the functions. In turn, because they have not been delegated responsibilities, they do not support the creation of an Environmental Manager (EM) post within their municipal structures. A co-operative governance agreement between national, provincial and local government that included financial and capacity building support where necessary would be a positive step towards addressing the confusion over obligations, and the absence of municipal capacity.

Once a municipality has created and adequately filled either a full or shared EM post, there will be a champion to drive the process of developing an environmental policy and integrating environmental concerns into the planning processes of the various municipal sectors. Vigorous and sustained campaigning will raise the profile of environmental issues in general. However without specific training in coastal management the EM is unlikely to be aware of the threats facing estuaries and in particular those posed by municipal activities themselves. Training on a continuous basis is essential to maintain the motivation and coastal focus of the EM whose role will encompass a broad environmental portfolio. National government has held occasional training workshops for local municipalities in the region but with the constant movement of municipal staff these workshops need to be repeated at least annually until EM posts are filled, stabilised and reflect adequate capacity.

If municipalities are to play a pivotal role in achieving government's coastal management intentions, they should not be left to operate in isolation, as currently is the case (Arcus Gibb 2005a, 2005b). With the Eastern Cape coastline divided into municipal zones incorporating units about 50km long, it makes little sense for each municipality to focus solely on its own relatively short stretch of coast. Better equipped municipalities must co-operate with 'lesser' ones to co-ordinate management efforts, share experiences and promote best practice. Uplifting and guiding these under-equipped municipalities is however a joint undertaking that requires commitment from all tiers of government. This is the essence of co-operative governance, a cornerstone of national environmental and coastal management policy.

4.2 The eThekwini Assessment

The Focus Areas, Key Strategic Programmes and Key Performance areas of the eThekwini Municipality are tabulated below including highlighting and notes on where estuary management is incorporated.

Focus Areas	Key Strategic Programmes	Key Performance Areas	
Economic development and job creation	New business investment & supporting & growing existing business	1. Manufacturing sector support 2. Tourism sector support 3. Primary sector support 4. Affirmative procurement programme	5. Markets 6. Administrative services 7. Local business support centres 8. Spatial Economy 9. Marketing & Branding
	Managing public realm	1. Informal economy	
Quality living environments	Meeting & maintaining basic needs	1. Council housing stock 2. Housing with services delivery	3. Service backlogs[1] 4. Infrastructure Mainten[2]
	Meeting & maintaining community service needs[3]	1. Supply of community facilities & services	2. Operation & maintenance 3. Cleaning & greening
Safety and security	Citizen safety	1. Road & pedestrian safety	2. Crime prevention
	Disaster Management	1. Disaster Recovery[4]	
	Information Safety & Security	2. Protocol for Municipal information dissemination	
Healthy & empowered citizens	Well being of citizens	1. Primary health care 2. Communicable diseases including TB, HIV & AIDS	3. Environmental Health[5] 4. Vulnerable groups 5. Indigence Programme
	Healthy employees	1. Occupational health & safety 2. HIV/AIDS Programme	3. HR Policies
	Bridging the skills gap	1. Employee skills development	2. Community action support
Embracing cultural diversity		1. Sport 2. Arts & Culture	3. Preserving our Heritage 4. Museums
Sustaining the natural and built environment	Development and maintenance of SDF & SDP	1. SDF/SDP[6] 2. Coastal development & management[7] 3. Transport planning	4. EMA environmental services management plan[8] 5. Infrastructure plan[9] 6. LUM System[10]
	Pollution Minimisation	1. Pollution Control[11]	
Local government democratisation	Accessibility & governance	1. Communication & marketing 2. Customer services centres (CSC) 3. E-Governance	4. NEPAD 5. National & provincial interface
	Efficient & effective municipality	1. Municipal court 2. E-Government	3. Workflow engineering
	Accountability	1. Ombudsperson	
	Learning organisation	1. Audit 2. Batho Pele - People First 3. Annual report 4. Performance Management System	5. Knowledge management 6. The city as the centre of learning 7. Area based management 8. Sister City programmes
Financial viability and sustainability	Strategic budgeting	1. Sustaining the Medium Term Expenditure Framework	2. Strategic budgeting alignment to IDP
	Increasing revenue	1. Seek alternate sources of funding	2. Tightening credit control
	Expenditure	1. Cost saving measures 2. Value for money	3. Growing revenue streams

[1] As sewerage and wastewater are regularly disposed of in estuaries, estuaries play an important role in meeting basic human needs relating to sanitation.
[2] Maintenance of storm water and sanitation infrastructure has an important impact on estuaries that act as receivers of storm water and wastewater.
[3] Many estuaries in eThekwini provide recreational services to the community.
[4] Pollution related disasters have the potential to have a high impact on estuaries.
[5] Estuaries are used for water-based recreation and water quality needs to meet standards for human health.
[6] The Spatial Development Framework and the Spatial Development Plans are strategic planning instruments that cover the entire municipality including estuaries.
[7] Coastal development and management activities include estuaries.
[8] Estuaries are an important component of the Environmental Services Management Plan.
[9] Storm water and sanitation infrastructure often direct the disposal of wastewater into estuaries and their catchments.
[10] The Land Use Management System will provide a detailed tool for the planning of development in and around estuaries.
[11] Water pollution has the potential to have a significant impact on estuaries.

Other than highlighting the presence of estuaries, the IDP does not make specific mention of particular estuaries. However a number of strategic focus areas link directly to estuary management. The next iteration of the IDP is to be released soon. Breetzke (pers. comm.) indicated that this version will have more explicit reference to estuary management issues and will identify various strategic projects for implementation. Projects likely to be included are development guidelines for coastal zone changes; the development and implementation of coastal management plans; manage and project the coast as a environmental and tourist asset; implement a sustainable coastal livelihood programme; development of estuary management plans (to be included in the relevant coastal management plans); consideration of coastal natural areas; and coastal water quality management.

Estuary management is considered implicitly and explicitly in many of the "package of plans" of the eThekwini Municipality:

Spatial Development Plans (SDPs): Most significantly SDPs of various areas in eThekwini are organised in terms of catchments. This is significant because many estuary management issues originate upstream from the estuary itself. Development planning on a catchment basis provides a significant opportunity for improved estuary management.

Land Use Management Systems (LUMS): The land use scheme will apply to the entire municipality including land adjacent to estuaries. The scheme will outline permissible land use and controls on these land uses. The existing scheme has often included inappropriate coastal and estuary zoning. Breetzke (pers. comm.) indicated that a revision is likely to result in more appropriate controls.

eThekwini Coastal Management Strategy (CMS): eThekwini Municipality is in the process of finalising an eThekwini Coastal Management Strategy (CMS) for adoption by Council. The CMS 'presents the proposed management framework for the municipality's coastal zone' and has the overarching aim of 'protecting, optimising and enhancing this unique and valuable asset' (eThekwini, 2005). In particular it 'sets out to be a systematic, integrated, multi-disciplinary organised approach to ensure that the coastal zone is managed, protected and enhanced while social and economic opportunities are optimised' (eThekwini, 2005). All of the strategic objectives link directly to estuary management.

Estuary Management Plans: As part of the CMS the intention is 'to develop and implement management plans for each of the estuaries and thereby work towards ensuring their ecological health, their role in biodiversity conservation and optimising their value as recreational nodes.' The draft strategy highlights that each plan should take into account area specific environmental and social issues, recreation, catchment and stormwater management, development potential and landscape values. The plans must include mechanisms for monitoring the health of the estuary (this must include fauna and flora indicators); calculation of ecological reserves; commitment to a continual improvement of incoming water quality; emergency response mechanisms; breaching policy; development of built form plan; conservation plan; and clear accountability and responsibility for implementation of the management plan.

Environmental Policy Initiative: this was first developed in 1998. The new draft policy initiative sets out the Environmental Management Policy for the Municipality (eThekwini Municipality, 2004b). The policy's central message is that the environment is a core asset for development and growth and to optimise its benefits, the municipality should invest in its protection and management. The policy is intended to support the implementation of the

eThekwini IDP and has also contributed to its content. All six goals relate directly to estuary management. However Goal E includes an objective that specifically focuses on the coast i.e.: 'To optimise the benefits derived from the unique coastal resources of the eThekwini Municipal Area'.

Environmental Services Management Plan: This is the approved open space-planning framework for the Municipality. In terms of the plan 63 000ha have been defined as important open space areas that provide significant environmental goods and services (eThekwini, 2003). Estuaries and parts of their catchment are included in the open space areas defined in terms of the Environmental Services Management Plan.

Financial Plan: eThekwini Municipality has a substantial budget. In the 2004-2005 the total budget was over R10b (R2.2b on capital expenditure and R8.5b on operating expenditure) (eThekwini Municipality, 2004a). Estuaries are significant municipal assets and, as discussed above, many municipal components are involved in estuary management activities (and activities that impact on estuaries). In addition there are numerous management activities that take place that are not focussed on estuaries in particular but are related to estuary management. For instance the drafting of the SDF is not focused on estuary management although a wide variety of estuary management activities are dealt within in these frameworks. As a result of these factors and the diffuse nature of estuary management activities, is not possible to estimate the budget allocated specifically to estuary management.

The IDP (and the associated Long Term Development Framework) takes precedence over all other plans, policies and strategies. This is demonstrated by the degree to which related plans, policies and strategies highlight this alignment. The legislated intention of the eThekwini IDP is to oversee the entire functioning of the municipality. This is underlined by the Municipal Manager who stated that 'the city's IDP is the foundation on which our strategies and action plans are built.... The IDP contains eight plans and everything we do must fit into those plans'. From an estuary management perspective this means that any plans, projects and activities need to be aligned with the IDP. In particular they must conform to the broad vision for the municipality and contribute to its strategic development programmes.

The IDP includes 'Sustaining the Natural and Built Environment' as one of eight strategic development programmes and illustrates the significance placed on environmental sustainability. As significant environmental resources estuaries should benefit from the strong emphasis on sustainable development.

The IDP approach is resulting in integration across disciplines as demonstrated by the cross section of issues covered in the IDP and the fact that the SDFs (and lower level plans) deal with issues over and above land use. In addition a variety of municipal components are being included in planning efforts to cover a multiplicity of issues. Proposals for Coastal and Estuary Management Plans in the draft coastal strategy indicate that these plans are also intended to cut across disciplines and integrate various issues. It should also be noted that components of the municipality regularly consult with other components if they believe their activities are inter-linked (Mather, pers. comm.). From an estuaries perspective this is a positive development in view of the fact that successful management depends on managing the many different types of activities that impact these systems. An integrated management approach will also result in a more integrated understanding of the value of estuaries and the range of human (municipal) activities that can impact the health of these systems. This will promote wiser estuary decision-making.

Boon (pers. comm.) highlighted that during interdisciplinary discussions regarding planning in the Northern Area, the oversupply of wastewater in the Ohlanga catchment resulted in an unnaturally high frequency of breaching events in the estuary. As a result of concerns about the possible impact on biodiversity, visual attractiveness and recreational use, the municipality is spending R25 million to divert sewerage inflows to other catchments (Mather and Boon, pers. comm.).

The Municipality has adopted a catchment planning approach illustrated by the use of catchments as a unit of planning for the Spatial Development Plans. This is a positive development from an estuary management perspective. Another significant challenge to estuary management is the impact that activities in the catchment have on the estuary downstream. Using a catchment approach to planning will assist in understanding the implications of catchment activities on the estuary and lead to effective management. Epstein (pers. comm.) indicated that this approach has been used in the Northern SDF where, for example, competing demands have been placed on the limited capacity of the Ohlanga catchment to receive stormwater runoff and wastewater effluent. In response it is necessary to balance the type and extent of development to avoid potentially negative impacts on the river and estuary within the Ohlanga catchment.

The municipality has opted to include Estuary Management Plans (EMPs) within the 'Package of Plans' framework. It is intended that these plans will form part of a coastal management plan for a particular area that will serve as the local area plan in terms of the 'package of plans.' EMPs will provide an opportunity to include in the package issues not covered in other plans, such as living resource exploitation and recreational use management.

5. Profiling Estuary Management in Integrated Development Planning

5.1 How?

The assessments described in Section 4 and direct engagement with municipalities in the course of supporting estuary management efforts in the Eastern Cape provide one clear take home message. Those municipalities that are well established, and have capacity and resources (Buffalo City and eThekwini) have integrated estuary management into their IDPs and are engaging the management process in a structured way. That is not to say that they have solved their problems. Some areas of these municipalities are highly urbanised and the impacts of this urban development on estuaries are significant. But, they have or are establishing processes to deal with the various issues.

The simple lesson to learn from this is that if one is well established, well resourced and well capacitated one can deal with the issues. However this lesson is not readily transferable to those poorly resourced areas with limited capacity. Local government in South Africa, particularly those coastal municipalities in the Eastern Cape that are rural in nature have limited capacity to govern and manage and this is unlikely to change in the short term. Many are effectively only six years old, have a limited revenue stream from rates, levies, taxes and services, and comprise staff and councilors for whom the experience of governance and management is entirely new. What capacity and resources exist, focus on the delivery of essential services. It is also common knowledge that in many of these municipalities institutionalised corruption, self-enrichment and political factionalism are key driving forces compromising delivery. Provincial and national government also have limited capacity to support these under-resourced municipalities. Many are out their struggling on their own and left to their own devices.

Expecting municipal staff and councilors to jump at the chance of engaging estuary management is entirely unreasonable. Waving the stick of legislative requirements and mandated responsibilities is unlikely to have the desired effect, probably the opposite as it will alienate the very people one is trying to influence.

With this as context how does one ensure that estuary management is taken into account in municipal processes, specifically Integrated Development Planning? The first and most important factor to recognise is that at the start that this is a social and political process of engagement that needs to be supported by technical expertise. It is not a technical process imposed on political and social systems. Also, at the start one is engaging people – councilors, officials, local stakeholders – and asking them to buy into something that initially might be entirely foreign to their frame of reference.

What is the focus of this engagement? The clue is provided in Section 2 which emphasises that municipalities are developmentally orientated. They are economically focused. So, it is imperative to use a common currency that is well understood by municipal staff and politicians – the currency of development, of economic value and of economic opportunity. If one is to engage at the start focusing on technical aspects of the ecology of an estuary, the impacts of human activity on its ecology and technical aspects of managing these impacts one is likely to lose one's audience immediately and be given short thrift. Engaging in a conversation which emphasises the economic value of an estuary, and how a municipality and

its residents might benefit from the goods, services and attributes that the estuary supplies is likely to be well received and well understood.

However, it is not enough to focus on the economic benefits that might accrue. The focus needs to be on tangible economic development opportunities that will accrue to the municipality and its residents. While the economic contribution of estuaries to coastal fishing is well known suggesting to a municipality that it might regulate fishing in an estuary because it impacts on coastal fishing is not meaningful if the benefits of an improved coastal fishery do not accrue at the municipal level. A more useful way to initiate a conversation is to focus on, for example, increased rates revenues and job creation from estuary-orientated residential, tourism, recreational and commercial development

Who should this conversation be with? It does not help to engage the environmental manager of the municipality only or whoever is mandated to carry out this function (if such a person exists). As has been explained estuaries are key economic, social and ecological resources. They cut across all functions in a municipality. It needs to be a structure conversation involving councilors, managers and support agencies across the full spectrum of municipal functions – financial, economic development, infrastructure development and maintenance, planning, amenities, social welfare, environmental protection and disaster management. Also, it is not ideal to converse with people individually. This is a collective process of learning and decision making.

Only when a municipality recognises that estuaries are of economic value and have embraced the need for their management can it effectively move on to engage the social and technical elements of management – how to maintain the ecological functioning of the system to continue to realise the benefits on a sustainable basis.

However, even when the concept of an estuary as an economically valuable resource is embraced the next hurdle – that of governance, management and planning – requires significant attention. Again this is a conversation which needs to take place using the currency that a municipality understands. What currency is this? It is the currency of the Integrated Development Planning process. In essence the fundamental frameworks for governing and cooperatively managing an estuary and a municipality are the same, as are planning and implementing various actions. Both are public resources and so the principles of good governance apply equally: public accountability, effective participation, and consistency of and transparency in decision making. Co-operative management is the same. There needs to be an organisation to manage. In both instances it comprises political leadership, managers, functionaries, civil society stakeholders and supporting institutions. There needs to be a structured management process. In both instances it is based on a process that is strategic and adaptive (Rogers and Biggs 1999). The approach is purposeful, explicit, promotes action, and adjusts to changes in economic, social and ecological conditions. It also provides opportunities for learning through experience, appropriate for local authorities in the Eastern Cape where experience and knowledge are limited. Furthermore, it sets direction for management and at the same time allows flexibility. The specific management processes are the same – achieving a collective vision amongst all stakeholders, establishing goals and objectives aimed at achieving the vision, planning and implementing tangible actions which realise the goals and objectives, monitoring the impact of these actions; and adapting and refining them to ensure they have the desired effect. In both instances the management process needs to be strategic – forward thinking to predict the consequences of various

actions. In short, the overall goal is to reassure a municipality that estuary management is business as usual only at a different scale.

Of critical importance is that every project or action carried out at an estuary is firmly embedded in the IDP. If it is it is likely to be resourced, that a staff member will be accountable in terms of his or her performance assessment and it is likely to receive political support. In practical terms this means that estuaries and coastal management need to be an explicit part of the goals and objectives of the IDP, that estuary management be included in the package of plans (SDFs, LUMs, coastal and environmental management plans, precinct plans etc.) and that every project or action at an estuary needs to be signed off as an initiative of and adding value to the IDP.

Once a municipality has embraced the concept of the economic value of an estuary and the need for active management is it important that the municipality understands how an estuary functions? Yes, but having stated that there is not an expectation that one is creating estuary experts out of every municipal politician or manager. What the municipality needs to understand is the consequences of various actions for the functioning of an estuary. Understanding, for example, that if a causeway is built across an estuary and impedes or alters water flow it will affect the functioning of the system and that specialist knowledge is required to quantify the environmental impact. Or, that agricultural development in the catchment will increase siltation and this will impact on benefits accruing to others operating at the estuary. A broad understanding provides a basis for predicting the consequences of activities on the flow of economic benefits and it also a basis for understanding when specialist expertise is required. Most importantly it allows a municipal official to respond effectively to (or deflect) questions raised by residents and other stakeholders. Telling a developer why he or she can't build a residential housing estate on an estuary floodplain is far more forceful than simply say that he or she can't.

5.2 Engaging local government – A Learning Tool.

In engaging local government it is apparent that one cannot address all the problems municipalities face. Many are beyond the scope of reference of those supporting estuary management activities. Focus is required. With this in mind the research team developed and tested an introductory educational course on estuary management. The purpose of this course was to use it as a point of engagement; to familiarise municipal staff, civil society stakeholders and support agencies with estuaries and their management; to build local management capacity, and to get municipalities thinking about how they might profile estuaries in their IDPs.

The process that was followed was firstly to select three diverse municipalities. These were eThekwini (Durban), Port St Johns and Buffalo City (East London). They provided a broad range in terms capacity, resources and urban/rural mix. Each municipality was engaged through an appropriate municipal representative to determine the challenges that the municipality faced with respect to estuaries management and what a course might include to assist in increasing knowledge to address the challenges. Course modules were then developed and presented in working sessions to the three municipalities. In eThekwini and Buffalo City these comprised one-day workshops and Port St Johns it took place over 1.5 days. At the conclusion of each workshop an evaluation was conducted to gauge the response to the course.

This educational tool is described in detail in separate publications. In summary it comprises a training course manual, a guide to trainers and a series of modules. The modules in rough sequence of delivery are:

1. The Estuaries of South Africa: Conserving and Managing our Coastal Assets – this is a PowerPoint-based slide show that exposes participants to the range of estuary types in South Africa, the benefits that accrue from their and the challenges of management
2. Estuaries of the XXX Municipality – a presentation designed specifically for the municipality where the training course is being delivered. It illustrates through photographs the various estuaries in the municipality and any other important information that is available (conservation status, environmental health etc.). The overall purpose of this presentation is to give the course a rich local context and so make it more meaningful to participants.
3. The Value of Estuaries – a presentation focusing on why estuaries are valuable economic resources with illustrative examples of these values
4. How does an estuary work? – a presentation providing a simple overview of the structure and functioning of estuary systems
5. Activities threatening estuaries – a presentation providing a simple overview of the type of impacts managers will encounter.
6. Engaging estuary management – a presentation outlining the estuary management process emphasizing its alignment with the IDP process. Where examples of local estuary management existed these were highlighted.
7. Economic development at estuaries – this presentation outlined the various economic opportunities that exist at estuaries, and what business models might be appropriate for particular enterprises and people.

The presentations were kept short, simply highlighting the key points. Copies of modules 3-7 were supplied to each participant as part of the workshop pack. Following the presentation of modules 3 – 7 the participants divided into groups and engaged in working sessions. These working sessions involved identifying an estuary in their municipality that they were familiar with; identifying the key goods, services and attributes that conferred value; relating the ecological functioning to the goods services and attributes; identifying impacts that affected functioning; deciding how to manage these impacts, and identifying economic opportunities that might be pursued at the estuary.

Each participant that attended the course received a certificate of participation.

The overall process of engaging the municipalities, developing the course material, presenting the course and receiving feedback from participants highlighted the following:

- Learning on the part of the researchers and the participants happened through engagement. Of particular value was that this was an educational course so individuals came to learn about issues rather than debate issues. This provided a less threatening environment in which to operate.
- The course material had to satisfy a considerable range of educational, expertise and skills levels amongst participants. In eThekwini certain participants expected a more technical approach but overall participants found the course content satisfactory. The comment by one participant "simple but not simplistic" encapsulates this sentiment.
- Giving the course as much local flavour as possible stimulated increased interest as was the use of local expertise to give certain presentations. At Port Johns, as an example, the

Chairman of the Mngazana Mangrove Forum received a standing ovation following his presentation on the forum's efforts.

- The process of alternating short presentations with working sessions found considerable favour.
- The course presenters had established relationships with the municipalities where the courses were held. This allowed for effective acceptance of the course and its material.
- The course was presented by acknowledged experts in the fields of estuaries and estuary management with a good understanding of local context and local resources. This is a prerequisite for success.
- All the municipalities took joint responsibility for organisational elements of the course which included the allocation of financial resources. This illustrated the commitment to the process.
- While each participant received a certificate of attendance the course is not formally accredited. This was regarded as important. The option of accrediting it through the University of KwaZulu-Natal is being investigated.
- Building on DEAT's Coastcare Induction Programme, held at all district municipalities two years ago, this course could be rolled out nationally.

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POLICIES AND PROCEDURES FOR INCORPORATING ESTUARY MANAGEMENT INTO INTEGRATED DEVELOPMENT PLANNING PROCESSES OF LOCAL GOVERNMENT

Lesley McGwynne and Margaret McKenzie

Water Research Commission Report
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Executive Summary

In most Eastern Cape municipalities, environmental issues (including the protection of estuaries) are often overlooked in favour of social needs associated with under-development and poverty relief. Since municipalities appear destined to play an important role in the management of estuaries at a local level, mechanisms need to be introduced to ensure that estuary related issues receive attention through formal municipal procedures. This report aims to identify the mechanisms to raise the profile of estuaries in municipal integrated development planning processes so that appropriate protection measures can be formally implemented through legally binding projects. Although the process to develop an Integrated Development Plan (IDP) can be regarded as well defined and systematic, it is not simple by any means particularly in municipalities that lack expertise, are often without clear policies to guide decisions on priorities, and are inexperienced at integrating issues between municipal sectors.

Fundamentally the IDP process is the same for all municipalities although there are differences in details of task teams and workshops, roles of municipal officials, composition of the IDP Representative Forum, and the capacity of IDP role players to identify and address priority issues. Measures recommended in this report to raise the profile of estuaries are generic and relate to each of the six phases of the IDP process. The municipal Environmental Manager is the most appropriate official to implement these measures and since many of the key planning activities involve the IDP Representative Forum, lobbying the cause of estuary protection among members of this body is a fundamentally important activity that should be undertaken as early as possible. At the same time, the Manager should develop and nurture an environmental lobby group in this Forum of which he is also a member. With some negotiation around the order in which environmental issues should be prioritised in the short and long-term, the Manager should succeed in persuading these role-players to support his drive to prioritise estuary related issues. Together with his allies, he should participate in the formulation of the IDP Process Plan during the Preparatory Phase to create and identify opportunities for the inclusion of estuary issues so that he can prepare to make full use of them.

For the environment to be recognised as a priority issue and for estuary protection to be singled out above other equally deserving environmental causes, the Environmental Manager will need to drive a dedicated and concerted environmental awareness campaign in the IDP Representative Forum in particular in close co-operation with his environmental lobby group. To do this effectively, the Manager himself will need environmental management training that includes the management of coastal resources. Success should not however depend on the efforts and skills of an individual but should be the outcome of a campaign fought jointly with his environmental allies. If not already in place, developing a sound environmental policy that highlights the management of coastal resources, especially estuaries, must be one of his priorities.

Outside of the IDP process, the Manager should build and actively maintain links with other environmental regulatory agencies (e.g. DEAT, DEAET, DWAF) and non-governmental organisations (NGOs) (e.g. EMFs, friends associations, nature reserve management committees), many of which may work alongside him in the IDP process. These links are vital not only to obtain their input into the process to enhance the accuracy and credibility of its outcome but also to encourage organizations (both government and NGOs) to co-operate with each other in

protecting natural assets, an approach that will be to the benefit of all role-players and especially the environment.

It needs to be remembered that the requirement for IDPs was first introduced in 1996 and clearly defined as recently as 2000. It will take many revisions and much learning over an extended period to streamline what is currently a time consuming and cumbersome process into a focused, efficient one that generates a truly integrated development plan that satisfies the expectation of most stakeholders.

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Abbreviations and acronyms used in this report

ADM	Amathole District Municipality
BCM	Buffalo City Municipality
CAP	Coastal Action Plan
CES	Coastal and Environmental Services
CMP	Coastal Management Plan
CMS	Coastal Management Strategy
DEAET	Department of Environmental Affairs and Tourism
DEAT	Department of Economic Affairs, Environment and Tourism
DIMAFO	District Mayoral Office
DWAF	Department of Water Affairs and Forestry
ECCMP	Eastern Cape Coastal Management Programme
EIP	Environmental Implementation Plan
EM	Environmental Manager
EMF	Estuary Management Forum
EMP	Estuary Management Plan
ENPAT	Environmental Potential Atlas
GIPO	Geographic and Information Policy Office
HO	Head of Department
ICLEI	International Council for Local Environmental Initiatives
ICZMP	Integrated Coastal Zone Management Plan
IDP	Integrated Development Plan
IEP	Integrated Environmental Plan
KPI	Key Performance Indicators
LA21	Local Agenda 21
LAP	Local Action Plan
LED	Local Economic Development
LTDF	Long Term Development Framework
MEC	Member of the Executive Committee
MSA	Municipal Systems Act
NEMA	National Environmental Management Act 107 of 1998
NGO	Non-governmental organisation
PE	Project Executive
PIMMS	Project Information and Management Support
SAM	Strategic Adaptive Management
SDF	Spatial Development Framework
SDP	Spatial Development Plan
SMME	Small, Medium and Micro-Enterprises
SoE	State of the Environment
STD	Sexually Transmitted Disease
SWOT	Strengths, Weaknesses, Opportunities and Threats

1 INTRODUCTION

Phase 1 of the Eastern Cape Estuaries Management Programme produced a series of guidelines to promote the effective management and sustainable use of Eastern Cape estuaries. Local municipalities are most likely to use these guidelines because estuaries fall within their areas of jurisdiction and mainly local people use estuary resources. With the advent of a new coastal policy and new environmental and municipal legislation, local authorities currently have more power and opportunity than before to plan their own futures and achieve their goals.

A key and enabling piece of legislation for local authorities is the Municipal Systems Act (MSA) of 2000, which requires all municipalities to prepare Integrated Development Plans (IDPs) to guide and inform their planning, budgeting, management and decision making. The IDP is a strategic instrument that holds municipalities accountable for service delivery that is environmentally, economically and socially sustainable. The MSA has provided the motivation for local municipalities to introduce measures to address environmental concerns and in the case of estuaries the need to protect the goods and services these systems provide. The process that builds an IDP is important because it offers several opportunities to lobby for and develop a case for estuary protection and the implementation of appropriate management action. Since the IDP informs municipal planning and development and focuses primarily on priority issues, the environment as a cross-cutting issue can be 'mainstreamed' into the planning and operational stages of all municipal sectors and departments.

Most local municipalities in the Eastern Cape operate within the context of limited budgets and expertise, little financial support and guidance from upper tiers of government, and high service delivery expectations from the communities they serve. Conservation of the natural environment receives little or no attention because municipalities are poorly informed about the impact environmental degradation has on the quality of human life. They are also unaware of their legal obligations since there has been no formal delegation of environmental management responsibilities. From iterations of the almost-final Coastal Bill, coastal municipalities appear to be earmarked as instrumental in achieving the objectives of national and provincial environmental policies (Breen *et al.* 2004, van Niekerk, pers. comm.). Municipal responsibilities therefore need to be clearly outlined and formally delegated through co-operation with the relevant provincial and national departments. This will strongly support the inclusion of environmental concerns into the IDP process, and provide the imperative to show a positive commitment to protect the health of natural ecosystems, and estuaries in particular.

Raising and maintaining the profile of estuaries during the IDP process presents the main challenge to the successful inclusion of measures to protect the health of these systems. The project presented in this report aims to identify opportunities and develop mechanisms to profile estuaries so that appropriate projects are incorporated into the IDP and supported by adequate funding and manpower.

The project is presented as the outcome of four tasks:

1. A review of policy, legislation and literature on current practices and plans for mainstreaming estuary issues into local land-use planning processes;
2. Interviews with local authorities to investigate methods and opportunities for mainstreaming estuary concerns;

3. Formulation of requirements for incorporation of estuary issues into IDPs; and
4. Documentation of a procedure for local municipal managers and estuary management forums to engage the IDP process.

2 ENVIRONMENTAL RESPONSIBILITIES OF LOCAL GOVERNMENT

2.1 The Constitution Act 108 of 1996

The Constitution clarifies the **objectives of local government** as:

- To provide a democratic and accountable government for local communities;
- To ensure the provision of services to communities in a sustainable manner;
- To promote social and economic development;
- To promote a safe and healthy environment; and
- To encourage the involvement of communities and community organisations in the matters of local government.

Sections 155 and 156 of the Constitution together with Schedules 4B and 5B outline the establishment of municipalities (local authorities) as well as their powers and functions.

Section 156(1), (2) and (4) state:

(1) A municipality has executive authority in respect of, or has the right to administer -

(a) The local government matters listed in Part B of Schedule 4 and Part B of Schedule 5; and

(b) Any other matter assigned to it by national or provincial legislation

(2) A municipality may make and administer by-laws for the effective administration of the matters that it has the right to administer.

(4) The national government and provincial governments must assign to a municipality, by agreement and subject to any conditions, the administration of a matter listed in part A of Schedule 4 or Part A of Schedule 5 which necessarily relates to local government, if

(a) that matter would most effectively be administered locally; and

(b) the municipality has the capacity to administer it.

The mandated responsibilities of municipalities are thus defined by the Constitution in Schedules 4B and 5B. Schedules 4A and 5A are national and provincial responsibilities that can be assigned to municipalities if these could be more effectively administered locally, and if there is the available capacity. Table 2.1 lists the mandated municipal responsibilities that relate to the management of the coastal zone as well as those responsibilities that can be delegated.

Table 2.1. Mandatory responsibilities of municipalities relating to coastal zone management according to Schedules 4B and 5B of the Constitution. These are compared with responsibilities that can be delegated by national and provincial government (Schedules 4A and 5A).

Mandatory municipal responsibilities		National and provincial responsibilities that can be delegated to municipalities	
Schedule 4B	**Schedule 5B**	**Schedule 4A**	**Schedule 5A**
Air pollution	Beaches and amusement facilities	Administration of indigenous forests	Provincial planning
Building regulations	Cemeteries, funeral parlours and crematoria	Agriculture (?)	Provincial cultural matters
Local tourism	Cleansing	Cultural matters	
Municipal planning	Control of public nuisances	Disaster management	
Municipal health services	Fences and fencing	Environment	
Municipal public works	Local amenities	Nature conservation excluding national parks, national botanical gardens and marine resources	
Pontoons, ferries, jetties, piers and harbours	Local sports facilities	Pollution control	
Stormwater management systems in built up areas	Markets	Regional planning and development	
Water and sanitation services limited to potable water supply systems and domestic waste-water and sewage disposal systems	Municipal abattoirs	Soil conservation	
	Municipal roads	Tourism	
	Noise pollution	Urban and rural development	
	Public places		
	Refuse removal, refuse dumps and solid waste disposal		
	Traffic and parking		

The definition of the competencies in Schedules 4B and 5B were outlined by CES (2005). Those that apply to specifically to coastal aspects are shown in Table 2.2.

Table 2.2. Definitions of Schedule competencies relevant to the coastal zone

Competency Schedule 4B	**Definition**
Pontoons, ferries, jetties, piers and harbours, excluding the regulation of international and national shipping and matters related thereto.	Establishment, operation, management, control and regulation of the physical facility of Pontoons, ferries, jetties, piers and harbours. Excludes regulation and control of national and international shipping matters. Includes activities in the harbour, access thereto, safety issues, hours of operation and so forth.
Competency Schedule 5B	
Beaches and amusement facilities	Establishment, operation, management, control and regulation of amusement facilities and beach facilities Includes locations, days, hours, licensing and safety

Mandatory core responsibilities are not uniformly applied across municipalities, which operate within a climate of considerable uncertainty and confusion. The Palmer Development Group (2004) attributes the uncertainty to the following factors:

- A lack of clarity over the precise meaning of the powers and functions assigned to the different spheres of government within Schedules 4 and 5 of the Constitution despite the fact that a new document by the Municipal Demarcation Board provides definitions for these functions.
- Functions can be shifted from one tier of government to another (e.g. from district to local municipalities or vice versa) depending on available capacity and the appropriateness of the issue.
- National and Provincial functions can be assigned to local government, if the Minister or MEC decides that it is more appropriate to deal with the issue at the local level (and if there is capacity to do so).
- Activities are increasingly delegated to local government from national and provincial departments and programmes (often without accompanying funding).

Municipalities respond to sectoral legislation, initiatives from national government departments and provinces as well as issues generated by their communities. They therefore take on responsibilities as required which effectively increases their current functions significantly transcending those set down in Schedules B of the Constitution.

2.2 Local Government: Municipal Structures Act 117 of 1998

The Municipal Structures Act (Ch 5) allocates the powers and functions listed in Schedules 4A, 5A, 4B and 5B of the Constitution between the tiers of local government. Category A municipalities (metropolitan areas) have responsibility for all functions listed in both Schedules. Sections 84(1) (amended) and 84(2) list the functions and powers of district and local municipalities. Those pertinent to coastal management (after Palmer Development Group 2004) are summarised in Table 2.3.

Table 2.3. The division of functions and powers between district and local municipalities related to coastal management (MSA of 1998)(after Palmer Development Group 2004)

District municipality	Local municipality
Integrated development planning for the district municipality as a whole including a framework for IDPs of all municipalities in the area of the district municipality	Preparation of IDP for local municipality
Potable water supply systems	Potable water supply systems (where there is capacity)
Domestic waste water and sewage disposal systems	Air pollution
Solid waste disposal sites: (a) determination of a waste disposal strategy (b) regulation of waste disposal (c) establishment, operation and control of waste disposal sites, bulk transfer facilities and waste disposal facilities for more than one local municipality in the district	Local tourism
Municipal health services (environmental health)	Storm water
Municipality roads	Beaches
Establishment, conduct and control of cemeteries and crematoria	Municipal parks and recreation
Promotion of local tourism	Local amenities

	Noise pollution
	Refuse removal, refuse dumps and solid waste
	Public places

When a function lies with a local municipality, the district municipality also has the responsibility to build capacity within local municipalities to perform this function where capacity is lacking, and to perform this function in District Management Areas (Palmer Development Group 2004).

2.3 National environmental legislation

In addition to the responsibilities set out in the Constitution and Municipal System Act, there is a range of national legislation applicable to the management of coastal resources that have direct implications for local government. This legislation is designed for the coastal zone as a physical and ecological entity and as such applies to the management of estuaries. The most pertinent coast-related legislation and the role of municipalities are described in Appendix 1.

3 PRINCIPLES AND POLICIES GOVERNING COASTAL MANAGEMENT IN THE EASTERN CAPE AT A LOCAL LEVEL

3.1 Introduction

South Africa's policy on coastal management (as reflected in the White Paper for Sustainable Coastal Development of 2000) focuses on the coastal zone as a whole, and while it recognises estuaries as an integral and important coastal ecosystem, its goals and objectives and Plan of Action are geared towards the sustainable development of coastal resources, which includes estuaries.

The review presented in this section covers national, provincial and municipal coastal management policy and that of related initiatives, and although not explicitly stated, these policies are also relevant to the management of estuaries. Environmental management that focuses on sustainable development must include governance and socio-economic issues. The review therefore adopts a holistic approach and includes factors that directly and indirectly govern the effective management of estuaries.

3.2 The White Paper for Sustainable Coastal Development in South Africa

The White Paper incorporates the fundamentals of NEMA and represents coastal management policy in South Africa. It sets out a vision for the coast and goals and objectives for coastal management, and binds these together in a Plan of Action.

The White Paper is underpinned by a set of principles for coastal management as follows:

- The coast must be retained as a national asset, with public rights to access and benefit from the many opportunities provided by coastal resources.
- Coastal economic development opportunities must be optimised to meet societies needs and to promote the well-being of coastal communities.
- Coastal management efforts must ensure that all people, including future generations, enjoy the rights of human dignity, equality and freedom.
- The diversity, health and productivity of coastal ecosystems must be maintained and, where appropriate, rehabilitated.
- The coast must be treated as a distinctive and indivisible system, recognising the inter-relationships between coastal users and ecosystems and between the land, sea and air.
- Coastal management efforts must adopt a risk-averse and precautionary approach under conditions of uncertainty.
- Coastal management is a shared responsibility. All people must be held responsible for the consequences of their actions, including financial responsibility for negative impacts.
- All people and organisations must act with due care to avoid negative impacts on the coastal environment and coastal resources.

- A dedicated, co-ordinated and integrated coastal management approach must be developed and conducted in a participatory, inclusive and transparent manner.
- Partnerships between government, the private sector and civil society must be built to ensure co-responsibility for coastal management and to empower stakeholders to participate effectively.

Policy focus is on the coastal zone as the interface between the land and the sea. The policy recognises the range of goods and services provided by coastal ecosystems (including estuaries) and the enormous contribution these make to the economy and livelihoods of coastal communities. At the same time it acknowledges the urgency of protecting the capacity of coastal ecosystems to deliver goods and services through planning and management that maintains their diversity, health and productivity.

The policy is people-centred and focuses on facilitating long-term, economically efficient, socially equitable, institutionally viable and ecologically sound coastal development. It also promotes co-operation and shared responsibility with a range of users and emphasises the importance of managing the coast holistically through encouraging co-ordination and integration geographically, across time scales, sectors and disciplines as well as institutions. It views coastal management as a flexible and evolving process through which continuous reflection, learning and review take place.

Theme D of the White Paper centres on natural resource management of coastal ecosystems. Estuaries are given special mention in the recommendations towards policy implementation of Goal D1 of this theme, which states that "special attention will need to be given to maintaining and where possible rehabilitating the diversity, health and productivity of coastal ecosystems, such as estuaries and dunes, which are vulnerable to human induced disturbance". Although the theme focuses on the coast in broad terms, the core goals and related objectives are applicable to the management of estuaries.

The White Paper paves the way for the protection of estuarine biodiversity through the inclusion of estuaries in coastal protected areas, an emphasis on the rehabilitation of degraded systems and practices that promote the sustainable use of renewable and non-renewable resources. The future of South African estuaries depends on direct management and the quantity and quality of freshwater inputs (Turpie *et al.* 2002). The White Paper incorporates the policy principles to address key issues governing the health and productivity of these systems.

3.3 Eastern Cape provincial coastal management policy

3.3.1 The Eastern Cape Coastal Management Programme

Eastern Cape provincial coastal policy is captured in the Eastern Cape Coastal Management Programme (ECCMP)(CES 2004). The programme identifies a vision and sets out goals and objectives for the coast that directly follow the five themes of the White Paper. As in national policy, the ECCMP does not refer specifically to estuaries although its core objectives directly apply to these systems.

The ECCMP identified key coastal areas in the province based on opportunities and threats related to biodiversity protection, industrial development, urban development, poverty alleviation and livelihood opportunities, and tourism development. It singled

out the Swartkops, Kromme, Great Fish estuaries as well as estuaries between East London and the Great Kei as threatened by freshwater extraction, habitat disruption, channel modification and siltation/sedimentation. The Amathole coast between the Fish and Mncwasa estuaries was threatened by development that focused at the mouth regions.

Specific to estuaries, the ECEMP made the following recommendations:

- Regulatory authorities need to work together more closely to achieve effective estuary management;
- A general Estuary Management Plan should be developed for Eastern cape estuaries that can be customized for individual systems;
- DEAET should dedicate a suitably trained person to deal specifically with estuary management issues;
- Estuary management officials at all levels should be trained and empowered to enforce the regulations of the Marine Living Resources Act 18 of 1998. Training should be ongoing and link with related initiatives;
- Local authorities should personnel dedicated to estuary management.

3.4 Municipal coastal management policy

3.4.1 Amathole District Municipality Coastal Management Programme

The Amathole District Municipality (ADM) Coastal Management Programme (CMP) is the only district level programme in the Eastern Cape. It covers the coastal zone between the Great Fish River in the west and the Mncwasa River in the east and includes 69 estuaries of which 12 are permanently open to the sea. The goals and objectives developed for the ADM CMP are closely aligned with the national and provincial policies already described. One strategy (represented as a project) compels the municipality to promote the development and implementation of Estuary Management Plans for all estuaries where there is development pressure. Following the estuary conservation rankings of Turpie *et al.* (2002) and Turpie (2004), priority estuaries were identified (not exclusively) in the following order: Keiskamma, Mbashe, Mpwekweni, Kobonqaba, Kwenxura, Nahoon, Gqunube, Great Kei and Great Fish.

ADM's CMP was aligned with the Eastern Cape provincial spatial framework, which states that development must not be permitted in environmentally sensitive areas such as:

- State forests;
- Dunes and estuaries;
- Within 30 m of water courses;
- Along major rivers including the Great Kei, Fish and Mbhashe;
- Game reserves and nature sanctuaries;
- Slopes steeper than 1:6;
- Heritage sites with tourism potential; and
- Wetland areas.

3.4.2 Buffalo City Municipality Coastal Management Plan

BCM's Integrated Coastal Zone Management Plan (ICZMP)(CES 2005) currently in draft form defines the following strategic objectives to achieve its overall vision as a "unique and conserved coastline that offers access and opportunities for all":

- To spatially define areas for conservation and development without further fragmenting existing natural coastal areas or negatively affecting landscape quality;
- To ensure future development is uniquely coastal, carefully planned and occurs in an aesthetically and ecologically sustainable manner;
- Taking into account the above ensures suitably located and equitable access to the coastal environment;
- To guide the provision of suitable infrastructure and facilities for all residents and visitors to BCM;
- To promote the uniqueness of the BCM coastline through appropriate tourism strategies;
- To ensure the maintenance of water quality that meets existing legal requirements within the estuaries and near shore coastal environments;
- To ensure pollution within the coastal zone is prevented through appropriate infrastructure and monitoring; and
- To develop practical, useful and realistic management guidelines that can be implemented cost effectively.

These strategic objectives were translated into Coastal Action Plans (CAPs) with management interventions that can be implemented cost-effectively. Estuary management is the focus of one of these Action Plans of which there are five viz:

- Coastal Action Plan 1: Spatial Planning & Development
- Coastal Action Plan 2: Estuarine Management
- Coastal Action Plan 3: Recreational Management
- Coastal Action Plan 4: Coastal Resource Management and Monitoring
- Coastal Action Plan 5: Conservation

The objectives of CAP 2: Estuaries Management focus on promoting sustainable management through co-operative management, setting targets for future desired states or uses, setting management guidelines and bylaws, and developing detailed estuary registers and management recommendations for priority systems.

The plan recommends four general management actions for BCM estuaries:

- Establish Estuary Management Forums to facilitate public participation in decision making and the compilation of Estuary Management Plans (EMPs);
- Develop EMPs that outline goals and objectives for each estuary;
- Develop a monitoring programme to track long-term changes in key physical, chemical, biological and socio-economic factors that impact estuarine health; and
- Develop a database to store and access all relevant scientific and management information for individual estuaries.

The plan recognised eight priority estuaries as follows: Nahoon, Buffalo, Gqunube, Quinera, Gxulu, Tyolomnqa, Ncera and Goda (after Wood *et al.* 2004). It proposed a range of management actions under the themes described for the White Paper for Sustainable Coastal Development. In addition it describes preliminary EMPs for 15 systems; these plans need to be verified through a process of public participation.

3.5 Local Agenda 21 – sustainable development at a local level

Agenda 21 is an internationally endorsed action plan for implementing sustainable development into the 21st century. The plan highlights the importance of a working partnership between local authorities and their communities to implement the proposals and guidelines of the Rio Declaration on Environment and Development of 1992, which was reaffirmed through the Johannesburg Plan of Action emanating from the World Summit on Sustainable Development in 2002.

Local authorities have a key role to play in the sustainable use of estuary resources since many of the problems and solutions listed in Agenda 21 are rooted in local activities (Urquhart and Atkinson 2002). At a local level sustainable development is *'development that delivers basic environmental, social and economic services to all residents of a community without threatening the viability of the natural, built and social systems upon which the delivery of these systems depends'* (International Council for Local Environmental Initiatives (ICLEI)). Interpreting this definition leads to a local-government-oriented meaning of sustainable development as:

- managing economic development in ways that use the talents and resources of local communities and that are supportive of community life and power;
- distributing the benefits of development equitably and to sustain these benefits in the long-term; and
- preventing the degradation of the natural environment that occurs through the overuse of natural resources and the generation of large volumes of waste.

Local Agenda 21 (LA 21) translates Agenda 21 into actions at the local level. It is a long-term strategic approach to help local municipalities balance the demands of economic development and employment, environmental protection, and social equity and justice. The key LA21 principles of sustainable development for local government (after Urquhart and Atkinson 2002) are as follows:

- Wise use and management of the environment is necessary for our survival, it is not an obstacle to it;
- Opportunities to develop must be available to all people – this means greater fairness in sharing wealth, opportunities and responsibilities, with particular emphasis on the poor and disadvantaged;
- There are ecological limits to human activities that must be respected;
- Development is much broader than economic growth and also has social, cultural, environmental, political, moral and spiritual dimensions;
- People must be given the opportunity to participate in all activities and decisions that affect their lives; and
- Environmental considerations must be integrated into all planning and development processes – this includes Integrated Development Plans (IDPs),

Local Economic Development (LED) plans, land use or structure plans and sector plans for water, transport and waste.

4 INTEGRATED DEVELOPMENT PLANNING – LEGISLATION, PRINCIPLES AND PROCESSES

4.1 What is Integrated Development Planning?

Integrated Development Planning is a key process whereby municipalities arrive at decisions on issues such as municipal budgets, land management, service delivery, promotion of local economic development and institutional transformation in a consultative, systematic and strategic manner. The process not only informs municipal management on key issues but also guides the activities of other spheres of government, corporate service providers, NGOs and the private sector operating in the municipal area (DPLG 2001).

An Integrated Development Plan is a five-year strategic development plan for a municipality. It serves as the principal strategic management instrument and takes priority over all other plans that guide development at a local level. It must reflect the priority needs of a municipality and its residents and ensure that available resources are used objectively to address these needs.

4.2 Underpinning legislation

4.2.1 The South African Bill of Rights (1996)

The Bill of Rights of the South African Constitution (Act 108 of 1996) sets the requirements that the actions of government (and civil society) must meet to protect the health of the environment, and consequently the health of its citizens. It therefore presents the cornerstone for the management of the country's natural resources. Section 24 of the Bill states that:

"... Everyone has the right

(a) to an environment that is not harmful to their health or well being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that

1. prevent pollution and ecological degradation;
2. promote conservation; and
3. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Since the Constitution is the supreme law of the land, all legislation and policy must be consistent with it and conform to it. The Bill provides the legal imperative for municipalities to ensure that their activities do not negatively impact the environment, and Independent Development Plans (IDPs) (as prescribed in the Municipal Systems Act) provide the opportunity for municipalities to integrate environmental concerns into multisectoral planning processes.

4.2.2 Municipal Systems Act 32 of 2000

Integrated Development Planning is a participatory planning process aimed at developing a strategic development plan to guide and inform all planning, budgeting, management and decision-making in a municipality over a five-year term (CSIR 2004). The Municipal Systems Act (MSA) (S25) states that:

"Each municipal council must, within a prescribed period after the start of its elected term, adopt a single, inclusive and strategic plan for the development of the municipality which –

- Links, integrates and co-ordinates plans and takes into account proposals for the development of the municipality;
- Aligns the resources and capacity of the municipality with the implementation of the plan;
- Forms the policy framework and general basis on which annual budgets must be based;
- Is compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation"

Section 26 states that an IDP must reflect at a minimum:

- An assessment of existing levels of development including an identification of communities excluded from basic services;
- A vision for long term development, with emphasis on development and internal transformation needs;
- The development priorities and objectives including the aims of local economic development;
- The development strategies which must be aligned with any national or provincial sectoral plans and planning requirements;
- A spatial development framework including basic guidelines for land use management;
- Operational strategies;
- Disaster management plans;
- A financial plan including a budget projection for at least the next three years; and
- Key performance indicators and key performance targets.

The IDP process must conform to two principles:

1. Planning must be developmentally oriented; and
2. Planning must take place within the framework of co-operative government.

IDPs are legally binding and no single executive decision may be in conflict with it. The MSA therefore provides the statutory basis for the compilation of IDPs that demonstrate a municipality's commitment to uphold the principles of the Bill of Rights. They offer the opportunity for integration between sectoral strategies to achieve optimum allocation of resources in a way that supports sustainable development, equity and the upliftment of poor communities.

4.2.3 National Environmental Management Act 107 of 1998 and legal obligations for local municipalities

NEMA is the cornerstone legislation for all environmental management activities. It sets out the principles for environmental management that apply to all government departments whose activities may impact the environment. The principles of NEMA are (after CSIR 2004):

- Environmental management must place people and their needs at the forefront of its concern.
- Development must be socially, environmentally and economically sustainable.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Environmental justice must be pursued.
- Equitable access to environmental resources to meet basic human needs and ensure human well-being must be pursued.
- Responsibility for the environmental health and safety consequences of a project or activity exists throughout its life cycle.
- The participation of all interested and affected parties in environmental governance must be promoted.
- Decisions must take into account the interests, needs and values of all interested and affected parties.
- The social, economic and environmental impacts of activities, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.
- The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.
- The costs of remedying pollution, environmental degradation and consequent adverse health effects must be paid for by those responsible for harming the environment.
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

A local municipality must ensure that its IDP policy is in keeping with national and provincial environmental management plans. It must ensure that the principles of NEMA are applied when strategies and projects are designed and implemented. These must comply with the principle of an ecologically sustainable development process. The IDP Guide Pack (DPLG 2001) lists the legal obligations of local municipalities relating to the environment. Municipalities must:

- Avoid pollution and degradation of the environment;
- Avoid waste, ensure recycling or disposal in a responsible manner;

- Minimise and remedy negative impacts on the environment and on people's environmental rights;
- Consider the consequences of the exploitation of non-renewable natural resources;
- Avoid jeopardising renewable resources and ecosystems;
- Pay specific attention to sensitive, vulnerable, highly dynamic or stressed ecosystems;
- Minimise the loss of biological diversity; and
- Avoid disturbance to cultural heritage sites.

4.3 Purpose and core objectives of Integrated Development Planning

The purpose of Integrated Development Planning (IDP) is to facilitate appropriate service delivery by providing the framework for social and economic development within the municipality (DPLG 2001). Through this framework, it contributes towards eradicating the development legacy of the past, puts into practice the ideal of developmental local government, and fosters a culture of co-operative governance.

The objectives of IDP (from DPLG 2001) are linked to its core processes:

1. It is a **consultative** process and aims to become a tool for democratic government by ensuring that:
   - engagement in the process is structured;
   - participation is institutionalised;
   - bottom-up and top-down decision making is inter-linked; and
   - analysis is focused and a forum for debate on real issues that affect service delivery is created.

2. It is a **strategic** process and aims to ensure that:
   - most efficient use is made of scarce resources;
   - innovative cost and time solutions are sought for local problems;
   - underlying causes and not symptoms are addressed; and
   - integration of cross-cutting and cross dimensional issues are considered.

3. It is an **implementation-oriented** process and aims to improve service delivery by:
   - ensuring that defined and substantive project proposals are designed;
   - planning-budget links are made for feasibility; and
   - institutional preparedness is addressed.

Conducted under optimal conditions and according to guidelines presented in the IDP Guide Pack Series (DPLG 2001), the IDP process should ensure that municipalities are sensitive to environmental issues and cross cutting dimensions and impacts, and understand their impact on budgetary and land-use management decisions. It also should provide the opportunity for intergovernmental co-operation by ensuring that municipal development activities contribute to furthering the visions, objectives and strategies of a municipality.

4.4 Key phases of the IDP process

The MSA prescribes the minimum requirements for the IDP in terms of process and content (see Section 4.2.2) and at the same time allows for flexibility to accommodate local circumstances. The approach to planning is designed to achieve a decision-making process that is consultative, strategic and implementation oriented.

The IDP process is set out in the IDP Guide Pack (DPLG 2001). There are six phases:

- Phase 0 – Preparation
- Phase 1 - Analysis
- Phase 2 – Strategies
- Phase 3 – Projects
- Phase 4 – Integration
- Phase 5 – Approval

A Preparation Phase (known as Phase 0) precedes these five phases and focuses on developing a Process Plan to guide the IDP.

The rest of this section centres on each phase in terms of its purpose, main planning activities and outputs. The sources of information are the IDP Guide Pack (2001), Rauch (2002) and Urquhart and Atkinson (2002).

4.4.1 IDP Phase 0: Preparation

Purpose	• To plan the process to be followed in developing the IDP • To plan for district level alignment actions

Main planning activities	1. Distributing roles and responsibilities 2. Determining organisational arrangements 3. Formulating mechanisms and procedures for public participation 4. Developing action programme with time frame, resource requirements, cost estimate 5. District level actions for alignment between municipalities and for provincial/national alignment

Outputs	• Process Plan (municipal) • District level framework

The executive committee, or executive mayor, or a committee of councillors must manage the drafting the process of drafting an IDP (MSA). The development of an IDP is initiated by the adoption of a process (as a Process Plan) to guide the planning, drafting, adoption and review of the IDP. The Process Plan should:

- indicate how the community will participate in the drafting and review processes;
- set out organisational arrangements for managing the IDP drafting process and in particular establish two key institutional structures:

  (a) IDP Steering Committee consisting of Heads of Departments (HODs) and senior officials to support the IDP Manager; and

(b) IDP Representative Forum, which institutionalises and guarantees representative participation. It includes Executive Committee members, councillors, traditional leaders, ward committee chairpersons, HODs and senior officials, stakeholder groups, advocates for unorganised groups, and community representatives.

4.4.2 IDP Phase 1: Analysis

- The Analysis Phase focuses on an assessment of the existing situation. The information collected must focus on information that is relevant and enables the municipality (and stakeholders) to decide on priority issues or problems while taking into account factual data and public perceptions.
- The essential features of the phase are described below.

Purpose	To ensure that decisions will be based on: • people's priority needs and problems • knowledge on available and accessible resources • proper information and a thorough understanding of the dynamics influencing development in a municipality

Main planning activities	1. Compilation of existing information 2. Community and stakeholder level analysis 3. Reconciling compilation of existing information and community / stakeholder analysis 4. Municipality level analysis (including economic, social, environmental and institutional analysis) 5. Spatial analysis and the spatial representation of development issues 6. Socio-economic and gender differentiation of analysis 7. Identification of municipal priority issues / aggregating priorities 8. In-depth analysis of priority issues: generic guidelines for sector alignment, and sector specific guidelines (transport, water, waste management, infrastructure) 9. Consolidation of analysis results

Outputs	• Assessment of existing level of development • Priority issues or problems • Understanding on nature, dynamics and causes of priority issues or problems • Knowledge on available resources and potentials (including a tentative overall financial frame)

- The municipal situation should be assessed in the context of national level driving forces e.g. population influx, economic rise/decline, national environmental problems.
- The analysis should not be sectoral but rather issue-focused making best use of available knowledge.
- Municipal decision-makers should be knowledgeable about trends, causes and impacts of priority issues in the context of existing and accessible assets and resources, as well as limitations.
- Sector planning should be aligned with the analysis in a manner that promotes local priorities and meets sector-planning requirements.

- Since the information collected is likely to be at different scales, levels and from different places, it needs to be aggregated and reconciled before issues can be prioritised.
- The prioritization of issues and stakeholder participation are important parts of this phase. The identification of Priority Issues should stem from the local context but must take into account HIV/AIDS and unemployment issues that are of national concern. Priority issues are consolidated after taking into consideration community-, stakeholder- and municipal-level priorities and the outcome of the information assessment. This consolidation is a key event and best done through an IDP Representative Forum workshop (see Section 2.2.1). The process inherent in the Analysis Phase is shown diagrammatically in Fig. 4.1.

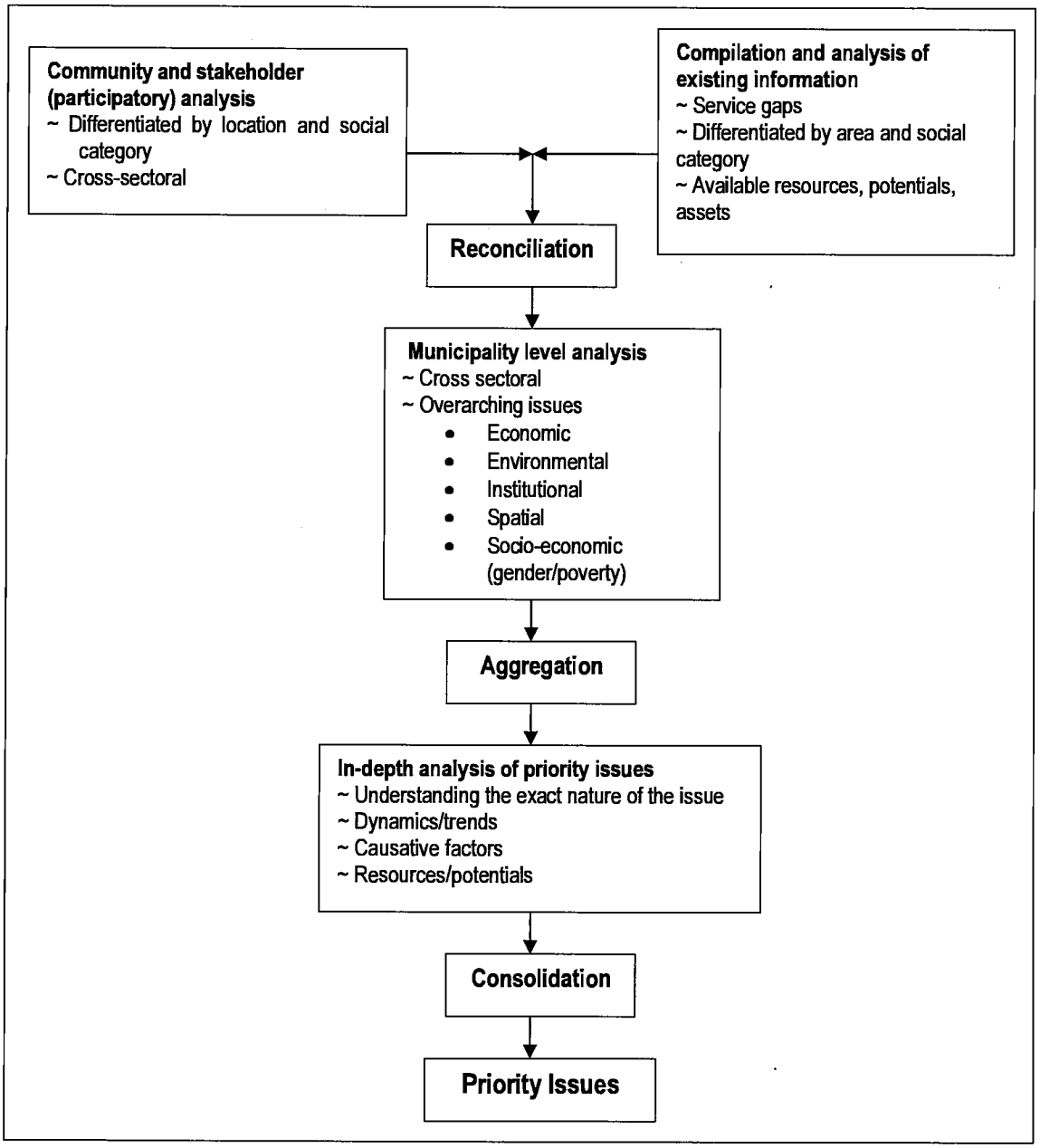

Fig. 4.1. Analysis Phase process (modified from the IDP Guide Pack (DPLG 2001))

4.4.3 IDP Phase 2: Strategies

- In this phase basic decisions are made on the future of the municipality in terms of what it needs to achieve and ways to achieve it. Strategic planning involves a process of developing options (strategies) and making choices in a systematic, rational and transparent way.
- Decisions need to be made on the future vision for the municipality, development objectives, and development strategies. If fully agreed upon, such decisions can unify and co-ordinate the management of the planning process.
- The essential features of the phase are described below.

Purpose	• To ensure broad inter-sectoral debate on the most appropriate ways to tackle priority issues • This debate should occur in the context of the vision, policy guidelines and principles, available resources, inter-linkages and competing requirements • Phase of making choices after due consideration of various options

Main planning activities	1. Inter-sectoral workshops as forums for open discussions on ways and means of dealing with priority issues 2. Workshops at district level with all affected local municipalities and representatives from relevant provincial and national agencies and corporate service providers to ensure (a) well informed and well facilitated strategic debates (b) cross-boundary issues are addressed and (c) inter-government/sector alignment 3. Planning activities at the workshops include: • Developing a vision • Determining working objectives • Designing Localised Strategic Guidelines (spatial, poverty alleviation and gender equity, environmental, LED, institutional strategic) • Defining resource frames and financial strategies • Creating alternatives for each priority issue • Analysing and deciding upon strategy alternatives

Outputs	• Multi-sectoral vision • Objectives (for each priority issue) • Strategic options and choice of strategy (for each issue) • Tentative financial framework for projects • Identification of projects

- The vision for long-term development should be multi-sectoral and capture the municipality's most important development and internal transformation needs. The vision describes an ideal future state (beyond a Council's term of office) and focuses on relevant core issues decided upon by consensus between participants. It should also serve to motivate role players.
- Instead of formulating fixed objectives (i.e. defining what you want to do) early in the process, working objectives that can be later refined offer some flexibility. Working objectives are developed for each priority issue (identified in Phase 1) for a five-year period and they need to be set before deciding on strategies.
- Localised Strategic Guidelines must be developed for cross-cutting dimensions to ensure that national and provincial policies are interpreted and implemented locally. These cross-cutting aspects are:

- Spatial development;
- Environmental sustainability;
- Poverty alleviation and gender equity;
- Local economic development;
- Institutional aspects;
- Other cross-sectoral policy guidelines (e.g. National HIV/AIDS and STD Plan 2000).

- Following the identification of objectives for each Priority Issue, a broad range of realistic alternative strategies should be developed to encourage creative thinking on ways to address issues. This should be done at both local and district levels.
- Following an agreement on criteria, alternative strategies are subsequently analysed and decisions on the most appropriate strategies made based on a systematic criteria-based analysis.
- The core features of the Strategy Phase process are outlined in Fig. 4.2.

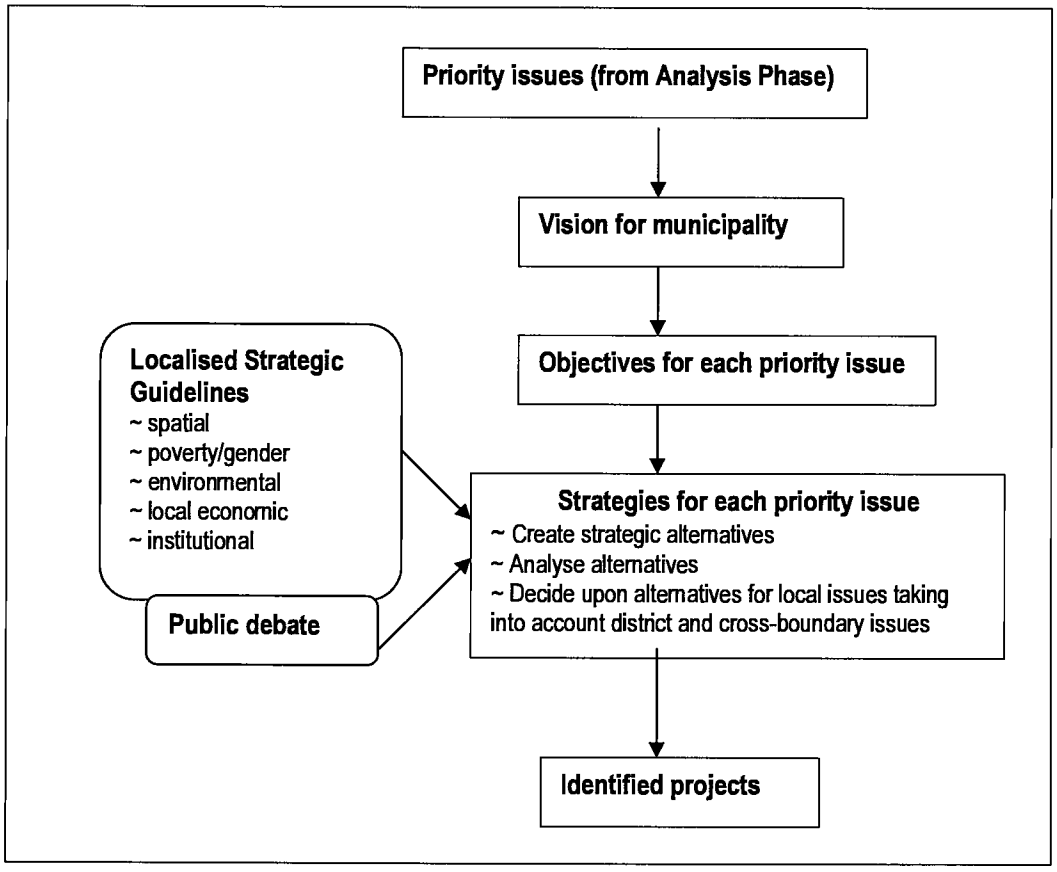

Fig. 4.2. Central features of the Strategy Phase process (modified from the IDP Guide Pack (DPLG 2001))

4.4.4 IDP Phase 3: Projects

- This phase centres on the design of projects for implementation that will provide concrete steps towards fulfilling the objectives for Priority Issues.

Purpose	• To formulate implementable project proposals • To ensure a smooth planning-delivery link through detailed work by technical teams, adjusted to needs and local conditions by affected groups of residents

Main planning activities	1. Forming project task teams 2. Preliminary budget allocations 3. Designing and planning projects 4. Setting indicators, outputs, targets, locations 5. Deciding activities, timing and responsible agencies 6. Estimating financial requirements and adjusting outputs and objectives to existing financial resources

Main outputs	• Indicators for each objective • Project outputs with targets and locations • Major activities with time frames and responsible agencies • Cost estimates and budgets with sources of finance

- Project Task Teams or small teams of technical experts carry out detailed project planning according to a preliminary budget allocation. Project designs can be adjusted according to local needs and conditions.
- Each project is defined by goals (desired end point of an issue), indicators (parameter that measures progress towards goals), targets (measurable steps towards the achievement of goals) and action plans (series of steps that need to be taken to achieve specific targets). Each one also has responsibilities and costs and budgets assigned to it.
- Projects should be aligned with sectoral policies and planning requirements, which in turn should be in line with locally driven priorities, objectives and strategies.
- The process involved in the Projects Phase is illustrated in Fig. 4.3.

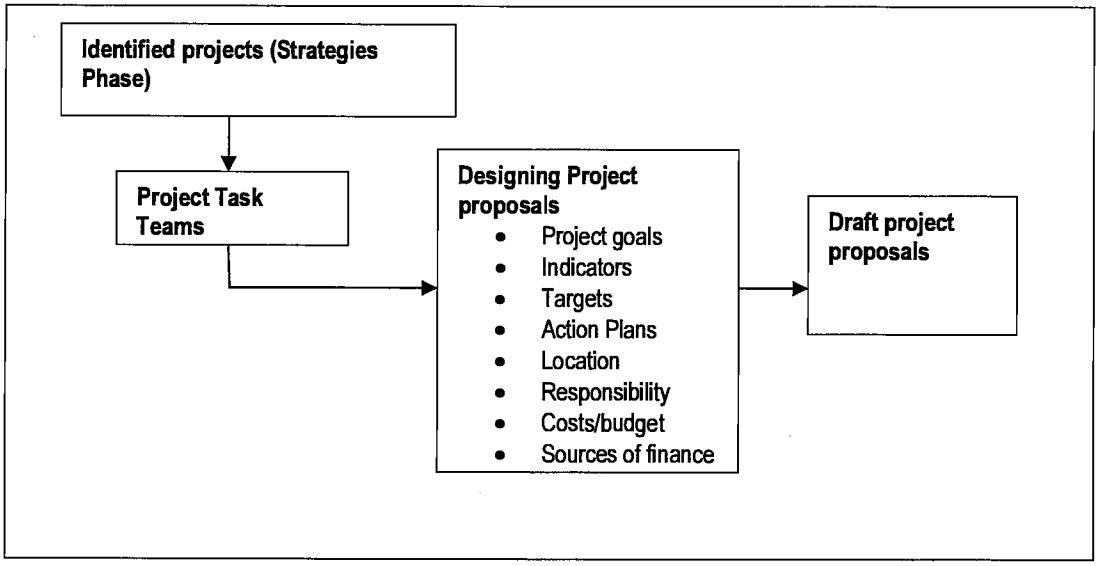

Fig. 4.3. Processes of the Project Phase (modified from the IDP Guide Pack (DPLG 2001))

4.4.5 IDP Phase 4: Integration

- This phase is critical for producing an IDP that is well integrated.
- Project proposals are reviewed for compliance with vision, strategies and financial and institutional resource constraints and opportunities. Projects are aligned and consolidated in terms of content, location and timing to generate consolidated and integrated programmes for the municipalities and for sector agencies/service providers.
- Outputs include a five-year action plan, a five-year financial plan and a five-year capital investment plan. The Spatial Development Framework is also finalised during this phase.

Purpose	• To check and harmonise results of project planning for compliance with the vision, strategies and resources • To ensure consolidated and integrated programmes that constitute an integrated development plan

Main planning activities	1. To check and harmonise results of project planning for compliance with vision, strategies, resources 2. To ensure consolidated and integrated programmes that constitute an integrated development plan 3. Screening draft project proposals 4. Integrating projects and programmes 5. Developing integrated sector programmes 6. Formulating 5-year financial plan and 5-year capital investment programme 7. Developing 5-year action programme 8. Compiling integrated monitoring and performance management system 9. Finalising spatial development framework 10. Consolidating integrated programmes for cross-cutting issues (poverty reduction and gender equity, environmental, LED, institutional, HIV/AIDS)

Main outputs	Operational strategy that includes:

	• Revised project proposals • Sectoral programmes • Financial/capital investment plan • Integrated spatial development framework • Integrated programmes related to cross-cutting dimensions (e.g. Integrated Environmental Programme) • Integrated institutional programme • Monitoring and performance management system (with indicators) • Disaster Management Plan

- A key activity in this phase is to get line departments to think cross-sectorally and consider how their activities affect other departments and vice versa. Strategies must be multi-sectoral if the development plan is to be integrated and holistic.
- The phase consists mainly of cross-checking, compiling and revising rather than further planning and decision making. Draft project proposals are screened for compliance with policies, priorities, objectives, budget frameworks and strategies. Sustainable development criteria (e.g. those in NEMA) can be used to assist this screening process.
- The key mechanisms for ensuring the integration of sustainable development concerns are the integrated programmes for the cross-cutting issues of spatial development, poverty reduction, gender equality, environment, LED and institutional development. The Integrated Environmental Programme must demonstrate IDP compliance with environmental policies and serve as a tool for mainstreaming environmental issues.
- The development of an Integrated Monitoring and Performance System that includes performance indicators and end-points that define the limits of acceptable change. This system must include all three dimensions of sustainable development (i.e. social, economic and environmental).

4.4.6 IDP Phase 5: Approval

- This is the phase of feedback on the draft IDP before it is finally approved and adopted by the municipal council. To ensure sustainable development, all interested and affected parties and stakeholder groups must be given sufficient opportunity to comment on the draft. Through this process, this phase offers an opportunity for buy-in that will enhance co-ordinated implementation and awareness.

Purpose	• To ensure that before being adopted by the Municipality Council all relevant stakeholders and interested parties (including relevant government departments) are given a chance to comment on the draft plan, thereby giving the finally approved plan a sound basis of legitimacy, support and relevance.

Main planning activities	1. Discussion of Draft IDP in the Municipal Council 2. Providing opportunity for public comments 3. Amendments in line with comments 4. Approval by Municipal Council 5. District-level alignment: horizontal co-ordination 6. Provincial/national level alignment (legal compliance check, sector alignment, feasibility check/professional feedback) 7. Amendments and/or response by local councils 8. Final adoption by council

Main outputs	• Amended and adopted Integrated Development Plan

- The final outcome is an IDP document that is approved by the Municipal Council and has the support of the administration, local residents, and the agencies responsible for implementation of programmes and projects.

4.5 Governmental roles and responsibilities

The roles and responsibilities of the different spheres of government in the IDP process (after KwaZulu-Natal Department Agriculture and Environmental Affairs 2003, from Breen *et al.* 2004) are outlined in Table 4.1.

Table 4.1. Roles and responsibilities of different spheres of government in IDP processes (from Breen *et al.* 2004)

Sphere of Government	Roles and Responsibilities
Local Government	To: • Prepare an IDP • Adopt an IDP • Provide support to poorly capacitated municipalities • Facilitate the compilation of a framework that ensures co-ordination and alignment between local municipalities and the district municipality
Provincial Government	To: • Co-ordinate training • Provide financial support • Provide general IDP guidance • Monitor the process in the province • Facilitate co-ordination and the alignment between district municipalities • Facilitate alignment of IDPs with sector department policies and programmes • Assess IDPs • Provide relevant information on sector department's policies, programmes and budgets • Contribute sector expertise and technical knowledge to the formulation of municipal IDPs in the allocation of resources at the local level
National Government	To: • Issue legislation and policy in support of IDPs • Issue Integrated Development Planning guidelines • Provide financial assistance • Provide a national training framework • Establish a Planning and Implementation Management Support System • Provide relevant information on sector department's policies, programmes and budgets • Contribute sector expertise and technical knowledge to the formulation of municipal policies and strategies

	• Be guided by municipal IDPs in the allocation of resources at the local level

5 FACTORS REGULATING THE INCLUSION OF ENVIRONMENTAL PROJECTS INTO THE IDPS OF THREE EASTERN CAPE MUNICIPALITIES

5.1 Introduction

Municipalities are legally bound to implement projects that appear in their IDPs. The inclusion of projects to address issues that threaten the health of estuaries is therefore the most direct way to compel municipalities to implement appropriate action. Lobbying for the integration of environmental concerns into the IDP through raising awareness among councillors and the municipal manager, and agitating for the integration of these concerns into municipal sector plans is an important function of an Environmental Manager (EM). In Eastern Cape municipalities especially this role is critical because there is little understanding among political figures and decision makers of the value of coastal goods and services, and the negative impact municipal activities can have on their environmental assets. Successful integration of estuary issues requires the EM to have a thorough knowledge of their sensitivities, the insight to recognise potential problems and the mechanisms to deal with them effectively.

Of the five coastal municipalities in the Amathole district (Great Fish to Mncwasa Rivers), only Buffalo City Municipality (BCM) has any coastal management capacity. It supports a fairly well capacitated Integrated Environmental and Sustainable Development Unit that has a strategic function only. The practical aspects of coastal management fall under the Amenities Department, which allocates staff to serve as river control and coastal management officers. In contrast, Ngqushwa municipality south of Buffalo City, and Great Kei, Mnquma and Mbhashe municipalities to the north have no environmental management departments and no dedicated environmental personnel. The absence of formal delegation of responsibility for environmental management has resulted in confusion about the relative roles of national and provincial agencies, and district municipalities. There is also little appreciation of the economic value of natural systems, and community demands for socially oriented spending means that environmental projects feature low on the IDP agendas of these municipalities.

The IDP is a plan that legally commits municipal budget to prioritised projects. Efforts to include estuary related issues into IDP planning will therefore need a clear understanding of the IDP development processes undertaken by municipalities and the factors that influence the identification and prioritisation of needs. This section aims to compare Ngqushwa, Buffalo City and Great Kei municipalities on the basis of their environmental management capacities, IDP development processes, and project prioritisation outcomes to understand the factors that govern the inclusion into the IDP of environmentally related projects. All three municipalities were established in 2000 and their first IDPs presented to their Municipal Councils in 2002. IDPs are reviewed annually and the initial IDPs are currently experiencing their third revision for the period 2005/6; these were not available for this study.

5.2 IDP development in Ngqushwa Municipality

5.2.1 Background

The estimated population of Ngqushwa Municipality is 84 234 (Statistics South Africa, 2004) comprising 21 888 households. The population is 99.27% black, 95% rural, and fairly evenly spread between 14 wards as scattered traditional villages surrounded by communal land used for subsistence farming e.g. Bell, Crossroad, Lover's Twist. The average number of persons per ward is 6 714 and the average household size is 4.5 persons. The municipality covers an area of 2 245 km^2 with an average density of 37.5 persons per km^2. About 52% of the population are under the age of 19 years.

There is confusion over land administration roles and powers between the local authority and traditional leaders. Most urban land belongs to the local municipality whereas most rural land is state owned and administered on behalf of the community. The redistribution of state farms is a major issue.

Some environmental issues that the municipality needs to address are:

- Soil erosion that is particularly problematic in some areas where poor veld management is exacerbated by random and uncontrolled fires;
- Inappropriate and indiscriminate felling of trees that has reduced plant diversity and thus the economic potential of the vegetation;
- Alien species such as the jointed cactus and the blue bush that have invaded some areas and resulted in the loss of grazing and productive land;
- Absence of proper environmental management;
- Pollution that occurs through the use of unlined pit latrines, unlicensed cemeteries, indiscriminate waste disposal, and burning of refuse; and
- Unsustainable use of terrestrial and marine resources.

5.2.2 IDP review process and the prioritisation of needs

Ngqushwa's IDP review process for 2004/5 generally followed the recommended procedures set out in the DPLG's 2001 IDP Guide Pack series. Details of the Preparation and Analysis Phases followed by the municipality are shown in Table 5.1. These phases are assessed in detail because they represent the critical IDP steps of planning the IDP process to be followed, engaging stakeholders, and determining and ranking priority issues. The stages that follow build on the outcome of these initial tasks.

The IDP is presented in clusters: Infrastructure, LED and environment, social needs, institutional and finance.

Table 5.1. Aspects and outcomes of Ngqushwa Municipality's 2004/5 IDP review process

Aspect	Process and outcome
Municipal Process Plan (to guide the planning, drafting, adoption and review of the IDP)	~**Municipal Manager** responsible for managing the IDP process, which is guided by four structures: 1. IDP Representative Forum 2. IDP Steering Committee 3. IDP Cluster Teams 4. Municipal Support Forum ~The Municipal Manager has the following tasks: - Preparing the process plan - Undertaking the overall management and co-ordination of the planning, ensuring:- - Participation and involvement of all different role-players - That the time frames are being adhered to - That the planning process is horizontally and vertically aligned and complies with national and provincial requirements - That condition for participation is provided - Ensure proper documentation of the results of the planning of the IDP document - Nominating persons in-charge of different roles - Responding to comments from the draft IDP from the public, horizontal alignment and other spheres of government to the satisfaction of the municipal council - Adjust the IDP in accordance with the MEC for Local Government's proposals - Managing consultants - Chairing the steering committee meetings
	~ **The IDP Steering Committee** - Provides terms of reference for the various planning activities. - Establish sub-committees (if necessary). - Commissions' research studies - Consider and comments on: * Inputs from sub-committee(s) study teams and consultants. * Inputs from provincial sector departments and support providers - Processes, summarises and document outputs. - Makes content recommendations. - Prepares, facilitates and documents meetings. - Defines terms of reference for the IDP forum. - Informs about the establishment of the IDP Representative Forum. - Identifies stakeholders to be part of the Forum in such a way that the public is well represented
	~**IDP Representative Forum** consisted of the Mayor (Chair), councillors, traditional leaders, ward committee chairpersons, stakeholder representatives of organised groups e.g. farmers associations, taxi associations, fishing forum, Peddie Development Forum, Peddie Pineapple Board, SANCO, Business Forum, Advocates of unorganised groups, community representatives, resource persons, IDP Steering Committee, NGOs (Ubuntu Women's Centre, Masimanyane, Peddie Women's Support Centre).
District-level Framework	~**IDP Framework Committee** ensured co-ordination and alignment between local and district municipalities. This structure grew into one known as **DIMAFO** (District Mayoral Forum) consisting of the municipal /IDP managers, Chair of the IDP Representative Forum and the IDP Steering Committee. This committee monitors the sub-activities that form part of the IDP review process that require special attention.
	Main role players in IDP process: ~Municipal Council (consisting of councillors), municipal manager/mayor, Steering Committee (Departmental Heads of Works, Finance, Administration and IDP Manager), government departments (DLA, DEAET, DHLG, SAC, National Sports Council etc.), PIMMS office, East London, residents, communities, stakeholders, district municipality and support providers.

Aspect	Process and outcome
~Assessment of existing level of development ~Priority issues or problems ~Information on available resources and potentials ~Information on context, causes and dynamics of priority issues or problems	**Key development issues/needs** were listed as: Infrastructure ~Water supply ~Sanitation ~Roads and stormwater ~Land related issues ~Solid waste ~Transportation ~Electricity ~Community facilities ~Housing ~Telecommunication
	LED and Environment ~Manufacturing/SMMEs ~Agriculture ~Tourism ~Environment (lack of environment strategic plan)
	Social needs ~Safety and security ~Education ~Disaster management ~Health ~HIV/AIDS
	Institutional ~Inadequate skills of municipal personnel ~Lack of clear policies ~Inadequate information dissemination between the municipality and communities ~Inadequate office equipment ~Reviewing the IDP ~Lack of operational project management system place ~Lack of co-ordination
	Finance ~Poorly integrated financial management system ~Poor service payment and service affordability ~Inadequate funding levels to deal with backlog

The Analysis Phase culminated with a ranking of prioritised needs that would lead to projects for 2004/5 (Table 5.2).

Table 5.2. Ranking of prioritised needs for Ngqushwa Municipality (2004/5 IDP Review)

Priority	Need / Project	Points	%
1	Agricultural development	150	15.46
2	Manufacturing (agro-based)	125	14.95
3	Roads and internal streets	108	11.13
4	Sanitation	96	9.90
5	Water Supply	94	9.69
6	Health facilities (Clinics)	93	9.59
7	Community facilities	90	9.28
8	Capacity building / skills development	88	9.02
9	Land Reform and Housing	82	8.45
10	Environmental conservation (Soil erosion control)	44	4.54
Total		970	100.00

5.2.3 Identification of environmental projects and the allocation of budget

The projects identified for the LED and Environment Cluster and the allocation of budget are show in Fig 5.3.

Table 5.3. LED and Environment Cluster projects and respective budgets in the 2004/5 IDP review.

Priority area	Budget allocation	Project 2004/5 IDP
Soil erosion control	Nil	~ Land Care programme (soil conservation works at Nyaniso) aimed at addressing soil erosion especially in Ward 8
Public awareness	Nil	~ Public awareness and education programmes to tackle waste management ~ Public participation on environmental issues
Environmental Action	Nil	~ Formation of Local Environment Action Plan
Environmental protection	Nil	~ Protection of coastal forests and estuaries (responsibility allocated to DEAT)
Landscaping	Nil	~ Landscaping project (responsibility allocated to DEAT Urban Revitalisation Committee)
Veld management	Nil	~ Proper veld management programmes
Solid waste	R750 000	~ Establishment of Hamburg Solid Waste Site
	R1 300 000	~ Upgrading of Peddie solid waste site
	R1 300 000	~ Waste management collection services study
	R330 000	~ Waste management planning and training
	Nil	~ Refuse dumping sites in all villages

There is no environmental manager at Ngqushwa municipality to lobby for the protection of coastal resources or even environmental resources in general. The IDP stated that the protection of coastal forests and estuaries is the responsibility of DEAT, a national department. As a consequence of a poor understanding of their role in coastal management, coastal issues were not identified for inclusion in the IDP.

The IDP issue prioritisation process shows that municipal priorities are strongly oriented towards supporting social livelihoods and the development of basic infrastructure. This is in line with the high levels of unemployment and poverty in the municipality and the poor state of infrastructure. Projects identified in the LED and Environment Cluster reflect a concern over veld quality and solid waste management, which received the total environmental budget of about R4m.

The IDP review process as described in the 2004/5 review highlights the central role of the Municipal Manager (MM). He appears to enjoy a position where there are opportunities to influence the decision making process. His ideas can be furthered through his interpretation of input documents he reviews from regulatory authorities and consultants. He also wields considerable power in that he defines the terms of reference for the IDP Representative Forum, identifies stakeholders he considers relevant, and chairs Steering Committee meetings. Should the MM (and/or the Municipal Council) be poorly informed on the link between economic growth and environmental health, the inclusion of estuary related issues into the IDP is unlikely. The scarcity of environmentally oriented projects in its IDP and the absence of funding of environmental projects is evidence of a lack of awareness. An environmental education programme focusing on estuary protection that targets the MM and Council appears to be paramount to remedy this situation.

5.3 IDP formulation in Great Kei Municipality

5.3.1 Background

There are approximately 44 469 people living in Great Kei in 11 363 households (Statistics SA 2001). Over 81% of the people live in rural areas, villages and on farms. They are spread among six wards with between 4 430 people (835 households) and 10 052 people (1 897 households) resident in each ward. There is an average of 6 686 people per ward and an average household consists of five people.

The centres of Komga, Kei Mouth and the coastal settlements of Morgan Bay, Haga Haga and Chintsa represent the urban areas. The population density within these areas is estimated at 185 people/km^2 (Statistics SA 2001), which can be attributed to the diverse economic activity and higher level of social and physical infrastructure in these centres.

The Amathole State of the Environment report (CES 2003) described the dominant environmental issues. These are listed below.

- Water pollution stems from poor sanitation and solid waste disposal. Contamination of rivers has resulted in the loss of freshwater eel species from rivers.
- Soil erosion and development pressure on steep slopes, wetlands, flood plains and estuaries. This increases runoff, degrades watercourses and reduces aquatic biodiversity.
- Only 21% of the households have access to potable water either on-site or in the dwelling. About 56% have access to public taps, while 15% rely on natural water sources, which are often polluted.
- Approximately 48% of households have no access to sanitation.
- Over-exploitation of fauna such as the orion buck, monkeys and bushbuck, has lead to the absence of species in areas where they previously occurred.
- Exploitation of marine living resources is apparently under control, owing to vigilance by local landowners. However some dissatisfied communities wish to introduce a fishing project so that they may benefit from harvesting.

5.3.2 IDP review process

The IDP formulation process for Great Kei municipality was structured along the same lines as that for Ngqushwa municipality (Table 5.4). Only aspects of process for Phases 0 and 1 and details of the Representative Forum are shown.

Table 5.4. Aspects of IDP Phases 0 and 1 for Great Kei municipality

Aspect	Process and outcome
Process Plan	~ Council and municipality considered and adopted the process plan and the final IDP. ~ Mayor, Municipal Manager and IDP Steering committee were legally responsible for managing and drafting the IDP. ~ Municipal Manager was responsible for managing, monitoring, and implementing the overall IDP process. The IDP steering committee and municipal officials assisted. ~ The main IDP role players were: • Council of Great Kei Municipality under leadership of the Mayor • Municipal manager • Chief Finance Officer • IDP Steering Committee • IDP Representative Forum consisting of residents, communities and other stakeholders • Amatole District Municipality Officials and Departments • Provincial Govemment departments in terms of their sector programmes • Support providers were PIMMS, consultants and NGOs
Representation and public participation	The IDP Representative Forum comprised: • Councillors of the six wards • Ward committee chairpersons • Stakeholder representatives of organized groups i.e. churches, ratepayers associations, farmers association, service clubs, Business forum, the different political parties, hospital board and clinics. • Advocates of unorganised groups such as farm workers. • Community representatives. • Resource persons such as Amathole District Municipality, PIMMS representatives and various consultants.

5.3.3 Key issues and priorities

Great Kei municipality has no environmental manager. The IDP Steering Committee and the Representative Forum were responsible for investigating and identifying key issues and priorities.

The 2004/5 IDP summarised the key issues and needs of the municipality in diagrammatic form (Fig. 5.1).

Fig. 5.1. Key issues and priority needs.

5.3.4 Goals and objectives

The needs identification generated a set of goals that were arranged into a set of clusters aligned to the National and District cluster approach. Although protection of the environment was not identified as a priority, environmental management was recognised as a municipal goal.

- Institution and Finance Cluster

Goal: A municipality with sufficient capacity, skills, expertise, offices and equipment to manage the municipal area on a sustainable basis.

- Social Development Cluster

Goal: Communities will have access to services, housing, amenities, government programmes and safety and security.

- Infrastructure Cluster

Goal: The municipal area will have an improved transport system, well built and maintained roads, and affordable water and sanitation services.

- Environment Cluster

Goal: An efficiently managed and conserved environment, allowing the co-existence of a multitude of other human activities on a sustainable basis so as to provide for the environmental needs of future generations.

- Local Economic Development Cluster

Goal: Reduced unemployment through local economic skills development, access to land for emerging farmers and community based tourism growth.

To achieve its vision of a better quality of life, the IDP proposed a set of objectives linked to strategies that include:

- Building a strong and efficient municipality
- Focusing on poverty alleviation and HIV/AIDS
- Skills development
- Better communications and public relations
- Disaster management
- Housing and other social services
- Integrated transport planning
- Infrastructure programmes to address backlogs
- Environmental management
- Economic development through agriculture and tourism.

5.3.5 Cluster programmes

A wide-ranging package of projects was formulated in consultation with the Representative Forum. These were grouped into a set of cluster programmes to facilitate integrated development. These programmes include:

- An Integrated Institutional Programme which addresses the financial plan, action plan, performance monitoring, capacity building and spatial development framework for land use management;
- A Social Development Programme which addresses HIV/AIDS, poverty alleviation and gender equity, land reform, housing and social facilities, transport, disaster management;
- An Environmental Programme focusing on environment management, education and solid waste management;
- A Local Economic Development Programme which addresses the LED institutional arrangements, agriculture, tourism and SMME's; and
- An Infrastructure Programme that addresses the provision of infrastructure to meet the backlogs and sustain economic development needs.

5.3.6 Projects – prioritisation and budget allocation

After devising a set of strategies, the project Steering Committee and Representative Forum considered the criteria to evaluate projects to ensure that principles were adhered to and projects were focused into essential nodes. The Amatole Framework Committee assisted the process by preparing a set of criteria with weights and rankings (Table 5.5).

Table 5.5. Compliance Criteria and Priorities Ranking

IDP Compliance Criteria	Weight
IDP Compliance	5
Spatial compliance	3
Integration compliance	2
Crosscutting programme compliance	2
Sustainability compliance	5
Cost compliance	3
Strategy	**Rank**
Infrastructure	1
Skills Development	2
Sport & recreation	3
Agriculture & Land	4
Tourism	5
Health	6
Safety and Security	7

This ranking and prioritisation lead to the proportional allocation of budget to projects. Although environment was not a priority strategy, the IDP recognised that effective environmental management is critical to the survival of tourism and agriculture, seen as the backbone of the municipal economy. It also acknowledged a lack of capacity to address environmental issues and anticipated assistance from the District municipality. Examples of environmental issues were given as the establishment of cemeteries in flood plains, dumping of hazardous waste and effluent, burning of waste material, and exploitation of natural resources.

Three projects were identified in the LED and Environment Cluster (Table 5.6) with one specific to environmental management. The allocation of funding to environmentally related projects was minuscule compared to that for LED projects.

Table 5.6. LED and Environment projects in the 2004/5 IDP review

Cluster	Project	Budget
LED and Environment	A local economic and skills development agency implementing LED An active and viable agricultural programme for emerging farmers on identified land by 2006	R2.9 m capital costs R100 000 operating costs (over five years)
	Environmental Management Strategy (project)	R100 000 over two years
	Develop community based and eco-tourism in Great Kei	R7.6 m capital costs R750 000 operational costs (over five years)

5.4 IDP processes in Buffalo City Municipality

5.4.1 Background

The municipal area is 2 400 km^2 and is the sixth largest metropolitan area in the country and the second largest in the province. There are about 880 000 people of which 80% live in urban/peri-urban areas and 20% in rural areas. Industrial activities dictate settlement patterns. With the shortage of formal housing, a fifth of people live in informal settlements. A major influx of 400 000 job-seeking migrants is expected in

the next 20 years. Land tenure includes freehold, quitrent, communal, permission to occupy and tribal trust land. The municipality is arranged in 45 wards that support 89 ward councillors (Municipal Demarcation Board 2005).

Large scale development in BCM is limited by the absence of large areas of flat land. River valleys, gulleys, steep slopes and separate catchments are constraints for transport and engineering services.

Environmental issues include (from CES 2003):

- BCM coastline is close to pristine in some areas and over-utilised in others. There is good potential for tourism, recreation and conservation.
- Uncoordinated development and inappropriate land use have resulted in environmental degradation as has deforestation, expansion of informal settlements, erosion, dune denudation, pollution of watercourses, alien vegetation and illegal dumping.
- Many by-laws, policies and procedures are outdated.
- Poor data to support municipal decision-making.
- Deficiencies exist in management structures.
- The municipal disaster management centre is poorly resourced and poorly funded.
- There is potential in waste management for waste reduction. There are six formal operating sites with no formal hazardous sites.
- The most common form of waste removal is pit burning.
- Water pollution control and monitoring is available in East London and King William's Town only; air pollution control in East London.
- Illegal toxic dumping in Dimbaza and King William's Town.

5.4.2 IDP review process and the prioritisation of needs

The IDP Review process for 2004/5 (aspects are in Table 5.7) shows a well organised process that lead to a well structured IDP. It is worth noting that BCM received substantial funding from a donor agency for this review (Maritz pers. comm.).

Table 5.7. Aspects of the 2004/5 IDP Review

Aspect	Process and outcome
IDP Process Plan	~ Five **Integrated Working Groups** were established to oversee the revision of key performance areas/priority issues, objectives and strategies, related programmes and key performance indicators. ~ Strategic workshop reviewed pressure points in the IDP and budgeting processes. Outcome informed the Integrated Working Groups and set the direction for the IDP Review 2004/5. ~ Integrated Working Groups revised the schedules for the IDP Review 2003, which identified key performance areas, and related objectives and strategies. ~ Representative Forum approved the Process Plan that guided the review activities. Also reviewed work produced by the Integrated Working Groups, and endorsed the review process. ~ Project Prioritisation Workshop brought together resolutions on service delivery and the need to review the process to prioritise capital expenditure items. Methodology informed budget finalisation. ~ Representative Forum approved all amendments in draft IDP Review. ~ Series of Public Presentations was undertaken. Draft IDP Review and draft Budget presented to 30 public meetings attended by 5 500 – 6 000 people. All valid comments were taken into account in finalisation process.
Municipal Revitalisation Plan - programmes	1. Effective Organisational Management 2. Customer Care 3. Service Improvement 4. Financial Management 5. Improving Health 6. A Sustainable City (links with the Spatial Development Framework initiative and the Integrated Environmental Management Plan) 7. Growth and Incomes (most critical of all seven programmes, and is central to the success of the Revitalisation Plan and the sustainable development of Buffalo City.
Sector plans (to meet requirements of sectoral legislation)	~ Draft Buffalo City Water Services Development Plan ~ Buffalo City Public Transport Plan ~ Buffalo City Spatial Development Framework ~ Buffalo City Housing Strategy ~ Buffalo City Integrated Waste Management Plan ~ Input from the Integrated Environmental Management Plan ~ Local Economic Development (LED) Strategic Initiatives ~ Mdantsane Urban Renewal Programme

The Revitalisation Plan and the Sector Plans served as the principal informants for the IDP review.

A project prioritisation exercise by the Working Groups generated priority weightings (Table 5.8).

Table 5.8. Priority ratings for projects

Theme	Priority rating for project prioritisation
Spatial and Infrastructure	50%
Social	30%
Environmental	12%
Finance and institutional	5%
Economic	3%
Total	100%

The importance of environmental issues were given fair recognition probably related to the profile of the Sustainable City programme, and the role played by the IEM and SD unit and the Amenities Department, both of which are well capacitated in terms of environmental and coastal management.

5.4.3 Objectives, strategies and projects

The Integrated Working Group for the Environmental Cluster reviewed the priority areas and related objectives and strategies. Three priority areas were recognised: environment; solid waste management; and water, soil and air pollution. For 2004/5, the capital budget for the cluster was R27 288 558 of which R650 000 was allocated to an environmental management project (Table 5.9).

Table 5.9. Objective and strategy leading to a single environmental management project

Issue	Objective	Strategy	Project	2004/5 funding
Sustainable use of the environment	To establish a safe, healthy, energy efficient and sustainable environment within Buffalo City	Formulation and adoption of an Integrated Environmental Management Programme (IEMP)	Coastal Zone project	R650 000

The Integrated Coastal Management Plan (ICMP) is currently in draft form. The plan proposes action for BCM aimed at achieving sustainable use of coastal resources in the municipality. The Estuaries Action Plan is a component of the ICMP and draws up management guidelines for 23 estuaries based on recommendations in published literature. These guidelines need to be consolidated through the compilation of Estuary Management Plans for individual systems that are worked through Estuary Management Forums that allow local stakeholders to contribute to the management process.

5.5 Inclusion of estuary related projects into IDPs – what are the key factors?

This assessment focused on three municipalities that lie alongside each other and stretch from the Great Fish River in the south to the Great Kei River in the north. Buffalo City Municipality has the longest coastline under its jurisdiction and consequently the most estuaries (Table 5.10).

Table 5.10. Lengths of the municipal coastlines between the Great Fish and Great Kei Rivers

Municipality	Extent	Coastal length (km)	Number of estuaries
Ngqushwa	Great Fish – Keiskamma Rivers	40	12
Buffalo City	Keiskamma – Kwelera Rivers	68	20
Great Kei	Kwelera – Great Kei Rivers	38	13

Important permanently open estuaries lie in all three municipal areas and most estuaries are in good condition. Almost all are under pressure from development and many (e.g. Fish, Keiskamma, Buffalo, Nahoon, Gqunube, Kei) experience water inflow modification. Although Turpie *et al.* (2002) ranked their conservation importance and showed some to be more conservation worthy than others, all systems have value and need appropriate protection.

Since local people benefit most from estuary goods and services, and local municipalities have jurisdiction over local matters, the onus is on these authorities to actively seek ways to sustain estuary goods and services. NEMA states that sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure. The protection of estuaries is thus a legal obligation for all regulatory authorities.

Although the three municipalities whose IDPs were assessed generally followed the legally prescribed IDP procedure (as per the Municipal Systems Act), the priorities and projects that emerged from the process were significantly different. A tabular comparison (Table 5.11) highlights the core features.

Table 5.11. Comparison between the core features of the IDP process of Ngqushwa, Buffalo City and Great Kei municipalities

Feature	Ngqushwa	Buffalo City	Great Kei
Defined environmental policy	No	No (policy under development at time of writing this report)	No
Environmental management as a municipal function	No Environmental Manager.	Yes. Strategic Head of Integrated Environmental and Sustainable Development Unit (IEM & SD) who reports directly to the Municipal Manager. Amenities Department has operational coastal management capacity.	No functional Environmental Manager. Post has been created and filled but incumbent does not perform this task.
Environmental management added on to existing function	Added on to an existing post	No. Integral part of the IEM & SD and Amenities Department functions.	No
Role of the Municipal Manager	Has influential position and appears to experience little if any environmental lobbying.	Takes direction from the IEM and SD Unit and the Head of the Amenities Dept.	Has influential position and appears to experience little if any environmental lobbying.
Environmental capacity of IDP Representative Forum	No specific capacity. No environmental or related NGOs.	The Head of the IEM & SD Unit and the Head of the Amenities Department lobby for environmental and coastal issues.	No specific capacity. No environmental or related NGOs.
State of the Environment Reporting (SoER)	No, although there is an Amathole District SoER that could inform the municipality on general issues.	Yes. State of the Environment Report, State of the Coastal Zone Report. State of Sanitation Report.	No, although there is an Amathole District SoER that could inform the municipality on general issues.
Current environmental or coastal projects	None	Integrated Environmental Management Plan (IEMP) and Integrated Coastal Management Plan (ICZMP)	Environmental Management Strategy
Awareness of legal environmental responsibilities	Poor. IDP stated that coastal forests and estuaries are the responsibility of DEAT.	Excellent. Highlighted in the IEMP and ICZMP.	Unknown
Ranking of environment in issue prioritisation process	Rated number 10 of 10 priority areas. Votes 4.54%.	Ranked 3 of 5 priority areas. Awarded 12% of votes.	Not listed as a priority issue. No votes.
Most important municipal issue	Agricultural development (15.5% of votes)	Spatial and infrastructure (50% of votes)	Infrastructure development (ranked 1)
Environmental management projects in IDP	None	Development of an IEMP Development of an ICZMP	Environmental Strategy for Great Kei
Budget allocated to environmental projects	None	R1.2m over 3 years	R100 000
Awareness of value of environmental goods and services	Poor - deduced from the absence of the environment in the list of priority areas	Good	Poor - deduced from the absence of the environment in priority listing
Extraordinary funding to support IDP	None	Significant funding. SIDA supported the development of the IEMP and ICZMP	None
Comparison between municipalities (1=most aware, 3=least aware)	3	1	2

The inclusion of environmentally related issues into municipal IDPs is related to a complex interaction between several factors. These are described below not in order of importance.

5.5.1 Availability of guideline documents

Although the IDP Guide Pack (2001) does provide localised environmental guidelines, these are strategic and need to be translated into area-specific actions that can be implemented by local municipalities. The absence of specific guidelines leaves municipalities individually responsible for drafting the terms of reference for consultants that often support them in the IDP process. Insufficient knowledge can lead to inadequate environmental criteria to guide planning and development activities. Consequently there is a need to develop national guidelines that clearly outline the environmental requirements of an IDP and provide minimum standards that need to be met for IDP approval (CSIR 2004).

The pathway described by Urquhart and Atkinson (2002) to integrate Local Agenda 21 principles and activities into the IDP process is a good starting point for municipalities to investigate and consider specific environmental issues. There are also several environmental research initiatives currently underway that can feed into the IDP process by assisting municipalities to identify their conservation priorities. Guidelines are needed on how to incorporate these priorities into IDPs and even SDFs. Useful guidelines should include the following: legal requirements for protecting key coastal ecosystems and biodiversity; principles of coastal management, conservation planning and LA 21; and an outline of local initiatives and data to support these processes (CSIR 2004).

5.5.2 Absence of a defined environmental policy

An environmental policy presents the approach, priorities and intentions of an organisation in broad terms and acts as the framework to guide management direction and action. It reflects an awareness of environmental issues and the level of commitment to address these issues. Environmental policy should be showcased prominently in an IDP since environmental issues cut across all municipal sectors and policy provides the core guiding statement. At the time of writing this report, of the five coastal municipalities in the Amathole district, none had yet formulated an environmental policy although that of BCM was in progress (Alan Carter, pers. comm.). Policy development is likely to follow from an awareness of legal obligations and in its absence, environmental management is bound to be reactionary and *ad hoc*, if it occurs at all. .

5.5.3 Municipal environmental management capacity

Most Eastern Cape municipalities are without a post (or even a shared post) dedicated to environmental management (post of Environmental Manager would precede that of Coastal Manager). A well capacitated and motivated Environmental Manager (EM) would play a central role in raising the profile of environmental (and coastal) issues in the IDP process and his energy is critical for the successful inclusion of priority environmental projects into the IDP.

5.5.4 Role of an Environmental Manager

Whether a full or shared Environmental Manager portfolio, achieving municipal support for environmental initiatives will depend to a large extent on the awareness the Manager creates of legal responsibilities (once these have been formally delegated), the economic value of environmental goods and services, and the potential impact of municipal activities and those of civil society on these goods and services. To further support environmental initiatives, the EM should ensure that key interest groups are included in the IDP Representative Forum during the process of IDP development. The commitment and energy of the EM is vital for the success of budget allocations to priority environmental projects.

5.5.5 Awareness of legal responsibilities

With no formal delegation of environmental responsibilities from national agencies, municipalities are unsure of their legal coastal management duties. They are confused about the relative responsibilities of national departments, such as DEAT and DWAF, provincial authorities and the role of the district municipality. Clear delegation of responsibility through a co-operative process is a fundamental requirement to impress on municipal decision makers that inclusion into the IDP of measures to protect natural ecosystems, including estuaries, is not an optional extra but mandatory. This awareness needs to be promoted among all role players in the IDP process i.e. Municipal Manager, Mayor, Municipal Council, IDP Steering Committee, Cluster teams and Representative Forum. Legal obligations also present the imperatives for encouraging a cross-sectoral approach to dealing with environmental concerns.

5.5.6 Awareness of the link between environmental health, socio-economic wellness and the functionality of management institutions

The low priority of the environment in most Amathole municipalities indicates a lack of awareness of the economic value of natural systems and the monetary cost and cost to the quality of human life of slow but systematic degradation of these systems. Municipal decision makers need to be made aware of the need to protect the goods and services natural systems provide to the communities they serve. The critical function of municipalities as effective management institutions needs to be impressed upon decision makers. They should understand how their style and efficiency determines the way natural systems are managed which in turn affects the socio-economic benefits of these systems to local communities. The pivotal role of municipalities should be emphasised to political role players especially councillors and the Mayor who are often involved in strategic decision-making.

5.5.7 Communication between municipal sectors

To mainstream biodiversity and conservation issues into municipal planning processes, there should be good communication between all municipal sectors. Development planners and conservation planners need to understand the key principles and processes used in each other's fields (CSIR 2004). This understanding should also extend to other sectors such as water services development, sanitation, environmental health, waste management and local economic development. Achieving real understanding needs broad training that focuses on cross-sectoral relationships.

5.5.8 Inclusion of environmental special interest groups

Special environmental interest groups (e.g. Wildlife and Environment Society of Southern Africa, Marine Working Group of the East London Museum, Estuary Management Forums, and various Friends groups) play an important part in highlighting specific needs and raising the profile of environmental issues. The IDP Representative Forum is the platform for these groups to engage the process. The municipal Environmental Manager should ensure that interest groups are informed of the opportunity to participate in the IDP process and they should be encouraged to do so.

5.5.9 Influence of the Municipal Manager and IDP Steering Committee

In Ngqushwa Municipality, for example, the Municipal Manager (MM) and IDP Steering Committee (seven members including the MM) have central roles to play in guiding and managing the IDP process. The Committee sets the terms of reference for the IDP Representative Forum meetings, considers and comments on input from sub-committees and can recommend research. The Mayor chairs the Forum meetings and is also a member of the Steering Committee. The MM and Committee

are thus in strong positions to influence the outcome of the IDP process. For environmental (coastal/estuary) issues to be addressed by the municipality, it is critical that the MM and committee are informed on the municipality's environmental obligations and the threats to environmental health and economic growth that can result from insensitive human activities.

5.5.10 Supplementary funding

BCM has recently received significant donor funding to support its IDP process and to implement an Integrated Environmental Management Plan and System and an Integrated Coastal Zone Management Plan. It is therefore not surprising that this municipality is well ahead of its peers in terms of natural resource management (it was the only municipality that received financial support). Efforts to improve the capacity of lesser municipalities will need adequate funding.

5.5.11 District municipality leadership

Local municipalities that either have or are without the post of Environmental Manager look to the district municipality for guidance in terms of sector planning. District municipalities are in many cases ahead of their local counterparts and have an important role to play in ensuring that core sector plans are developed and aligned with district plans. District environmental management strategies (e.g. Integrated Environmental and Coastal Management Plans) can in effect lead local planning initiatives.

District municipalities should also co-ordinate policy and strategies between local municipalities and between national environmental regulatory bodies (i.e. promote horizontal and vertical alignment). DIMAFO (District Mayoral Forum) has a co-ordination role to play between municipal tiers, which further emphasises the importance of the EM in ensuring that the Mayor is informed about environmental issues. In the Amathole district, limited manpower and capacity restrict the involvement of the district Environmental Manager in local municipal activities.

5.5.12 Role of provincial and national government

Most Amathole municipalities for example are poorly informed about the division of environmental responsibilities between the different tiers of government. Although there is generally a willingness to address environmental concerns, there is confusion about legal mandates. Although the onus is on the local municipality to identify its role, responsibility also lies with provincial and national government to clarify their respective obligations. There appears to be a serious lack of communication between levels of government, which is hampering efforts to find and maintain optimum levels of natural resource use.

5.5.13 Mentorship

Well-capacitated and relatively well-funded municipalities, such as BCM, that are busy implementing key environmental projects should actively support less capacitated municipalities through a constructively designed mentorship programme. If coastal management is to be effective in optimising resource use, common initiatives should be identified and co-ordinated along the coastline. Municipalities such as BCM are in a position to support 'lesser' municipalities and take a lead position in setting the trends and encouraging best practice.

5.5.14 State of the Environment Reports

Knowledge of the state of coastal resources can help identify and prioritise issues of concern. Coastal municipalities in the Amathole district (with the exception of BCM) have little understanding of the state and economic value of their coastal resources, and the level of local community dependence on these resources (Arcus Gibb

2005b). BCM is the only municipality that has produced a State of the Coastal Zone report that will inform its Integrated Coastal Zone Management Plan (ICZMP) and will direct action to protect the health of coastal ecosystems, particularly estuaries. Other Amathole municipalities are dependent on the Amathole State of the Environment report (CES 2003) that describes coastal issues from a district perspective.

5.6 Conclusion

Judging from the content of the IDPs of Great Kei and Ngqushwa municipalities, environmental issues are largely overlooked in favour of infrastructure, skills and agricultural development, and manufacturing. This is the case for almost all the eight local municipalities in the Amathole District of the Eastern Cape (Arcus Gibb 2005a, 2005b). The only exceptions are BCM, where environmental management was relatively high on its IDP agenda in 2004 and resulted in the development of integrated environmental and coastal management plans (CES 2005), and ADM, which is currently implementing its EMP/S and ICZMP finalised in 2005 (Arcus Gibb 2005a, 2005b). The general neglect of environmental issues has meant that not a single municipality has yet developed an environmental policy to guide the approach to environmental management and lay the foundation for management activities (BCM's is currently being prepared).

There are many reasons for poor municipal environmental management performance in the Eastern Cape. The root causes are complex and relate in part to the absence of formal delegation of responsibility from national government. This could be equated to a "catch-22" situation whereby municipalities are not delegated responsibilities because they have no manpower to exercise the functions. In turn, because they have not been delegated responsibilities, they do not support the creation of an Environmental Manager (EM) post within their municipal structures. A co-operative governance agreement between national, provincial and local government that included financial and capacity building support where necessary would be a positive step towards addressing the confusion over obligations, and the absence of municipal capacity.

Once a municipality has created and adequately filled either a full or shared EM post, there will be a champion to drive the process of developing an environmental policy and integrating environmental concerns into the planning processes of the various municipal sectors. Vigorous and sustained campaigning will raise the profile of environmental issues in general. However without specific training in coastal management the EM is unlikely to be aware of the threats facing estuaries and in particular those posed by municipal activities themselves. Training on a continuous basis is essential to maintain the motivation and coastal focus of the EM whose role will encompass a broad environmental portfolio. National government has held occasional training workshops for local municipalities in the region but with the constant movement of municipal staff these workshops need to be repeated at least annually until EM posts are filled, stabilised and reflect adequate capacity.

If municipalities are to play a pivotal role in achieving government's coastal management intentions, they should not be left to operate in isolation, as currently is the case (Arcus Gibb 2005a, 2005b). With the Eastern Cape coastline divided into municipal zones incorporating units about 50km long, it makes little sense for each municipality to focus solely on its own relatively short stretch of coast. Better equipped municipalities must co-operate with 'lesser' ones to co-ordinate

management efforts, share experiences and promote best practice. Uplifting and guiding these under-equipped municipalities is however a joint undertaking that requires commitment from all tiers of government. This is the essence of co-operative governance, a cornerstone of national environmental and coastal management policy.

6 INTEGRATED DEVELOPMENT PLANNING IN ETHEKWINI MUNICIPALITY, KWAZULU-NATAL, AND ITS RELATIONSHIP WITH ESTUARY MANAGEMENT

6.1 Introduction

This chapter provides an insight into estuary planning and management within eThekwini Municipality in KwaZulu-Natal and highlights links with the Integrated Development Planning process within the municipality. The specific aims are to investigate and describe the following:

- Coastal management policy within the context of the legal responsibilities of municipalities;
- Institutional structure and specifically the position of environmental and coastal management functions within the municipality;
- Focus of EIPs (Environmental Implementation Plans), Environmental Management Plans and CMPs (Coastal Management Plans/Programmes) (in terms of projects) on issues that can impact the health of estuaries (include catchment issues);
- Structure of the IDP in terms of specific clusters;
- The process of prioritisation of environmental (specifically coastal/estuary) projects and their inclusion into IDPs;
- The role of the environmental or coastal manager in prioritising estuary related projects;
- The factors that determine the success of inclusion of specific projects into the IDP.

6.1.1 Defining estuary management

Estuary management refers to a suite of activities that aim to manage human interactions with estuaries. Some of the broad actions that constitute estuary management activities are:

- Establishing estuary management policy;
- Promoting co-ordination of activities impacting on estuaries;
- Establishing plans for estuaries or the land adjacent to them;
- Monitoring the impact of activities on estuaries;
- Taking action to maintain the condition of estuaries.

In addition there are management actions to control specific human activities that impact on estuaries. These management actions would aim to control the following:

- abstraction of water from an estuary and/or its catchment;
- effluent disposal into an estuary and/or its catchment;
- activities that change sediment loads;
- dredging;

- harvesting of living resources;
- mouth manipulation;
- non-consumptive recreational use;
- development of structures that encroach on the water body; and
- development on the banks and in the catchment.

6.1.2 Background to eThekwini Municipality

eThekwini Municipality is a large well-resourced municipality located on the east coast of KwaZulu-Natal. The municipality has a population of around three million people living within a municipal area of 2 297 km^2 (eThekwini Municipality, 2004a). Although the municipal area makes up only 1.4% of the total area of KwaZulu-Natal approximately a third of the province's population and 60% of its economic activity is located within eThekwini's borders. The 2004-2005 municipal budget was > R10 b (R2.2 b on capital expenditure and R8.5 b on operating expenditure) (eThekwini Municipality, 2004a).

6.1.3 eThekwini estuaries

The municipality has 16 estuaries along its 100km coastline (eThekwini Municipality, 2004a). These estuaries are listed in Table 6.1 from south to north together with some information on their status (Whitfield 2000).

Table 6.1. Estuaries in eThekweni municipality and their status

Estuary	Classification	Information	Condition
Mahlongwa	Temporarily open/closed estuary	Poor	Good
Mahlongwana	Temporarily open/closed estuary	Poor	Good
Mkomazi	Permanently open estuary	Moderate	Fair
Ngane	Temporarily open/closed estuary	Poor	Fair
Umgababa	Temporarily open/closed estuary	Moderate	Good
Msimbazi	Temporarily open/closed estuary	Moderate	Good
Lovu	Temporarily open/closed estuary	Poor	Fair
Little Manzimtoti	Temporarily open/closed estuary	Poor	Poor
Manzimtoti	Temporarily open/closed estuary	Moderate	Poor
Mbokodweni	Temporarily open/closed estuary	Moderate	Poor
Sipingo	Modified permanently open estuary	Moderate	Poor
Durban Bay	Estuarine bay	Good	Fair
Mgeni	Temporarily open/closed estuary	Good	Fair
Mhlanga	Temporarily open/closed estuary	Good	Good
Mdloti	Temporarily open/closed estuary	Moderate	Fair
Tongati	Temporarily open/closed estuary	Moderate	Poor

The estuaries are subject to diverse levels of human use. At the extreme is Durban Bay that supports the port of Durban and is the centre of economic activity. There are also examples of highly modified and impacted estuaries, such as the Sipingo in the South Durban Basin industrial area, estuaries with high levels of residential development, such as Manzimtoti, and estuaries located in less urbanised settings, such as Umgababa.

6.2 Institutional arrangements

Grey boxes in eThekweni's organogram (Fig. 6.1) show the components that play a role in coastal and estuary management (Mather pers. com.).

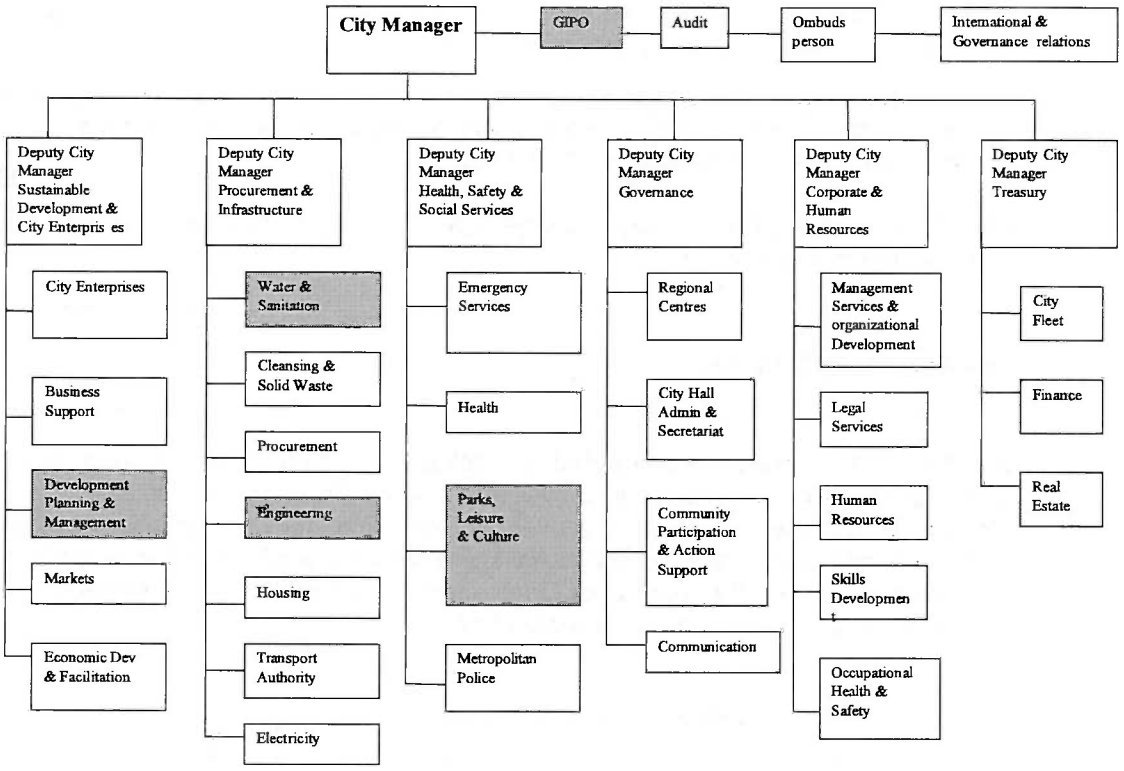

Fig. 6.1: Organogram of eThekwini Municipality

- **Geographic Information and Policy Office (GIPO)**: Currently there is no dedicated coastal management office and only a single staff member in GIPO who serves as the Project Executive: Coastal Policy. The Project Executive (PE) coordinates and leads coastal management efforts, and contributes and comments on iterations of the IDP through interactions with involved staff. Currently he is developing a municipal coastal strategy, which is open for comment by other departments.
- To promote co-ordination, the PE has established and chairs an eThekwini Coastal Working Group that includes relevant staff members from a variety of municipal components and external stakeholder groups (e.g. relevant national and provincial government departments and NGOs). The PE interacts formally with other municipal components (e.g. Environment Department, Engineering etc.) through the Coastal Working Group. He also has informal and *ad hoc* contact with these components as the need arises. The PE represents the municipality on the Provincial Coastal Committee and on the Estuaries Sub-committee of the Provincial Coastal Committee. Other sections of GIPO are responsible for the drafting and review of the municipal Integrated Development Plan itself.
- **Development Planning and Management**: This component is responsible for all development planning and management and, as such, defines the framework

for current and future development on the coast and along estuaries. The Environment Department also falls under the Development Planning and Management component.

- **Parks, Leisure and Culture**: This component manages public open space areas and the recreational use of these areas. In particular it manages recreational use on beaches and open areas linked to estuaries.
- **Water and Sanitation**: This component manages water usage and wastewater, which is a significant input into many eThekwini estuaries.
- **Engineering**: The coastal stormwater and catchment management component is based within this section, which manages stormwater and coastal engineering and is involved in estuary mouth management.

An overview of specific estuary management activities and responsible components is presented in Appendix 1.

6.3 Development planning

eThekwini Municipality has adopted a 'package of plans approach' (Fig. 6.2). The 'package of plans' is a hierarchical structure and all plans should conform to plans at a higher level. Lower level plans provide greater detail for specific areas. However it should be noted that the Spatial Development Framework (SDF) is effectively the spatial expression of the Integrated Development Plan (IDP) and is reflected in some municipal documentation as a component of the IDP.

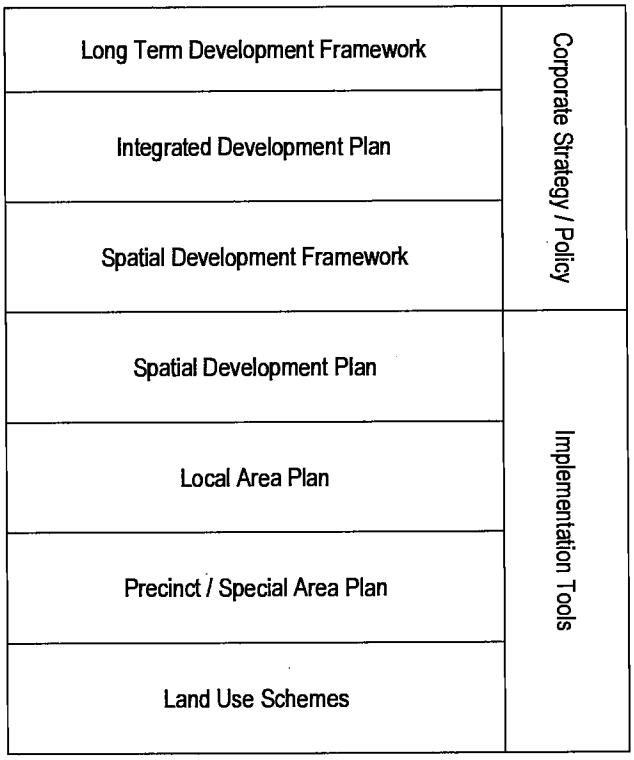

Fig. 6.2: eThekwini Package of Plans

6.3.1 Long Term Development Framework

6.3.1.1 Overview

The Long Tem Development Framework (LTDF) outlines a vision of eThekwini as a "quality of life" city by 2020 (eThekwini, 2004a). The three core elements of the LTDF are (eThekwini, 2004a):

1. meeting basic needs
2. strengthening the economy
3. developing people skills and technology base for the future

The LTDF framework emphasises sustainable development and indicates that the municipality must 'balance the social, economic and environmental needs of our society to ensure that all development occurs within the carrying capacity of the natural environment.

6.3.1.2 Links to estuary management

There is no explicit link to estuary management. However as estuaries play important roles in the economy (e.g. Durban Bay is the location of the Port that drives the eThekwini economy) and in meeting basic needs (e.g. estuaries perform a waste assimilation service), these systems clearly have an important role to play in contributing to the overall vision of the LTDF.

6.3.2 Integrated Development Plan

6.3.2.1 Overview

The latest version of the eThekwini IDP was published in June 2004 for the 2003 to 2007 period (eThekwini, 2004a). This version has eight focus areas (eThekwini, 2004a):

- Economic development and job creation;
- Quality living environments;
- Safety and security;
- Healthy and empowered citizens;
- Embracing cultural diversity;
- Sustaining the natural and built environment;
- Local government democratization;
- Financial viability and sustainable development.

Strategic programmes have been identified for each focus area (Table 6.2). In addition key performance areas have been adopted for each strategic programme. The IDP does not identify specific projects and only a broad budget allocation is outlined that is not linked to strategic programmes. The next IDP iteration is to reflect a stronger link between the IDP programmes and the municipal budget.

Table 6.2. Focus areas, strategic programmes and key performance areas as outlined in the eThekwini IDP (eThekwini, 2004a).

Focus Areas	Key Strategic Programmes	Key Performance Areas	
Economic development and job creation	New business investment & supporting & growing existing business	1. Manufacturing sector support 2. Tourism sector support 3. Primary sector support 4. Affirmative procurement programme	5. Markets 6. Administrative services 7. Local business support centres 8. Spatial Economy 9. Marketing & Branding
	Managing public realm	1. Informal economy	
Quality living environments	Meeting & maintaining basic needs	1. Council housing stock 2. Housing with services delivery	3. Service backlogs[1] 4. Infrastructure Maintenance[2]
	Meeting & maintaining community service needs[3]	1. Supply of community facilities & services	2. Operation & maintenance 3. Cleaning & greening
Safety and security	Citizen safety	1. Road & pedestrian safety	2. Crime prevention
	Disaster Management	1. Disaster Recovery[4]	
	Information Safety & Security	2. Protocol for Municipal information dissemination	
Healthy & empowered citizens	Well being of citizens	1. Primary health care 2. Communicable diseases including TB, HIV & AIDS	3. Environmental Health[5] 4. Vulnerable groups 5. Indigence Programme
	Healthy employees	1. Occupational health & safety 2. HIV/AIDS Programme	3. HR Policies
	Bridging the skills gap	1. Employee skills development	2. Community action support
Embracing cultural diversity		1. Sport 2. Arts & Culture	3. Preserving our Heritage 4. Museums
Sustaining the natural and built environment	Development and maintenance of SDF & SDP	1. SDF/SDP[6] 2. Coastal development & management[7] 3. Transport planning	4. EMA environmental services management plan[8] 5. Infrastructure plan[9] 6. LUM System[10]
	Pollution Minimisation	1. Pollution Control[11]	
Local government democratisation	Accessibility & governance	1. Communication & marketing 2. Customer services centres (CSC) 3. E-Governance	4. NEPAD 5. National & provincial interface
	Efficient & effective municipality	1. Municipal court 2. E-Government	3. Workflow engineering
	Accountability	1. Ombudsperson	
	Learning organisation	1. Audit 2. Batho Pele - People First 3. Annual report 4. Performance Management System	5. Knowledge management 6. The city as the centre of learning 7. Area based management 8. Sister City programmes
Financial viability and sustainability	Strategic budgeting	1. Sustaining the Medium Term Expenditure Framework	2. Strategic budgeting alignment to IDP
	Increasing revenue	1. Seek alternate sources of funding	2. Tightening credit control
	Expenditure	1. Cost saving measures 2. Value for money	3. Growing revenue streams

[1] As sewerage and wastewater are regularly disposed of in estuaries, estuaries play an important role in meeting basic human needs relating to sanitation.
[2] Maintenance of storm water and sanitation infrastructure has an important impact on estuaries that act as receivers of storm water and wastewater.
[3] Many estuaries in eThekwini provide recreational services to the community.
[4] Pollution related disasters have the potential to have a high impact on estuaries.
[5] Estuaries are used for water-based recreation and water quality needs to meet standards for human health.
[6] The Spatial Development Framework and the Spatial Development Plans are strategic planning instruments that cover the entire municipality including estuaries.
[7] Coastal development and management activities include estuaries.
[8] Estuaries are an important component of the Environmental Services Management Plan.
[9] Storm water and sanitation infrastructure often direct the disposal of wastewater into estuaries and their catchments.
[10] The Land Use Management System will provide a detailed tool for the planning of development in and around estuaries.
[11] Water pollution has the potential to have a significant impact on estuaries.

6.3.2.2 Link to estuary management

Other than highlighting the presence of estuaries, the IDP does not make specific mention of particular estuaries. However a number of strategic focus areas link directly to estuary management (these have been highlighted in grey in Table XX).

The next iteration of the IDP is to be released soon. Breetzke (pers. comm.) indicated that this version will have more explicit reference to estuary management issues and will identify various strategic projects for implementation. Projects likely to be included are (Breetzke, pers. comm.):

- development guidelines for coastal zone changes;
- develop and implement the coastal management plans;
- manage and project the coast as a environmental and tourist asset;
- Implement a sustainable coastal livelihood programme;
- development of estuary management plans (to be included in the relevant coastal management plans);
- consideration of coastal natural areas;
- coastal water quality management.

6.3.3 Spatial Development Framework

6.3.3.1 Overview

The Spatial Development Framework (SDF) forms part of the IDP. Breetzke (pers. comm.) highlights that this plan integrates strategic spatial strategies in various sectors from socio-economic to the environment. The broad framework published in the revised IDP (eThekwini, 2004a).

6.3.3.2 Links to estuary management

The SDF provides an overview of eThekwini's spatial vision. Even at this strategic level the significance of several estuaries is apparent. Umhlanga, Durban Bay and Umgababa estuaries are located at the centre of important nodes identified in the SDF. It is important to note that one of the SDF layers is the environmental asset layer that provides environmental goods and services. Estuaries and their catchments are included within the environmental asset layer (Boon, pers. comm.).

6.3.4 Spatial Development Plans

6.3.4.1 Overview

eThekwini intends to have four separate Spatial Development Plans (SDPs) for the Northern, Central, Southern and Outer West areas. The Northern and Outer West plans are in the process of completion. The intention of the plans is to 'provide guidance on the nature and intensity of development that can potentially be sustained on the land'. In particular the plans provide guidance on the preferred land uses in the various locations. The SDPs are catchment based and the municipality is involving all components in the formulation of these plans.

6.3.4.2 Link to estuary management

Most significantly SDPs are organised in terms of catchments. This is significant because many estuary management issues originate upstream from the estuary itself. Development planning on a catchment basis provides a significant opportunity for improved estuary management.

While the Outer West SDP has been through a public review process, the Northern SDP is currently in draft format. Epstein (pers. comm.) indicated that the plan for the northern area is to address issues such as broad land uses either adjacent to or with the potential to impact estuaries. The plan will take into consideration coastal and estuary set back lines, the protection of view sheds, biodiversity, river health and the capacity of rivers and estuaries to accept stormwater and waste water. Epstein also indicated that maintaining river and estuarine water quality and ensuring public access to rivers and estuaries are important for promoting tourism and addressing recreation needs.

6.3.5 Local Area Plan

6.3.5.1 Overview

Most Local Area Plans (LAPs) are to be initiated on the completion of the SDPs. However LAPs have been initiated for a few selected areas. It is intended that ultimately the entire area covered by a SDP will be covered by a number of LAPs. The purpose of the LAP is to provide a more detailed response to 'the peculiar nature of the local area'. Some of the issues a LAP will cover are:

- alignment of local movement systems
- the identification of local economic opportunities
- the identification of local leisure opportunities
- identification of development areas (with more detail than the SDP)
- identification of conservation areas (with more detail than the SDP)

6.3.5.2 Link to estuary management

No LAPs were available for review. However Mather (pers. comm.) indicated that LAPs would be undertaken for all coastal areas. LAPs for coastal areas were also referred to as Coastal Management Plans (CMPs) (more details on CMPs can be obtained from the section on the Draft Coastal Strategy.)

6.3.6 Precinct (Special Area) Plan

6.3.6.1 Overview

Precinct plans are intended for areas that require 'special attention as a result of their unique or special character'. These plans would be at the scale of a road and would contain 'high levels of detail including architectural themes, landscapes, street furniture etc.'

6.3.6.2 Links to estuary management

Precinct plans could be completed for areas adjacent to or including portions of estuaries.

6.3.7 Land Use Scheme

6.3.7.1 Overview

eThekwini currently has a town-planning scheme that covers some parts of the municipality. With changes in approaches to planning and the implementation of the 'package of plans' approach, this scheme is largely outdated. Accordingly the municipality is planning to establish a municipal wide land use scheme that covers the entire municipality and reflects the intent of the various spatial plans. The scheme will outline zoning and built form controls.

6.3.7.2 Link to estuary management

The land use scheme will apply to the entire municipality including land adjacent to estuaries. The scheme will outline permissible land use and controls on these land uses. The existing scheme has often included inappropriate coastal and estuary zoning. Breetzke (pers. comm.) indicated that a revision is likely to result in more appropriate controls.

6.4 Other strategies, policies and plans significant to estuaries

6.4.1 eThekwini Coastal Management Strategy[12]

eThekwini Municipality is in the process of finalising an eThekwini Coastal Management Strategy (CMS) for adoption by Council. Key departments have been consulted during the formulation of the strategy. The information outlined in this section is therefore subject to change.

The initiative to draft the CMS arose from the inclusion of coastal management as a key performance area in the IDP (Mather, pers. comm.). The CMS provides detailed content to the strategic intention of the IDP to address coastal management. It is a document subsidiary to the IDP but reflects its broad intentions. The next iteration of the IDP will include additional details on some key programmes of the CMS (Mather and Breetzke, pers. comm.). Over time there is likely to be an exchange between the two documents with new iterations of the CMS reflecting new thinking in the IDP and key issues arising out of the CMS being feed back into the IDP.

6.4.1.1 Overview

The CMS 'presents the proposed management framework for the municipality's coastal zone' and has the overarching aim of 'protecting, optimising and enhancing this unique and valuable asset' (eThekwini, 2005). In particular it 'sets out to be a systematic, integrated, multi-disciplinary organised approach to ensure that the coastal zone is managed, protected and enhanced while social and economic opportunities are optimised' (eThekwini, 2005).

The management area of the CMS is the eThekwini Coastal Zone defined in terms of three different boundaries (eThekwini, 2005):

- A primary management zone defined as the highest area of importance to the functioning and feel of the coast including coastal wetlands, estuaries and view scapes.
- A secondary management zone includes river valleys, dams and activities that contribute directly to the coastal system through the movement of water, nutrients and sediment (or loss of sediment by sand winning, dams, etc.).
- A tertiary management zone that encompasses the municipal area and includes the indirect impacts in the rest of the city.

[12] Unless otherwise stated the discussion in this section is based on Version 4 of the Coastal Management Strategy (eThekwini, 2005).

The vision of the draft strategy is:

> "To be the leading African city that sets the standard of management for the coastal zone as a unique and significant social, economic and environmental asset in the City.
>
> To commit to the management of this resource in an innovative and integrated manner that will ensure the environmentally sustainable functioning of the natural systems while optimising the economic and social benefits."

In addition the following goals have been defined by the draft strategy:

- Effective, efficient and transparent management of the coastal zone;
- A people-first approach while maintaining sustainable development of the coastal zone;
- To ensure that Durban continues to remain the premier surf and sand destination in the country;
- To continue to expand access to some of the best beaches in the world;
- The maintenance of an appropriate balance between the built, rural and wilderness coastal areas;
- To optimise social and economic benefits from the coastal zone within the constraints of the natural system;
- Ensure the sustainable supply of environmental goods and services.

To implement the draft strategy a number of strategic objectives have been identified (eThekwini, 2005):

- Development and implementation of Coastal Management Plan's at each of the Coastal Management Units;
- Blue Flag Rollout Plan;
- Coastal Recreation/Tourism Development Plan;
- Event Management Plans;
- Estuary Management Plans for each estuary;
- Coastal and stormwater water quality Improvements;
- Coastal legislation and bylaw development;
- Coastal education and awareness;
- Sustaining the supply of environmental goods and services;
- Managing development in the coastal zone;
- Sustainable Coastal Livelihoods Programme (poverty relief focussed);
- Coastal structures management and coastal engineering.

6.4.1.2 Links to estuary management

All of the strategic objectives link directly to estuary management. However two of these are particularly significant:

(i) Coastal Management Plans

The draft strategy highlights that 'detailed management plans will be developed for each of the coastal management areas to give effect to the key coastal issues in that specific coastal area'. It is intended that these CMPs will present 'a new integrated approach in which the coast is managed holistically by including natural, economic, social and administrative matters in one management plan.' Each CMP will include the following:

- Beach cleansing (waste, litter, organic debris);
- Safety and security (law enforcement);
- Emergency and disaster procedures;
- Festive season plans;
- Event management;
- Estuary Management Plans;
- Coastal dune management;
- Coastal infrastructure management;
- Community and stakeholder communication and participation;
- Integration and communication between service delivery units;
- Amenities quality control (ablutions etc);
- Water quality monitoring;
- Signage procedure; and
- Document and record keeping.

In terms of the 'package of plans', a Coastal Management Plan will serve as the local area plan for that area.

(ii) Estuary Management Plans:

The draft strategy indicates the intention 'to develop and implement management plans for each of the estuaries and thereby work towards ensuring their ecological health, their role in biodiversity conservation and optimising their value as recreational nodes.' The draft strategy highlights that each plan should take into account area specific environmental and social issues, recreation, catchment and stormwater management, development potential and landscape values. The plans must include:

- Mechanisms for monitoring the health of the estuary (this must include fauna and flora indicators);
- Calculation of ecological reserves;
- Commitment to a continual improvement of incoming water quality;
- Emergency response mechanisms;
- Breaching policy;
- Development of built form plan;
- Conservation plan; and
- Clear accountability and responsibility for implementation of the management plan.

Estuary Management Plans 'must be integrated into the relevant Coastal Management Plan for a particular area'.

6.4.2 Environmental Policy Initiative

6.4.2.1 Overview

An eThekwini Environmental Policy was first developed in 1998. The Municipality is in the process of reviewing this policy. The discussion in this section is based on the draft policy initiative and is subject to change.

The draft policy initiative sets out the Environmental Management Policy for the Municipality (eThekwini Municipality, 2004b). The policy's central message is that the environment is a core asset for development and growth and to optimise its benefits, the municipality should invest in its protection and management. The policy is intended to support the implementation of the eThekwini IDP and has also contributed to its content.

The policy outlines a Vision for eThekwini as:

- a municipal area that strives for sustainable development – optimising the developmental benefits gained from the environment through managing and protecting it effectively;
- a centre with a thriving, vibrant economy with full employment that reflects a balance between social justice and well-being, economic efficiency and ecological sustainability;
- a place where all citizens enjoy a well structured, efficient and user friendly city which values its unique character and natural beauty;
- a home to people who all enjoy a good quality of life, including adequate nourishment, housing and education, and who enjoy safe, clean and healthy place to live and work and play;
- a place with a rich ecological biodiversity, where unique natural resources and features are protected and access by all is promoted;
- a place in which all people recognise their role in managing the integrated built and natural environment as an essential part of their lives, and as their contribution to the lives of generations to come; and
- acting proudly as a world leader in environmental management.

To give effect to the Vision the policy has six goals:

- Goal A: To consolidate an environmental management system in the municipal area that enables the implementation of the Policy.
- Goal B: To ensure the sustainability of the municipal area through integration of environmental, social and economic principles into all planning and development processes.
- Goal C: To ensure a safe and healthy living, working, recreational and built environment for all people through effective environmental management.
- Goal D: To contribute to a sustainable economy and a clean and healthy municipal environment through establishing an integrated system of pollution and waste management

- Goal E: To provide for sustained delivery of services and a sustainable economy by protecting and managing the renewable and non-renewable resources on which delivery depends.
- Goal F: To create a culture of learning to enable the effective participation of all in managing the environment, and to enhance an understanding and appreciation of the environment.

6.4.2.2 Links to estuary management

All six goals relate directly to estuary management. However Goal E includes an objective that specifically focuses on the coast i.e.: 'To optimise the benefits derived from the unique coastal resources of the eThekwini Municipal Area'. Under this objective the following actions are outlined:

- Local government shall develop a municipal coastal management policy in keeping with new national coastal policy, in collaboration with relevant stakeholders, to protect coastal resources and enhance coastal quality to maximize the developmental benefits they provide;
- The economic, recreational, educational, cultural and health value of the coast shall be acknowledge, protected and enhanced;
- Coastal ecosystems, including estuaries, shall be protected and managed to derive the optimum benefit for all on a sustainable basis;
- Durban Bay shall be protected and managed to enhance its ecological value, health value and linkages with the municipal area.
- Local government shall manage unique coastal resources within its jurisdiction in a manner that does not undermine the environment integrity of coastal ecosystems and optimises benefits without jeopardising the coastal ecosystem.

6.4.3 Environmental Services Management Plan

6.4.3.1 Overview

The eThekwini Environmental Services Management Plan is the approved open space-planning framework for the Municipality. In terms of the plan 63 000 ha have been defined as important open space areas that provide significant environmental goods and services (eThekwini, 2003). This open space asset has been mapped and is included in the SDF (Boon, pers. comm.) and referred to as the Environmental Asset. The Environmental Services Management Plan outlines various approaches and institutional arrangements that can contribute to securing the open space asset (eThekwini, 2001; 2003).

6.4.3.2 Links to estuary management

Estuaries and parts of their catchment are included in the open space areas defined in terms of the Environmental Services Management Plan.

6.5 Budgeting for estuary management

eThekwini Municipality has a substantial budget. In the 2004-2005 the total budget was over R10 b (R2.2 b on capital expenditure and R8.5 b on operating expenditure) (eThekwini Municipality, 2004a).

Estuaries are significant municipal assets and, as discussed in previous sections, many municipal components are involved in estuary management activities (and activities that impact on estuaries). In addition there are numerous management activities that take place that are not focussed on estuaries in particular but are related to estuary management. For instance the drafting of the SDF is not focused on estuary management although a wide variety of estuary management activities are dealt within in these frameworks. As a result of these factors and the diffuse nature of estuary management activities, is not possible to estimate the budget allocated specifically to estuary management.

Budget is likely to be allocated to specific projects in the coming years. The process of budget allocation is complex and influenced by a variety of factors. Factors identified by Mather (pers. comm.) and Breetzke (pers. comm.) are:

- **Alignment with the IDP**: This is a critical factor because to be eligible for funding, a project must align with the IDP. While the current version of the IDP does not have an explicit link with the budgeting process, the next iteration is being formulated with an eight-point plan that will identify programmes and projects for funding. Projects that fall outside of identified programmes will not access funding.
- **Tenacity and commitment of the project champion**: The project champion must be committed to the process of securing funding and must engage with officials drafting the relevant components of the IDP to ensure that the project is funded.
- **Support of decision-makers**: It is critical that decision-makers understand the project rationale and value its outcome.
- **Alignment with social equity issues**: In South Africa as a whole there is a strong emphasis on the need to promote social equity by creating economic opportunities and access to resources among previously disadvantages sectors. Projects that have a social equity focus or are aligned with broader projects with a social equity focus are likely to secure support.

6.6 Conclusion

6.6.1 IDP takes precedence

The IDP (and the associated Long Term Development Framework) takes precedence over all other plans, policies and strategies. This is demonstrated by the degree to which related plans, policies and strategies highlight this alignment. The legislated intention of the eThekwini IDP is to oversee the entire functioning of the municipality. This is underlined by the Municipal Manager who stated that 'the city's IDP is the foundation on which our strategies and action plans are built.... The IDP contains eight plans and everything we do must fit into those plans'.

From an estuary management perspective this means that any plans, projects and activities need to be aligned with the IDP. In particular they must conform to the broad vision for the municipality and contribute to its strategic development programmes.

6.6.2 Giving sustainable development status within the IDP

The IDP includes 'Sustaining the Natural and Built Environment' as one of eight strategic development programmes and illustrates the significance placed on environmental sustainability. As significant environmental resources estuaries should benefit from the strong emphasis on sustainable development.

6.6.3 Integrating across disciplines

The IDP approach is resulting in integration across disciplines as demonstrated by the cross section of issues covered in the IDP and the fact that the SDFs (and lower level plans) deal with issues over and above land use. In addition a variety of municipal components are being included in planning efforts to cover a multiplicity of issues. Proposals for Coastal and Estuary Management Plans in the draft coastal strategy indicate that these plans are also intended to cut across disciplines and integrate various issues. It should also be noted that components of the municipality regularly consult with other components if they believe their activities are inter-linked (Mather, pers. comm.).

From an estuaries perspective this is a positive development in view of the fact that successful management depends on managing the many different types of activities that impact these systems. An integrated management approach will also result in a more integrated understanding of the value of estuaries and the range of human (municipal) activities that can impact the health of these systems. This will promote wiser estuary decision-making.

Boon (pers. comm.) highlights that during interdisciplinary discussions regarding planning in the Northern Area, the oversupply of wastewater in the Ohlanga catchment resulted in an unnaturally high frequency of breaching events in the estuary. As a result of concerns about the possible impact on biodiversity, visual attractiveness and recreational use, the municipality spent R25 million to divert sewerage inflows to other catchments (Mather and Boon, 2004 in Hay and McKenzie, 2004).

6.6.4 Catchment planning

The Municipality has adopted a catchment planning approach, illustrated by the use of catchments as a unit of planning for the Spatial Development Plans. This is a positive development from an estuary management perspective.

Another significant challenge to estuary management is the impact that activities in the catchment have on the estuary downstream. Using a catchment approach to planning will assist in understanding the implications of catchment activities on the estuary and lead to effective management.

Epstein (pers. comm.) indicated that this approach has been used in the Northern SDF where, for example, competing demands have been placed on the limited capacity of the Ohlanga catchment to receive stormwater runoff and wastewater effluent. In response it is necessary to balance the type and extent of development to avoid potentially negative impacts on the river and estuary within the Ohlanga catchment.

6.6.5 Including Estuary Management Plans within the 'Package of Plans'

The municipality has opted to include Estuary Management Plans (EMPs) within the 'Package of Plans' framework. It is intended that these plans will form part of a coastal management plan for a particular area that will serve as the local area plan in terms of the 'package of plans.' EMPs will provide an opportunity to include in the package issues not covered in other plans, such as living resource exploitation and recreational use management.

The Long Term Development Framework, the IDP and the SDF are the umbrella plans under which all eThekwini activities take place. The other components of the 'package of plans' (Spatial Development Plans, Local Area Plans, Precinct Plans and Land Use Schemes) are implementing tools. Including EMPs within the 'package of plans' should result in these plans influencing those at a higher and lower level. As EMPs fall within the 'package of plans', issues identified that are in need of funding will be included in the formal framework within which budget allocation takes place.

7 ESTUARIES AND INTEGRATED DEVELOPMENT PLANNING – INCORPORATING ESTUARY ISSUES INTO THE IDP

7.1 Introduction

Research conducted as part of Phase I of the Eastern Cape Estuaries Management Programme identified Strategic Adaptive Management (SAM) as 'best practice' for managing estuaries (Hay and McKenzie 2005). To be effective at a local level, estuary management needs to be conducted within the context of local level planning (Breen *et al.* 2004). Estuary protection measures must be integrated into each phase of the IDP process in a strategic and systematic way. The challenge of the project presented in this report is to describe the process to achieve this integration.

Estuary research in South Africa has focused mainly on ecological processes (summarised in Baird and Allanson 1999), health and conservation status (e.g. Harrison *et al.* 2000, Turpie *et al.*, 2002), and management (e.g. Hay and McKenzie 2005). The practicalities of implementing estuary protection measures at a local level have received little attention probably because of the confusion about municipal roles and responsibilities and the lack of local capacity. In 2000 the Municipal Systems Act made integrated development planning mandatory for municipalities to serve as the framework for rural and urban development. Since IDPs are legally binding, issues of concern can be structured as projects and included in an IDP with a strong chance of being implemented. IDPs are thus the route to follow to 'force' estuary protection at a local level.

Incorporating projects that directly address estuary conservation issues is a relatively clear way to make tangible progress towards protecting these systems. A more challenging aspect of achieving this protection is to bring the importance and sensitivities of estuaries to the fore in other municipal sector planning processes so that protective measures can be integrated into their plans e.g. LED and land reform strategies, water services development plans, transport plans, land use management systems, and rural and urban development plans. Achieving this integration requires innovative thinking and simple clear strategies.

In earlier but related initiatives, Urquhart and Atkinson (2002) described how Local Agenda 21 principles and activities could be combined with IDP processes to achieve sustainable development at a local level. Later CSIR (2004) reported on the progress of ongoing South African initiatives to incorporate systematic conservation planning into the IDP process. In addition the IDP Guide Pack Series (2001) provided local strategic environmental guidelines to inform strategy decisions and project designs. Several tools to support the integration of sustainable development issues into the IDP process are highlighted in DEAT (undated) and Urquhart and Atkinson (2002). The outcome of these works provided the basis for identifying tools that can be introduced into the IDP planning process to protect the health of estuaries.

This section aims to briefly describe best practice related to the process of estuary management and to highlight the similarity between this process and that of Integrated Development Planning. The ultimate aim is to describe the most effective ways of incorporating estuary protection measures into the municipal IDP process.

7.2 The process of estuary management - strategic and adaptive

Best practice applied to the management of estuaries says that management should be strategic and adaptive (Rogers and Biggs 1999). The approach is purposeful, explicit, promotes action, and adjusts to changes in ecological and social conditions. It also provides opportunities for learning through experience, appropriate for local authorities in the Eastern Cape where experience and knowledge are limited. Furthermore, it sets direction for management and at the same time allows flexibility.

Fig. 7.1 illustrates the strategic adaptive management approach applied to the process of estuary management described by McGwynne and Adams (2004) as part of the first phase of the Eastern Cape Estuaries Management Programme.

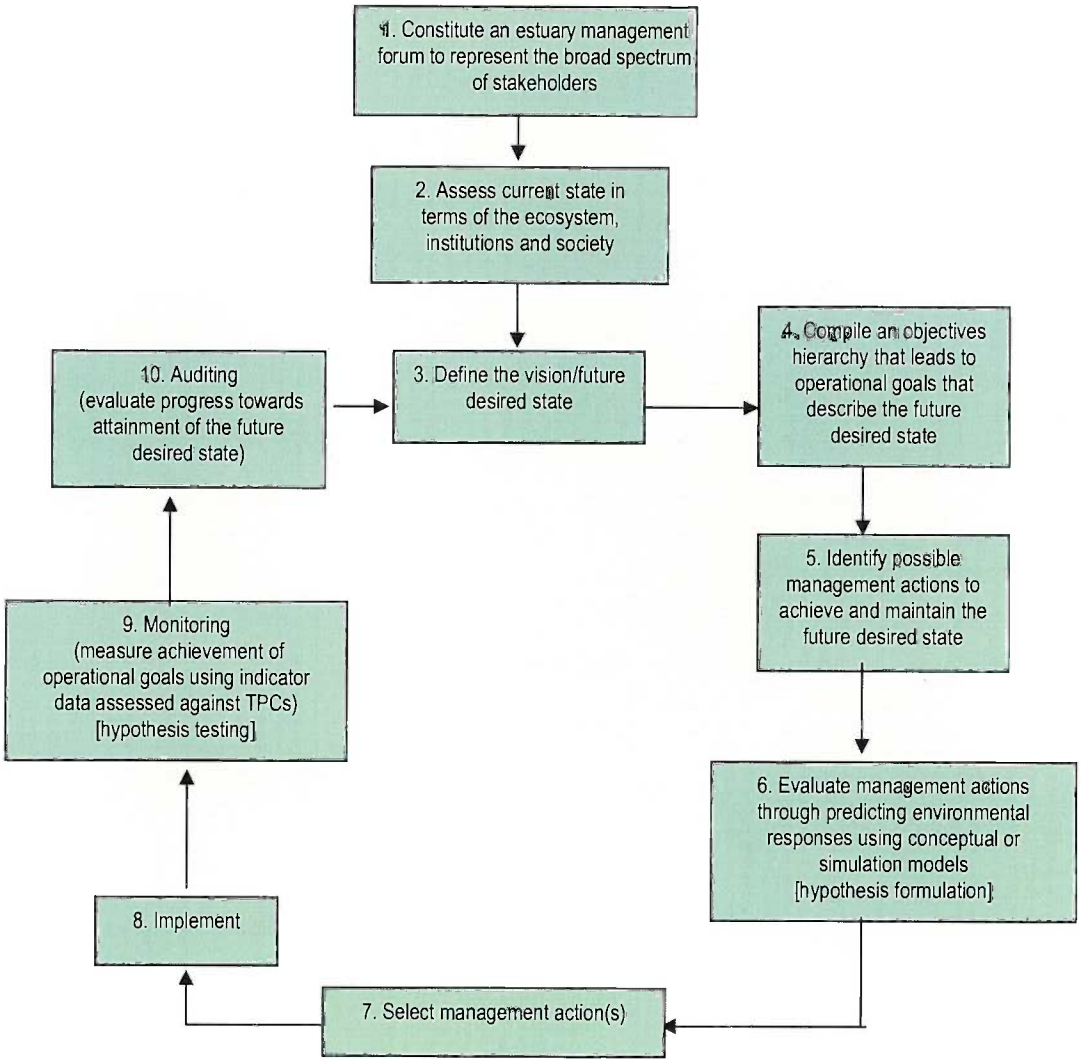

Fig. 7.1. An estuary management protocol proposed for South African estuaries (McGwynne and Adams 2004 modified from Rogers and Biggs 1999)

The process starts with the establishment of a formally constituted estuary management forum representative of all possible stakeholders e.g. relevant municipal

councillors and environmental officers, district municipality and provincial government environmental persons, interested local residents, scientists, environmental organisations and Friends associations. Since municipalities are likely to be allocated a central role in estuary management, they should initiate the process, maintain its momentum, and play a key role in driving the implementation of projects that arise from it.

To serve as a starting point from which to initiate the management process, the municipality as the likely (although as yet unofficial) responsible agent should authorise an independent assessment of the current state of the estuary. The assessment should be holistic covering the state of the biophysical, social and institutional environments and should include opinions from the broader forum. The current state assessment will expose less-than-ideal areas and allow the development of a vision for a future ideal state that will focus management priorities. The ideal state is described through the development of a hierarchical series of objectives that culminates in operational goals that define desired ecological, social and institutional conditions. Management actions to achieve these goals are subsequently identified and evaluated by examining the potential cause-effect relationships associated with each one. Although the process is depicted as a cyclical series of steps, it is in fact iterative.

There are various tools that can be used to predict cause-effect relationships (Fig. 7.1, step 6) (e.g. predictive modelling or using expert opinion) to guide decision-making. The effectiveness of an action in achieving an operational goal is followed through monitoring using specific indicators. An auditing process evaluates progress towards achieving the desired state and, if necessary, leads to an adjustment of the objectives and operational goals.

7.3 IDP formulation and the process of estuary management

The IDP is a tool for achieving developmental local government that is integrated between municipal sectors. The IDP process and the details of each phase are described in Section 4 and illustrated schematically in Fig. 7.2.

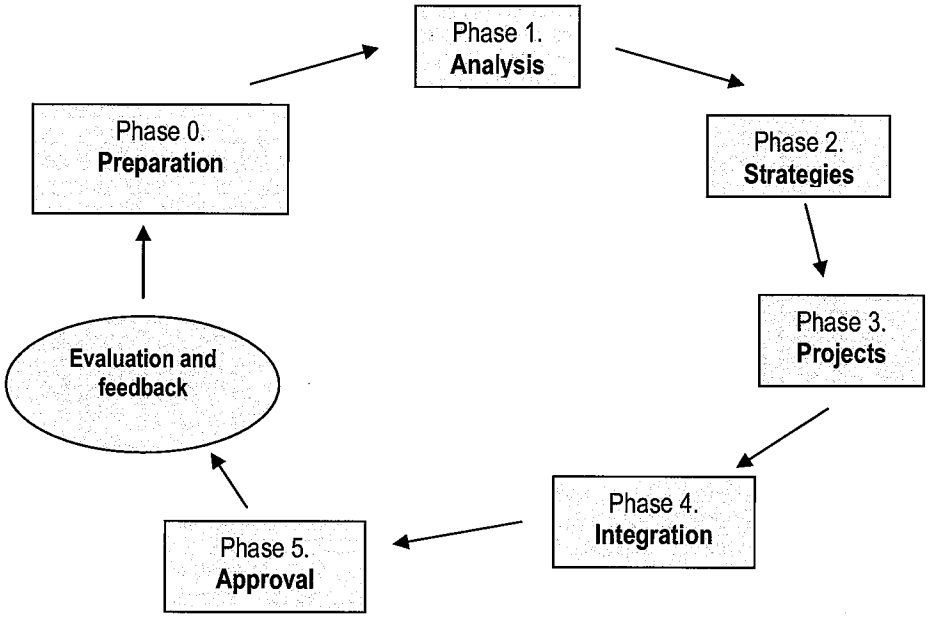

Fig. 7.2. Cyclical representation of phases in the IDP process

The IDP process must achieve buy-in from relevant stakeholders and take place within the framework of co-operative governance. As in estuary management, it is strategic in that it focuses on key issues, and is adaptive in that it is reviewed annually to refocus its priorities and budget allocations.

The processes of IDP development and estuary management incorporate closely related principles (see Sections 4.2 and 4.3). Indeed the five phases of IDP development can be compared with the steps that characterise estuary management as indicated in Fig. 7.3.

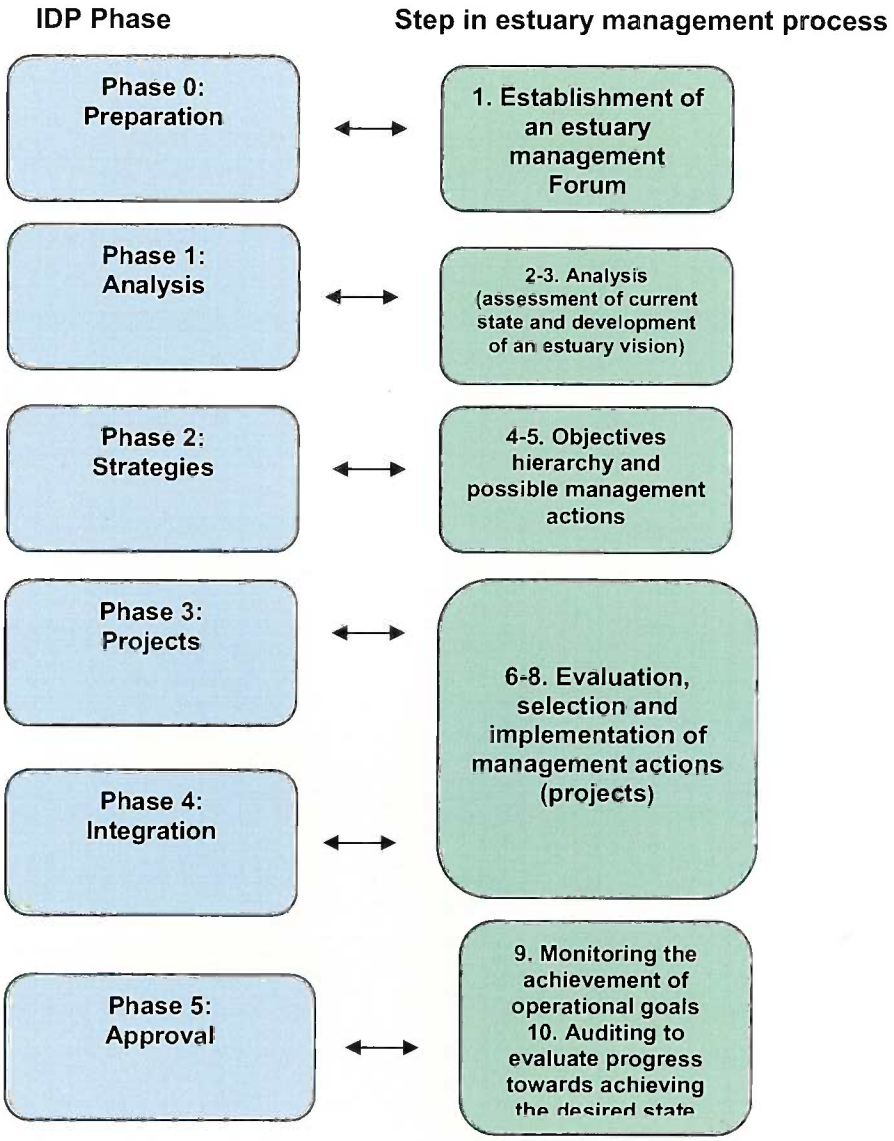

Fig. 7.3. Relationship between IDP phases and steps in the estuary management process (see also Fig. 7.2)

To some, drawing a parallel between the processes of IDP formulation and estuary management may appear tenuous. Both are based on the 'plan-do-check-review' approach that presents an optionally cyclical method of continuous planning and review to track change following the implementation of specific actions. This approach is common to most planning and management initiatives that generate actions to implement plans.

In the IDP process actions required of a municipality are presented in the form of projects allocated to a specific cluster to meet a specific objective. Each project has a budget and a recommended time frame. Projects that are strategic e.g. development of an Integrated Coastal Zone Management Plan (ICZMP) or Environmental Management System, can generate additional projects to achieve objectives outlined

in the primary plan; these can appear in subsequent revisions of the IDP. Projects may constitute specific management actions and may be relatively small. It needs to be remembered that all actions accepted by a municipality as mandatory and included in an IDP are structured and presented as specific projects.

Although not explicitly stated, the implementation of management actions generated through the estuary management process can also be regarded as individual projects each with its own objectives, deliverables, budgets, time frames and manpower requirements. Even a suite of relatively minor actions can be expressed in an Estuary Management Plan as a project, which gives formal legitimacy to these actions. Regarding estuary management actions as projects presents an alternative way of viewing these actions.

7.4 Strengthening the case for estuary protection in the IDP process

Inclusion into an IDP of projects that either directly address threats to estuaries or incorporate estuary protection measures is an effective way of coercing municipalities to play an active role in the management of these systems. To succeed in making estuary protection a municipal environmental priority, the importance of estuaries and the factors that impact their health need to be understood by municipal decision-makers and IDP stakeholder groups. Achieving this awareness means that the profile of estuaries must be raised from the first phase of the planning process and maintained throughout. Since IDPs are reviewed annually, estuary issues need to be made part of the 'normal' IDP agenda so that each review revisits these issues.

The environment is not regarded as a priority in most Eastern Cape municipalities (see Section 5) with the result that IDPs have generally not supported projects that directly tackle environmental issues. In addressing this omission, there are two approaches that could be taken. One would be to raise the profile of the natural environment in general, highlight the issues faced by both terrestrial and marine systems (especially since municipalities need to deal with all environmental issues in their areas), and follow this with a campaign focused specifically on the protection of estuaries. An alternative approach is to focus immediately on the importance of estuaries and threats to their goods and services, and in so doing raise the profile of the environment in general at the same time. The latter approach is the one adopted in this report although both approaches are valid.

The rest of this section focuses on how to incorporate estuary issues into each phase of the IDP process. The IDP Guide Pack (DPLG 2001) is a useful manual and can be used as supplementary reference material. It is important to note that although the IDP process is defined and well structured, its actual implementation in terms of task teams, working groups and workshops at the various phases can differ between municipalities.

7.4.1 IDP Phase 0: Preparation

The IDP development process was outlined in detail in Section 4 of this report. Part of the summary table presented in that section is repeated here to capture the essential elements of each phase for easy reference. Measures to promote the inclusion of estuary issues follow in the table below the phase description.

A municipality is likely to respond positively to pressure to integrate environmental concerns into its planning and development activities once its environmental responsibilities have been formally delegated, accepted and understood.

The presence of three other factors (not necessarily pre-requisites) will notably improve the chances of the successful inclusion of estuary related projects viz.

1. An environmental policy that recognises the value of coastal ecosystems and promotes sustainable use of natural resources.
2. A knowledgeable Environmental Manager (EM) who is familiar with estuary issues, the IDP process, activities of other municipal sectors, and is acquainted with the officials who manage each phase of the planning process.
3. Established Estuary Management Forums (EMFs) that are likely to have identified the main threats to 'their' estuaries and even developed Estuary Management Plans with specific management actions (presented as projects - see also Section 7.3). EMFs are a source of stakeholders willing to contribute to IDP processes in an effort to protect the natural functioning of estuaries.

In Eastern Cape municipalities these elements are usually absent and ways need to be found to achieve integration regardless of the state of the municipality. Success is related to the motivation of preferably a municipal official who champions the cause by lobbying the influential tiers of management, particularly the IDP Representative Forum and IDP Steering Committee, at all stages of the planning process. Ideally the 'champion' should be the EM or, if there is no such post, an official who performs this function as an add-on to another post. If neither exist, the municipality should delegate this function to a related department (e.g. waste management) until an EM is appointed.

Actions to address estuary concerns should be guided by the principles of sustainable development (highlighted in the White Paper for Sustainable Coastal Development in South Africa 2000), national environmental legislation and policy, and international environmental agreements to which South Africa is a signatory. Municipal environmental policy that recognises estuaries as valuable natural systems lays the foundation for the integration of estuary issues across municipal sectors and the inclusion of estuary specific projects in the IDP. The relationship between the elements that govern these processes is presented in Fig. 1.

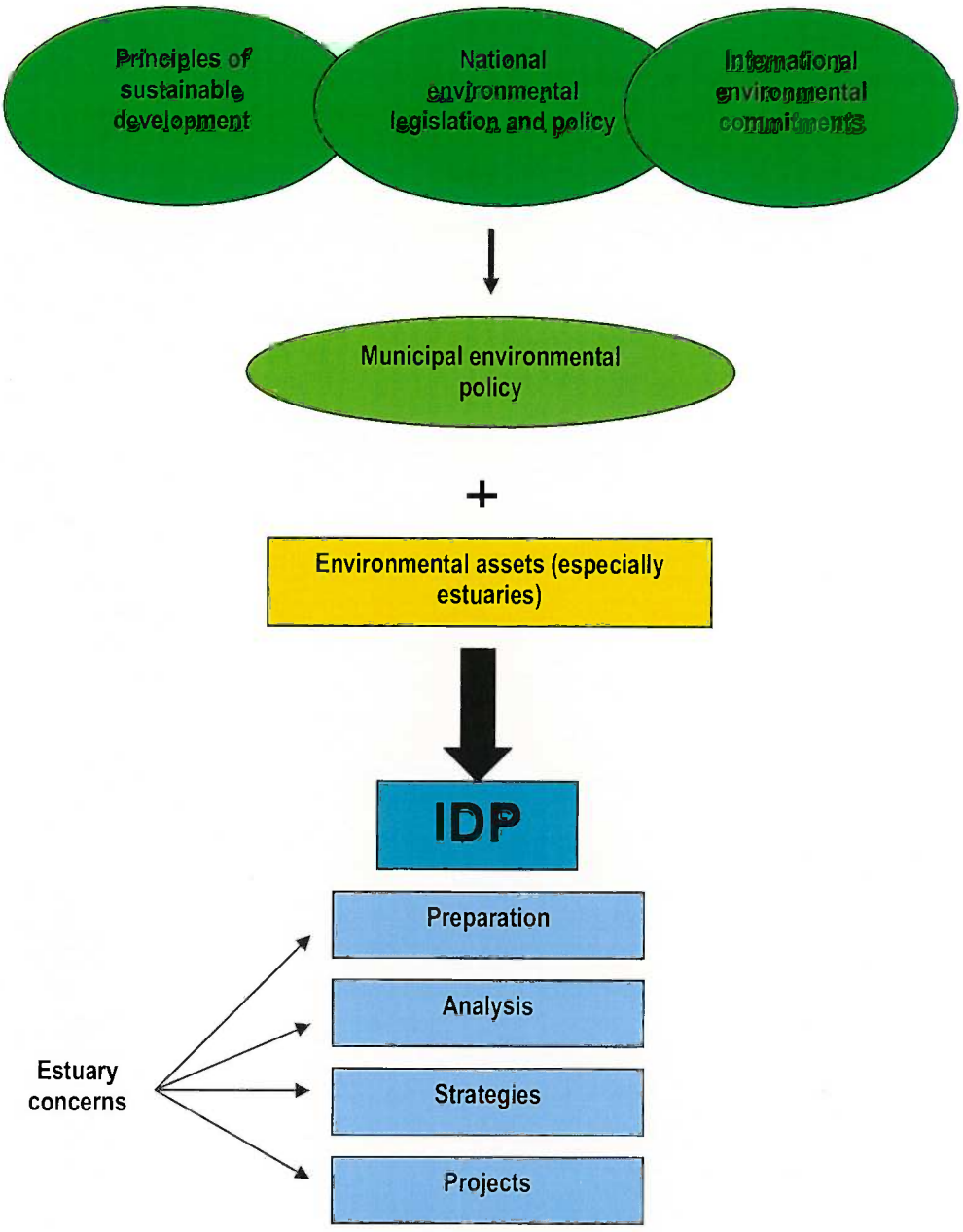

Fig. 1. Diagrammatic representation of the factors that shape the outcome of an IDP (modified from DEAT (undated))

Municipal environmental policy plays a key role in the municipal approach to environmental issues. If a policy is place, it should be highlighted during the Preparation Phase to raise the profile of the environment and set the tone for the formulation of the Process Plan and the stakeholder participation.

7.4.1.1 Key elements and measures to incorporate estuary issues

The EM should invite a broad range of environmental stakeholders to contribute to the IDP process through participating in the IDP Representative Forum. With environmental conservation a common thread linking these stakeholders, they are likely to become allies of the EM and support his various campaigns while at the same time looking for support for their own causes. Through encouraging a spirit of reciprocity and nurturing relationships, the EM can build a strong environmental lobby group that can focus the debates on municipal issues and priorities and influence their outcomes. Developing a support base will be an invaluable asset for the EM and will ultimately enhance the environmental performance of the municipality in all spheres not only in the management of estuaries.

Key elements of the Preparation Phase and measures to raise the profile of estuaries are summarised in the boxes below.

IDP Phase 0: Preparation

Purpose	• To plan the process to be followed in developing the IDP • To plan for district level alignment actions
Outputs	• Process Plan (municipal) • District level framework

Measures to incorporate estuary issues

- The Environmental Manager (EM) or equivalent municipal official must be a member of the IDP Representative Forum, a structure that institutionalizes and guarantees participation in the IDP process.
- Prior to the IDP process, the EM should develop partnerships with other environmental groups, such as Estuary Management Forums (EMFs), Friends Associations, marine conservation working groups, and environmental departments of national and provincial government to improve his/her understanding of the threats to estuaries and ways to manage them. Improved insight will mean that he/she is better equipped to lobby with confidence and persuasion.
- The EM should invite his environmental partners to contribute to municipal planning processes by becoming members of the IDP Representative Forum. If he has not yet made contact with environmental groups, he should encourage broad participation by these groups in the IDP Representative Forum. He/she should also ensure that they are aware of the IDP process and ways in which they can participate.
- The EM should ensure that at least one member of each Estuary Management Forum (EMF) (where these are established) is included in the IDP Representative Forum. The EMF member must keep the broader EMF informed of the progress of the IDP process so that opportunities for lobbying can be used optimally.
- The EM should unify his environmental allies into an informal but well recognized environmental lobby group that makes its voice heard in the IDP Representative Forum. He will need to be sensitive to their issues of concern and as far as possible address these as well as his own immediate issues. A positive relationship with this group will provide invaluable support and strengthen the effectiveness of the EM's endeavors.
- If possible, the EM should participate in the formulation of the Process Plan to create and identify opportunities for highlighting estuary issues so that he can plan and optimize his approach at each phase. With details of the IDP process differing between municipalities, each municipality will have its own set of task teams, working groups and workshops. The EM must decide on the opportunities that would most suit his purposes and, if required, delegate attendance at these

events to partners in his environmental lobby group.

- If an environmental policy exists, the EM should highlight this policy to the IDP Steering Committee so that opportunities for the inclusion of environmental (and estuary related) issues into the IDP process can be created.
- Within the IDP Representative Forum, the EM should conduct an estuary awareness campaign and target municipal officials, councilors, community members and stakeholder groups. The campaign should: (i) emphasize that the environment is the resource base of all human activities and there are ecological limits to development (ii) highlight municipal environmental responsibilities, (iii) draw attention to the municipal environmental policy (if one exists) and its implications, and (iv) showcase estuaries by highlighting the value of their goods and services, and the potential impact of municipal and societal activities on these goods and services. The campaign should open the opportunity to gain input from stakeholders and municipal sectors, and ultimately gain support for estuary related projects.
- The EM should link with a coastal management expert who can act as a mentor and provide support and training on the management of estuaries. Budget may need to be allocated for this item.
- The EM should develop a close working relationship with a member(s) of the IDP Steering Committee that will enable him/her to lobby the estuary cause among this group. Relevant portfolio councilors (e.g. environment) may be on this committee and these councilors should receive particular attention during the environmental awareness campaign in the IDP Representative Forum.

DEAT (undated) formulated a list of tools to promote the integration of sustainability issues into the IDP process. Although some of these tools are used in the measures already described for estuary-related issues, they have been adapted for the estuary cause and presented in the box below.

Tools for the integration of estuary-related issues (after DEAT (undated))

- Stakeholder analysis
- Stakeholder workshops
- Creation of participation structures and processes

7.4.2 IDP Phase 1: Analysis

The phase centres on assessing the level of development in the municipality and prioritising issues from a multisectoral perspective. A technical municipal officer will as part of a designated task team compile existing information on priority issues and risks based on available reports. He will produce a list that includes each problem (location, people affected, magnitude of the problem, causes) and a short description of the major threats. Stakeholders in the IDP Representative Forum will also get an opportunity to undertake an issue-focused analysis and their information will be reconciled with the technical information so that issues can be prioritised.

An analysis of key estuary issues can (if there is enough information documented or known) emerge from an analysis of environmental issues during this phase. These issues may already have been identified by an EMF during the development of an Estuary Management Plan (EMP) that captures the actions needed to manage threats to the health of a particular estuary. This phase presents an opportunity for direct input from an EMP into the IDP.

Because the IDP process is strategic and budgets are limited, it must focus its resources on priority issues. It is important that the key threats to estuaries are recognised during this phase and singled out as priority issues that warrant inclusion in the form of projects into the IDP.

The IDP Representative Forum develops the criteria for prioritization of social, economic and environmental concerns. After a process of aggregating and consolidating issues, this forum decides whether certain environmental (i.e. estuary) issues will become municipal priority issues. The prioritization process will initially be area-specific and issue-specific, followed by sector-specific and then project-specific. Environmental and particularly estuary related input is vital during these events.

The absence of an environmental policy in most Eastern Cape municipalities means that environmental issues are tackled in an *ad hoc* manner, if at all. Not having a policy can also allow a municipality to let environmental issues slide into the background. It is therefore imperative that the Analysis Phase recognises the development of an appropriate environmental policy as a priority that must remain uppermost on the environmental agenda until one is in place.

7.4.2.1 Key elements and measures to incorporate estuary issues

Key elements and measures are summarised in the boxes below.

IDP Phase 1: Analysis

Purpose	To ensure that decisions will be based on: • people's priority needs and problems • knowledge on available and accessible resources • proper information and a thorough understanding of the dynamics influencing development in a municipality
Outputs	• Assessment of existing level of development • Priority issues or problems • Understanding on nature, dynamics and causes of priority issues or problems • Knowledge on available resources and potentials (including a tentative overall financial frame)

Measures to incorporate estuary issues

- The Environmental Manager should impress upon the IDP Representative Forum and the technical municipal officer who compiles and analyses existing information that the analysis should be issue-focused and not sectoral, and that environmental issues are important because they cut across and impact all municipal sectors. The EM should highlight the current status of estuaries and the human impacts they experience. The analysis should link issues to their cause(s).
- The EM should participate in the stakeholder analysis of priority issues. Environmental issues may be analyzed by the IDP Representative Forum or by an *ad hoc* task team. The EM should participate in whatever structure is assigned to this task and use it to highlight the status and needs of estuaries.
- It would be useful to include an estuary checklist to assist the environmental analysis. This checklist would include questions related to key issues such as sediment and water dynamics, water quality, exploitation of living resources, development, and management and planning. The IDP Guide Pack supplies a matrix to assist in defining information requirements prior to an information search or in-depth analysis. The checklist could also be rephrased into a series of questions.

- The Analysis Phase should be supported by municipal or district wide State of the Environment or State of the Coast reports where available. Where these are not available, local municipalities can join the district municipality and initiate a district analysis on priority environmental issues with an emphasis on the coast and estuaries. Or a local municipality may wish to conduct a specific coastal study that would include estuaries. This research should be done over 2-3 weeks in parallel with other planning activities.
- Where appropriate, available information on estuaries should be mapped to place the issues into a spatial context. This will help to ensure that the municipal spatial strategies and land use management/development decisions are based on a general awareness of spatial constraints, problems, opportunities, trends and patterns. These maps should be used as a tool during this phase and should not constitute a separate process but an extension of the compilation of existing information. Data capturing should be avoided and existing information used e.g. the Environmental Potential Atlas (ENPAT). Municipalities with planning departments should prepare the maps, and those without should engage a planner for this purpose.
- The EM should adopt a pro-active approach to the environmental analysis. His prior research and networking should prepare him for this approach.
- The EM supported by the environmental lobby group can assist the prioritization process by forming a task team to develop criteria to assist in prioritizing environmental issues and specifically those related to estuaries. The task team would report back to the IDP Representative Forum.
- The EM and, if possible, members of the environmental lobby group should participate in the process to consolidate municipal priorities. This is a key event and is the final opportunity in this phase to ensure that issues that impact the health of estuaries are accepted as municipal priorities.

Below are the tools listed by DEAT (undated) that have been adapted for the integration of estuary-related issues.

Tools for the integration of estuary-related issues (after DEAT (undated))

- Estuary Scan/Overview
- Strategic Environmental Assessments
- State of the Environment Reports
- Sustainable Livelihoods Framework
- Resource Economics
- GIS

7.4.3 IDP Phase 2. Strategies

This phase centres on strategic planning that will help a municipality make choices about its future direction. The municipality must develop a multi-sectoral vision and objectives and strategies for each issue prioritised during the Analysis Phase; it must also identify projects. If the lobbying for the estuary cause during the Preparatory and Analysis Phases was successful, the end product of this phase should see priority estuary issues defined as or incorporated into projects supported by clear financial frameworks.

Municipal strategies and projects must reflect ecologically sound principles and an economically and socially sustainable process. The IDP Guide Pack lists the

principles to guide municipalities in the formulation of local strategies, which should be focused on:

- avoiding pollution and degradation of the environment;
- avoiding waste, ensuring recycling or disposal in a responsible manner;
- minimising and remedy negative impacts on the environment and on people's environmental rights;
- considering the consequences of the exploitation of non-renewable natural resources;
- avoiding jeopardising renewable resources and ecosystems;
- paying specific attention to sensitive, vulnerable, highly dynamic or stressed ecosystems;
- minimising the loss of biological diversity; and
- avoiding disturbance to cultural heritage sites.

To be effective, these guidelines must identify the principles that are applicable to a particular resource and at a particular location. Specific guidelines can be developed to inform strategy decisions and project designs. Guidelines may include:

- a list of endangered or degraded resources;
- a list of locations that may require restrictions for use;
- a list of economic activities that may impact the environment; and
- risks of environmental disasters.

The IDP Representative Forum is where the core activities of the Strategies Phase take place. It has the important task of deciding between alternative environmental strategies and formulating criteria to guide this process. The protection of estuary health needs to be captured in these criteria and the municipal Environmental Manager and his environmental lobby group should play an active role in their formulation.

It is important to note that each phase of the IDP process builds on the outcome of the previous one. Earlier lobbying and the awareness campaign will have sensitised stakeholders, municipal officials and politicians about the importance of the environment, especially estuaries, and the impact their decisions have on environmental health and thus the lives of local people and future generations. The success of the entire estuary campaign depends on the impact of these early phases.

7.4.3.1 Key elements and measures to incorporate estuary issues

These are summarised in the boxes below.

IDP Phase 2: Strategies

Purpose	• To ensure broad inter-sectoral debate on the most appropriate ways to tackle priority issues • This debate should occur in the context of the vision, policy guidelines and principles, available resources, interlinkages and competing requirements • Phase of making choices after due consideration of various options
Outputs	• Multisectoral vision • Objectives (for each priority issue)

	• Strategic options and choice of strategy (for each issue) • Tentative financial framework for projects • Identification of projects

Measures to incorporate estuary issues into Phase 2: Strategies

The measures listed below are recommendations for the Environmental Manager (EM) working in close co-operation with the environmental lobby group. Many of the functions of this phase are achieved through planning and discussion workshops. Participation by the EM and the environmental lobby group in these events is vital for the success of the estuary protection campaign.

- The vision statement should include the concepts of 'sustainable use of coastal resources' and 'protection of coastal ecosystems'. This can be achieved by focusing on how estuary protection is in line with the core national value of sustainable use and that the broader community and not only those living nearby will experience the benefits.
- A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis can be used to identify and prioritize the elements to be included in a vision. The environmental lobby group should maintain the high profile of estuaries.
- Assuming that estuary issues are recognised as priorities, the formulation of working objectives related to the protection of estuaries should be guided by key questions. These questions should incorporate the principles of sustainable coastal development (see The White Paper for Sustainable Coastal Development 2000) and promote the maintenance or enhancement of estuary ecosystems. The working objectives should be formulated taking into account limits of acceptable change broadly identified for estuaries. The precautionary principle should be adopted where these limits are not known or understood.
- In general, Localised Strategic Guidelines related to the environment should be used to guide the development of alternative strategies, decisions on which strategy to adopt, and in the project planning process. Guidelines should be developed specifically for estuaries (and for individual estuaries where possible) and incorporated into the guidelines for sustainable development that will be considered together with those for other cross-cutting issues such as spatial development, poverty alleviation and gender equity, local economic development, institutional issues and other cross-sectoral policy guidelines (e.g. HIV/AIDS and STD Plan). Estuary guidelines may include checklists and recommendations on how to address constraints and maximize opportunities. The guidelines could be quantitative (rates of freshwater inflow), qualitative (promote the establishment of Estuary Management Forums), or spatially based (mapping of sensitive areas).
- Clear criteria should be developed for evaluating alternative strategies for each priority issue. The working objectives and Localised Strategic Guidelines for estuaries should be used to assist this process.
- If no environmental policy is in place, the formulation of an appropriate municipal environmental policy must be made a priority objective and be captured within the framework of a fully supported project. If a policy is in place, it should be used to guide decisions on objectives, strategies and the selection of projects.

Below are the tools listed by DEAT (undated) that have been adapted for the integration of estuary-related issues.

Tools for the integration of estuary-related issues (after DEAT (undated))

- Multi-stakeholder workshops
- Localised Strategic Guidelines
- Estuary health criteria

- Scenario planning
- Environmental audit

7.4.4 IDP Phase 3: Projects

The Projects Phase integrates the vision, development strategies and Localised Strategic Objectives into project proposals with defined action plans and budgets. Technical and financial experts constitute Project Task Teams that generate the project details which the municipality must ensure are concrete and sufficiently specified. Affected stakeholders can subsequently adjust the details to suit their needs.

The phase produces a series of projects with goals that reflect desired outcomes for specific issues, action plans to achieve objectives and indicators that measure progress. Indicators should be developed not only to measure meeting project deliverables, but also to measure change on the ground in response to the action plan. These will constitute different types of indicators and need to be carefully selected to serve both purposes. Indicators for tracking change in key estuary issues were described by Taljaard *et al.* (2003) and McGwynne and Adams (2004). These can provide insight into possible indicators and their application. Estuary related indicators should not only measure change in biophysical elements but also in social and institutional factors that reflect the interaction between estuary resources and users, and the effectiveness of management institutions. To detect real change in South African estuaries through monitoring, baseline information is needed against which change can be evaluated. This information is however often incomplete and unavailable, which makes the interpretation of data difficult.

Ideally those who use indicators should contribute towards their selection although the IDP Guide Pack states that the Project Task Teams should fulfil this task. State of the Environment (SoE) reports can assist municipalities to identify key issues although there are few municipalities in the Eastern Cape that can be guided by local or even district SoE assessments.

7.4.4.1 Key elements and measures to incorporate estuary issues

These are summarised in the boxes below.

Purpose	• To formulate implementable project proposals • To ensure a smooth planning-delivery link through detailed work by technical teams, adjusted to needs and local conditions by affected groups of residents
Main outputs	• Indicators for each objective • Project outputs with targets and locations • Major activities with time frame and responsible agencies • Cost estimates and budgets with sources of finance

Measures to incorporate estuary issues into Phase 3: Projects

- The Environmental Manager (EM) and the environmental lobby group should input into the process of selecting indicators to monitor project deliverables and also to track change in estuary variables where a project has been designed to address a particular estuary issue. These variables should not only measure change in biological or physical components but also changes in social factors

that characterize communities associated with the estuary. The EM should consult with estuary management experts to decide on the most appropriate indicators.

- If possible, environmental indicators should be selected and developed in association with the people (stakeholders) who are to use them to raise awareness of the importance of specific issues.
- As part of indicator development for estuaries, triggers (red flags) should be identified that will prompt action by stakeholders. These should indicate the state of the ecosystem in relation to the limits of acceptable change for key resources.

Below are the tools listed by DEAT (undated) that have been adapted for the integration of estuary-related issues.

Tools for the integration of estuary-related issues (after DEAT (undated))

- Environmental Impact Assessment
- Social Impact Assessment
- Environmental / estuary related guidelines
- Estuary health indicators

7.4.5 IDP Phase 4: Integration

During this phase, draft project proposals are checked and revised for compliance with the municipal vision, policies, legislation, priorities, objectives, budget frameworks and strategies. Projects are then co-ordinated between sectors in terms of content, location and timing to generate consolidated and integrated programmes that make up an IDP. At this stage a set of clear criteria should be used to encourage sustainable use practices.

One of the outcomes is an Integrated Environmental Programme (IEP) that demonstrates IDP compliance with environmental policies, ensures that urgent environmental issues are addressed, and that envisaged projects have no negative impact on the natural environment. This programme is not an add-on programme but aims to capture the environmental contributions from all the IDP projects in context. It serves as a tool for mainstreaming environmental issues.

The EIP should take the form of a summary statement that reflects the following:

- issues identified in the Analysis Phase;
- consideration of the Strategic Environmental Guidelines;
- projects and their activities that significantly impact the environment;
- the manner in which the municipality will ensure that its projects comply with the principles in NEMA and national environmental standards; and
- those projects that require an EIA.

The Environmental Manager should compile the EIP and check all project proposals to ensure that the recommendations of the IDP Representative Forum are incorporated into final project proposals and into each Integrated Sector Programme.

At this stage an Integrated Monitoring and Performance Management System is developed to ensure accountability on the basis of a simple, effective and affordable monitoring and performance management system. This system would serve as a tool

for the Municipal Manager to periodically review priorities and strategies. It would require checking all indicators that measure project objectives and synchronising them in terms of indicator type and targets. It would also require compiling, checking and harmonising targets and milestones for all projects.

The Municipal Systems Act has provided a set of national key performance indicators (KPIs) to ensure that municipalities direct resources to the strategic priorities of government. The Act also sets parameters for municipalities to select their own indicators. The national set of KPIs establishes a basis for comparison between municipal performances and for benchmarking among municipalities.

7.4.5.1 Key elements and measures to incorporate estuary issues

These are summarised in the boxes below.

Purpose	• To check and harmonise results of project planning for compliance with the vision, strategies and resources • To ensure consolidated and integrated programmes that constitute an integrated development plan
Main outputs	Operational strategy that includes: • Revised project proposals • Sectoral programmes • Financial/capital investment plan • Integrated spatial development framework • Integrated programmes related to cross-cutting dimensions (e.g. Integrated Environmental Programme) • Integrated institutional programme • Integrated Monitoring and Performance Management System (with indicators) • Disaster Management Plan

Measures to incorporate estuary issues into Phase 4: Integration

The measures listed below are directed at the Environmental Manager and the environmental lobby group.

- The Integrated Environmental Programme should include estuary issues as priority issues.
- All environmental project proposals should be checked to ensure that the recommendations of the IDP Representative Forum are incorporated into final project proposals and also into each Integrated Sector Programme.
- A set of criteria should be developed to promote the incorporation of estuary protection measures into the process of project cross-checking, compiling and revising.
- Estuary protection criteria should be incorporated into the selection of key performance indicators for the Integrated Monitoring and Performance Management System to ensure that the system is truly integrated and reflects the overarching values the municipality would like to promote.
- The development of locally specific environmental indicators should try to align at least in part with the national set of key performance indicators. Estuary related indicators should be oriented towards sustainable use.

Below are the tools listed by DEAT (undated) that have been adapted for the integration of estuary-related issues.

Tools for the integration of estuary-related issues (after DEAT (undated))

- Estuary monitoring programme
- Community-based monitoring
- Environmental Management Plan
- Social Management Pan

7.4.6 IDP Phase 5: Approval

The Approval Phase centres on gaining feedback on the IDP before approval and adoption by the municipal council. It presents an opportunity for buy-in to the co-ordinated implementation of the IDP by all parties involved or affected. Giving stakeholders sufficient time to comment on the draft will encourage this buy-in and facilitate the success of the plan in delivering on its priorities. IDP review also raises awareness of issues and consolidates commitment towards the municipal vision and goals, and if the environmental lobbying has been successful, towards the sustainable use of estuaries.

7.4.6.1 Key elements and measures to incorporate estuary issues

These are summarised in the boxes below.

Purpose	• To ensure that before being adopted by the Municipality Council all relevant stakeholders and interested parties (including relevant government departments) are given a chance to comment on the draft plan, thereby giving the finally approved plan a sound basis of legitimacy, support and relevance.
Main outputs	• Amended and adopted Integrated Development Plan

Measures to incorporate estuary issues into Phase 5: Approval

- The Environmental Manager (EM) should notify stakeholders of the availability of the draft IDP. The environmental lobby group and other stakeholders should ensure that they have sufficient opportunity to comment on the report before its approval by council.
- The EM and environmental lobby group should ensure that estuary issues feature satisfactorily in the draft report and that these are adequately integrated into other sectoral programmes.
- The opportunity presented by the IDP approval period should be used to consolidate the profile of estuaries as important but vulnerable coastal ecosystems that require protection measures across sectors.

Below are the tools listed by DEAT (undated) that have been adapted for the integration of estuary-related issues.

Tools for the integration of estuary-related issues (after DEAT (undated))

- Estuary-related review guidelines
- Public review

7.5 Procedure for an Estuary Management Forum to engage the IDP process

An Estuary Management Forum (EMF) focuses on protecting the health of an estuary of interest by promoting the sustainable use of its resources and at the same time meeting the needs of the communities that depend on these resources. The composition of an EMF is described in Section 7.2. They are formally and properly constituted estuary conservation bodies that co-ordinate local opinion with a view to engaging regulatory authorities on matters that impact the estuary. They currently

have no legal status although the concept of local environmental caretaker groups is supported in the national coastal management policy.

EMFs have the capacity to contribute significantly to municipal planning processes especially those involving the use of estuary resources. Section 7.4.1 recommends that the municipal Environmental Manager invites EMF representatives to participate in the IDP process during the Preparatory Phase by becoming members of the IDP Representative Forum. EMFs should however also bear the responsibility of ensuring their own participation by keeping in touch with municipal planning events. As a Representative Forum member, EMFs have the opportunity to lobby the cause of 'their' estuary throughout the entire IDP process, as illustrated in Sections 7.4.1 to 7.4.6. They can also form extensive and useful networks that would support the management efforts of both the EMF and the municipality. The production of an IDP that satisfactorily addresses the concerns of estuary stakeholders depends to a large part on the commitment of EMFs (where these are in place) to participate fully in the process.

A detailed procedure on the avenues open to EMFs to engage the IDP process has been clearly described in Section 7 of this report. For this reason, it is not necessary to present these details again here.

7.6 Conclusion

The IDP process as it is presented in the IDP Guide Pack (DPLG 2001) is a well defined, systematic and consultative procedure that aims to promote municipal service delivery in priority areas in a manner that integrates issues across the various sectors. Although the Guide Pack provides excellent guidelines for each phase, it is not a simple process by any means particularly in municipalities that lack expertise, are often without clear policies to guide decisions on priorities, and are inexperienced at the mechanics of integration. It is thus not surprising that in most Eastern Cape municipalities, environmental issues (including the protection of estuaries) are overlooked in favour of more socially pressured needs associated with poverty and under-development. However despite the inherent difficulties, the IDP process does offer municipalities the opportunity to define and progress (albeit it slowly) towards their desired futures.

For the environment to be recognised as a priority issue and for estuary protection to be singled out for attention above other equally deserving environmental causes, it will need a dedicated and concerted campaign lead by the Environmental Manager in close co-operation with an environmental support group created and nurtured by the manager from the start of the IDP process. Although environmental conservation will lie at the heart of this group, the manager will need to persuade some of these role-players to put aside their own priorities (albeit temporarily) in favour of estuary related issues. He will need to present a convincing case and be prepared to negotiate the criteria to assess the order in which the various environmental issues will be prioritised both in the short and long-term. To achieve all of this, the manager himself will need environmental management training that includes the management of coastal resources. He will need to build and actively maintain links with other environmental regulatory agencies (e.g. DEAT, DEAET, DWAF) and non-governmental organisations (NGOs) (e.g. EMFs, friends associations, nature reserve management committees), many of which may work alongside him in the IDP process. These links are vital not only for the accuracy and credibility of the outcome of the IDP process but also to encourage organizations (both government and NGOs)

to co-operate with each other in protecting natural assets, an approach that will be to the benefit of all role-players and especially the environment.

It is not ideal for success to depend on the efforts and skills of an individual but because municipalities appear likely to play a significant role in estuary management in future, the municipal Environmental Manager is the most obvious person to lead the municipal response. Success will thus be related to his energy and motivation, his understanding of environmental and specifically coastal issues, his interpersonal and negotiation skills, and the strength of the network potentially available to support him. His first environmental campaign is likely to be the most difficult but thereafter campaigning and indeed achieving success will become easier with each IDP revision. If not already in place, developing a sound environmental policy that highlights the management of coastal resources, especially estuaries, must be one of his priorities.

Fundamentally the IDP process is the same for all municipalities although details of task teams and workshops, roles of municipal officials, composition of the IDP Representative Forum, and the capacity of IDP role players to identify and address priority issues differ between municipalities. Measures presented in this report to raise the profile of estuaries are generic and relate to the basic phases of the IDP process. They can be adapted to suit the variations in each municipal process. To best implement these measures, the Environmental Manager should participate in the formulation of the IDP Process Plan formulated during the Preparatory Phase to pinpoint the phases most critical for the inclusion of environmental issues and prepare to make full use of these opportunities. It needs to be remembered however that the requirement for IDPs was introduced in 1996 and clearly defined as recently as 2000. It will take many revisions and much learning over an extended period to streamline what is currently a time consuming and cumbersome process into a focused, efficient one that generates a truly integrated development plan that satisfies the expectation of most stakeholders.

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ANNEXURE 1

National legislation applicable to the management of coastal resources and the responsibilities of local authorities

Legislation	Activity/theme	Aim of law	Responsible authority	[redacted]
Constitution of RSA, Act 108 of 1996 [Chapter 2: Bill of Rights]	Damage or degradation of the environment and the promotion of sustainable development.	Protects and promotes fundamental human rights, including an environmental right (section 24).	Organs of state (defined in section 239 of the Constitution).	Municipal decisions and plans must take into account that everyone has a right to an environment that is not harmful to their health or well-being.
Maritime Zones Act, 15 of 1994	Demarcation of the different zones of (and laws applicable in) South Africa's coastal and marine environment.	Laws enforced in the Republic apply in the territorial waters and to the air space above it.		Municipalities must be aware that their obligations and responsibilities in the implementation of laws may, unless otherwise indicated, include the implementation thereof in the territorial waters.
National Environmental Management Act, 107 of 1998 ("NEMA")	Prevention of damage to or degradation of the environment; Provision of principles for appropriate and sustainable environmental governance by relevant organs of state; Provision of a regime for environmental impact assessment ("EIA").	Establishes principles for organs of state on matters that may significantly affect the environment and for co-operative environmental governance.	National Department of Environmental Affairs and Tourism (DEAT)	Municipalities must consider the NEMA principles (in section 2) when their actions "may significantly affect the environment". Activities that require authorisation or permission in law and which may significantly affect the environment (see section 24) require environmental impact assessment in accordance with section 24(7). A municipality, as a relevant authority when an emergency incident occurs, may direct the responsible person to take specific measures within a specified time period to limit or remedy the effects of the incident.
National Environmental Management: Coastal Zone Bill	Conservation and sustainable development of the coastal zone	To establish a system of integrated coastal management in South Afrtica to promote the conservation of the coastal environment and the sustainable development of the coastal zone; To re-state the law relating to the seashore and the legal status of the seashore and other coastal land; To determine the responsibilities of organs of state in relation to the seashore and other coastal land; To prohibit incineration at sea and to control dumping at sea, pollution in the coastal zone and other adverse effects on the coastal environment;	DEAT / Provincial Authority / Local Authority	A municipality may prepare and adopt a municipal coastal management programme (CMP) for managing the coastal zone or specific parts of it in the municipality. CMPs must be reviewed every five years and can be amended. The programmes may be prepared as part of integrated development plans. The Bill stipulates that a municipal CMP must: (i) be a coherent municipal policy directive for the management of the coastal zone within the jurisdiction of the municipality; and (ii) be consistent with the Coastal Zone Bill, the Biodiversity Act including the national biodiversity framework and national and provincial CMPs.

Legislation	Activity/theme	Aim of law	Responsible authority	[redacted]
		To give effect to South Africa's international obligations in relation to coastal matters.		
National Environmental Management: Biodiversity Act (10 of 2004)	Protection of South Africa's biodiversity. The Act provisions on threatened ecosystems, bioregional plans and biodiversity management plans, and together with the Protected Areas Act that provisions for a range of protected area options including private or communal protected areas, gives us powerful tools for achieving biodiversity management and conservation in production landscapes.	Provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and for the establishment and functions of a South African National Biodiversity Institute.	DEAT / Provincial Authority / Local Authority	National, provincial and local government are all considered 'competent authorities' for the control of an alien species or a listed invasive species. The National biodiversity framework may contain norms and standards for provincial and municipal environmental conservation plans (s38(2)). Bioregional plans may be produced by the Minister at the request of a municipality (s 39(2)(b)). Any organ of state that must produce an EMP (under NEMA) and all municipalities that have to prepare IDPs, must make sure that: o The EMP/IDP is aligned with the national biodiversity framework and any applicable bioregional plan o The EMP/IDP incorporates provisions of the national biodiversity framework or a bioregional plan that specifically apply to it; o The EMP/IDP demonstrate how the national biodiversity framework and any applicable bioregional plan will be implemented by that organ or state or municipality (s46(2)) All organs of state in all spheres of government must prepare an invasive species monitoring, control and eradication plan for land under their control. This must be included within EMPs. Municipalities must include this plan as part of their IDP. Municipalities may be able to get help with preparation of this plan from the National Biodiversity Institute (with the consent of Minister) (s71).
National Environmental Management: Protected Areas Act (57 of 2003)	Protection of South Africa's biological diversity. The Act provides for any land, including private or communal land, to be declared a protected area, and allows for the co-management of such a protected area by the landowner(s) or any suitable person or organisation.	Provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; Establishes a national register of all national, provincial and local protected areas;	DEAT / Provincial Authority / Local Authority	A municipality can declare a nature reserves (and determine the type of reserve), protected environments (and allocation of type and name)(s42, 43, 46, 47) Municipalities must follow an appropriate consultation process before designating a reserve or protected environment (s52). Local protected areas must be managed by the municipality itself or management must be assigned to a municipal entity (in accordance with

Legislation	Activity/theme	Aim of law	Responsible authority	Municipal responsibility
		Provides for the management of protected areas in accordance with national norms and standards; Provides for intergovernmental co-operation and public consultation in matters concerning protected areas.		the Local Government Municipal Finance Act) under the sole or shared ownership control of the municipality (s59). Local Protected Area management plans: a municipality **must** prepare a management plan for a local protected area and submit a copy of the plan to the MEC for environmental affairs in the province for approval (s 60(2)). Section 62 contains reference to the required contents of the management plan. Performance Indicators for monitoring performance of managed of provincial and local protected areas and the management of biodiversity in those areas **may** be established by the MEC for environmental affairs in a province (s64(2)).
ORV Regulations under NEMA	Control of vehicles in the coastal zone.	To prohibit generally the recreational use of vehicles in the coastal zone and, in certain circumstances, to provide procedures for approving of the use of vehicles in the coastal zone.	DEAT / Provincial Authority / Local Authority and the management of coastal protected areas (e.g. SANParks in coastal reserves proclaimed and protected under the National Parks Act, 1976).	Municipalities may be required to exercise powers delegated to them, by provincial authorities, to act as authorising agents. They must ensure that: • the requirements of section 24 of NEMA, where applicable, have been met; • municipal officers or employees have sufficient expertise to evaluate applications and render decisions within a reasonable time period; • they refuse applications under certain circumstances; • the record of decision contains certain specified information; and • they suspend, cancel and/or amend permits or licences in certain circumstances. The ORV Regulations prevail where there is conflict between it any other regulation, by-law or other subordinate legislation relating to the use of vehicles in the coastal zone and where the subordinate legislation was made prior to the ORV Regulations coming into effect. **Note:** Proposed amendments to the ORV Regulations were recently published: these amendments include the deletion of regulation 10 (that authorises provincial authorities to delegate its power to local authorities).
Environment Conservation Act, 73 of 1989		Provides for activities that require authorisation because of the significance of	DEAT / Department of Water Affairs and Forestry (DWAF) / Provincial Authorities	Listed activities require authorisation from the competent authority before such activities may be undertaken in the municipal area.

Legislation	Activity/theme	Aim of law	Responsible authority	Municipal responsibility
		their actual/potential impact on the environment (by an EIA process that precedes authorisation), and the permitting of waste disposal sites.		Municipalities may, if a person performs an activity which may seriously damage or detrimentally affect the environment, issue a directive to such a person to cease such activity or to take such steps as are specified (see section 31A).
Marine Living Resources Act, 18 of 1998		Provides for the conservation, long term utilisation of marine living resources and their exploitation.	DEAT	The Minister may declare marine protected areas ("mpa"). No person may, without permission, fish or attempt to fish, take or destroy any fauna and flora, dredge, discharge or deposit waste or any other polluting matter, alter or destroy the natural environment, construct any building within such marine protected area or carry on an activity which may adversely impact on the ecosystems of that area. Municipalities must be aware that these activities are, unless authorised, prohibited in these areas. The Minister, before declaring an area as a fisheries management area and during the preparation of any such plan, must consult with organs of state affected by the plan.
National Heritage Resources Act, 25 of 1999	Destruction of heritage resources.	Management, conservation and protection of heritage resources.	National Department responsible for Arts and Culture / Provincial Authority / Local Authorities	Municipalities may be responsible for Grade 3 heritage resources or areas in the coastal zone or for areas where authority was delegated to them.
National Water Act, 36 of 1998	Water resources, including estuaries.	To manage and conserve the nations water resources.	DWAF / Catchment Management Agencies (CMA).	A municipality as an owner of land, a person in control of land or a person who occupies or uses the land where a situation exists which may cause, is causing or has caused pollution of a water resource, must take reasonable measures to prevent such pollution from occurring, continuing or recurring. ("Water resource" includes, among other things, an estuary, which is defined as "a partially or fully enclosed body of water that is open to the sea".) Where an emergency incident occurs and the municipality is the responsible person (i.e. person responsible for the incident, owns the substance involved in the incident or was in control of the substance involved the incident) its personnel must report the incident to the relevant authorities and take measures to contain and minimise the effects of the incident.
Sea birds and Seals Protection Act, 46 of	The Minister exercises control over seabirds,	Protection and control of the capture and	DEAT	Municipalities must be aware of this prohibition.

Legislation	Activity/theme	Aim of law	Responsible authority	Municipal responsibility
1973	seals and products produced from seabirds and seals. Persons are prohibited from shooting or capturing any seabirds or seals.	killing of seabirds and seals and for the products of such animals.		
Sea-shore Act, 21 of 1935	The State President is regarded as the owner of the sea and the sea-shore. The Minister may let any portion of the sea and sea-shore for certain purposes. The sea is defined as the water and bed from the low-watermark to within the territorial waters, and sea-shore includes the water and land between the low-water mark and the high-water mark. The Minister may delegate any of the powers vested in him under section 3(2) to a local authority. The Minister may, subject to conditions let, sell or donate any portion of the sea and sea-shore to any local authority.	Provides for the granting of rights in respect of the sea-shore and the sea and for the alienation of portions of the sea-shore and the sea.	Minister / local authorities	The Minister must consult with a local authority, where any portion of the sea-shore or sea in which it proposes to enter into any lease or permit certain activities, is situated within the area of jurisdiction of a local authority. Where the power has been properly delegated, a local authority must exercise the powers which are conferred under the Health Act, 1977 on it to the sea and sea-shore. A local authority may be required to make regulations, for the use of the sea, the removal of any material from the sea and sea-shore and the depositing or discharging of material in the sea-shore, where the sea and sea-shore are situated within or adjoining its area of its jurisdiction. Regulations made by the Minister apply to a portion of the sea situated within or adjoining the area of jurisdiction of a local authority and he may confirm powers or duties to administer the regulations on the local authority. The Minister must consult a local authority before declaring any regulation within its area of jurisdiction. A local authority desiring to make regulations must publish it in one newspaper circulating in the area where it will apply. Where the local authority has ownership of a portion of the sea-shore it may, with the Minister's approval, make regulations for that portion of the sea. Regulations made may also apply to the land owned by that local authority abutting such portion of the sea-shore.
Marine Pollution (Control and Civil Liability) Act, 6 of 1981		Protection of the marine environment from pollution and to determine liability for the loss or damage caused by the discharge of oil from ships.	Department of Transport / South African Maritime Safety Authority (SAMSA)	The Minister may ratify the expenses incurred by a local authority for removing oil pollution from the sea discharged from any ship, to the extent to which those expenses could have been incurred by SAMSA.
Eastern Cape Nature	Nature Conservation	Provides for the	Provincial Authority /	Local authorities are charged with

Legislation	Activity/theme	Aim of law	Responsible authority	Municipal responsibility
Conservation Ordinance		conservation and management of protected areas.	Local Authority	establishing local nature reserves and exercising various powers and duties in respect of those local nature reserves, including the issuing or cancellation of permits or authorisations issued.

ANNEXURE 2

Estuary management activities of the eThekwini Municipality

Overview of the components of the eThekwini Municipality and their involvement in Estuary Management (Mather, pers. Comm.)						
	Geographic Information and Policy Office (GIPO)	**Development Planning and Management**	**Water and Sanitation**	**Engineering**	**Parks, Leisure and Culture**	**Other components of the municipality**
General Coastal and Estuary Management Activities						
Coastal and Estuary Policy	Drafts the eThekwini coastal strategy. Drafts the IDP.	Drafts the eThekwini Environmental Policy.				
Coastal & Estuary Co-ordination	Chairs the eThekwini Coastal Working Group.	Member of eThekwini Coastal Working Group.	Member of eThekwini Coastal Working Group.	Member of eThekwini Coastal Working Group.	Member of eThekwini Coastal Working Group.	Member of eThekwini Coastal Working Group.
Coastal and Estuary Planning	Initiating coastal management plans. Initiating estuary management plan.	Drafts various levels of plans that cover the coast and estuaries. Draft the eThekwini Environmental Services Management Plan.				
Monitoring		Undertakes eThekwini State of Environment Report.	Monitors water pollution and water quality.	Monitors coastal processes.		Health component monitors coastal water quality.
Maintenance					Maintains municipal public open space including some coastal and estuary areas.	
Human Activities that Impact on Estuaries **Municipal action to control activities is shown in green Municipal activities that impact on estuaries are show in orange**						
Abstraction of water from catchment / estuary			Supports DWAF in controlling abstraction of water.			
Effluent/pollution disposal in the catchment or estuary			Supports DWAF in permitting polluting activities and prosecution in terms of by-laws. Disposal of sewerage effluent into certain rivers and estuaries (and some marine outfalls).	Control and management of the storm water system through which illegal effluent disposal takes place.		Health component acts on human health hazards and gives health warnings.
Activities that change the sediment load		In extreme cases of negative soil erosion building inspectorate would act in terms of by-laws.				
Dredging				Dredging of Durban Bay.		

Overview of the components of the eThekwini Municipality and their involvement in Estuary Management (Mather, pers. Comm.)						
	Geographic Information and Policy Office (GIPO)	**Development Planning and Management**	**Water and Sanitation**	**Engineering**	**Parks, Leisure and Culture**	**Other components of the municipality**
Harvesting of living resources		Monitoring and reporting to DWAF and EKZN Wildlife.			Monitoring and reporting to DWAF and EKZN Wildlife.	
Estuary mouth manipulation	Monitoring and reporting to EKZN Wildlife. Setting policy for municipal action.			Opening mouth of Manzimtoti and Mgeni to manage water levels. Installation of a pipe at Sipingo to increase tidal exchange.		
Non-consumptive recreational use					Management of recreation use of beaches and associated recreational areas in terms of Sea-Shore Act regulations for Durban. Management of Boat Launching.	
Development of structures that encroach on the water body		Permitting and control of encroaching structures through municipal plans and zoning schemes.	Construction of water and sanitation infrastructure.	Construction of engineering infrastructure.		Construction of transport infrastructure.
Peripheral Development		Permitting and control of peripheral development through municipal plans and zoning schemes.	Construction of water and sanitation infrastructure.	Construction of engineering infrastructure.		Construction of transport infrastructure and other infrastructure.

ANNEXURE 3

Outcome of workshops with three coastal municipalities

Background

The second phase of the Eastern Cape Estuaries Management Programme aims at describing ways to integrate estuary management into IDP processes. Two municipalities in the Eastern Cape (Port St Johns and Buffalo City) and one in KwaZulu-Natal (eThekwini) were chosen as case studies. Since it is essential that the project delivers appropriate products, a project process was designed where the broader project team engages in a session with management of each municipality to achieve the following:

- an understanding of their IDP processes;
- issues they face related to the management of estuaries;
- information on how each municipality deals with estuary related issues in the context of the IDP;
- information and knowledge requirements, and how to package this information and knowledge.

Based on the outcome of workshops, the existing guidelines and tools would be adapted and new ones developed if necessary. These guidelines and tools would aim to form the basis of interactive learning sessions with the municipal staff of each municipality to be conducted in October 2005. These sessions would guide the research into the best ways to include estuary issues into the IDP.

Workshops were held with eThekwini Municipality on 2 August in Durban and with Buffalo City Municipality on 3 August in East London. A meeting later on 23 September was held with Port St Johns Municipality This section reports on the outcome of these meetings.

Outcome of workshop with eThekweni Municipality

Issues

Issues highlighted in the workshop are listed as follows:

- On the ground implementation of policy/plans is difficult – keen on development;
- The new land use management system;
- Will there be legal challenges?
- Existing development rights;
- 100-year flood line – no legal backing;
- Restrictions in the primary coastal zone are needed;
- Tightening of procedures to address ongoing tension about development limits;
- Need to be able to apply policies and plans on site;
- A policy or plan must be able to be expressed in land use management schemes;

- Tribal Authority Areas - informal areas;
- There is no land use scheme;
- Have no authority – tenure;
- Impacts in upper catchments – especially informal activities;
- Legality of extending land use controls into Tribal Authority Areas;
- IDP is not clearly scheduling priorities;
- Sustainable development is not clearly defined;
- What is an acceptable change in an estuary?
- All eThekwini water comes from the Umgeni River and is dispersed into other systems through waste water disposal;
- Rivers and estuaries are going to be used for waste water disposal;
- Need to prioritise estuaries for protection versus "work horse" estuaries;
- A methodology is required to prioritise estuaries;
- DWAF and DEAT have a major say in estuary management;
- There are issues of co-ordination with other estuary management role players such as DWAF, DEAT, EKZN Wildlife, DLA;
- The city has not decided the use for each estuary;
- Rapid Reserve Assessment does not help at low level planning. Environmental Dept does not have the tools to protect assets;
- Reserve Determination stops at the ecological level and does not address social and economic issues;
- Do we need to look at mitigatory measures for historical inappropriate developments? eThekwini has in the past bought some properties;
- Climate change – what impact will this have on estuaries?
- Should be some level of delegation of responsibilities to well capacitated municipalities;
- Information management;
- Much data available but it is fragmented;
- How do we make research useful to end users?
- Need a decent river monitoring system – problems are responsibilities, funds, etc.

Potential solutions

1. Get funded mandate from national authorities to do Reserve Determination.
    a. There is a precedent for eThekwini Water and Sanitation Department getting a mandate from DWAF with money.
    b. DWAF has funding but is not spending.
    c. It takes a long time to get these mandates – the national departments are not keen.
2. Meet national DWAF to strengthen co-ordination with national departments.
3. Tribal Authority Areas:

a. Awareness / education.
b. Look at economic sustainability issues to encourage people.
c. Look at lessons from Eastern Cape Estuaries Management Programme.

4. Lessons learnt from other municipalities would be very helpful.
5. There is cohesion between departments but need to have better information to support activities:
   a. Need to define roles of systems.
   b. Need to rapidly get detailed Estuary Management Plan.
6. Issues of prioritisation of estuaries:
   a. This has been done from an ecological perspective.
   b. It should be simple to do a ranking exercise for eThekwini estuaries.
   c. Research programme could provide a system for prioritising estuaries.
7. Defendable lines on maps.
8. How can you take away existing rights especially in light of huge financial vested interest?

Outcome of workshop with Buffalo City Municipality

Discussion notes

- The Coastal Zone Management Plan (CZMP) is a plan of the IDP and includes a specific section for estuaries.
- Management guidelines for specific estuaries are included in the CZMP – there is information on who should implement and the capacity available to implement. The leadership role comes from within BCM.
- The CZMP identifies the need to create Estuary Management Forums for some of the key estuaries and BCM will need to drive this initiative.
- Capacity presents a challenge – there is a need to be creative in addressing this challenge because the municipality is unlikely to increase its capacity. The strategic relationships between the clusters and other spheres of government are therefore significant.
- There is a memorandum of understanding planned between DEAET and BCM that includes some transfer of funding to BCM.
- There is also potential to secure funding from provincial sources e.g. at the Nahoon Nature Reserve, DEAET is funding the removal of alien vegetation.
- The process of developing the CZMP has involved extensive consultation with various stakeholders and levels of government.
- A final draft of the CZMP will be produced at the end of August 2005 and will be available for public comment.
- The CZMP will be finalised in September 2005.
- Getting participation from some of the national and provincial departments has been difficult.
- Problems with understanding legal responsibilities e.g. jetties are managed by province and they get a levy each year, but there are extensive problems with

illegal jetties that province is not addressing. BCM would like to be delegated the authority as they receive no support from province.

- The Sea-Shore Act delegates some powers to Amathole District Municipality (ADM) and BCM needs to work ADM.
- Between Nahoon Point and Gonubie Point there is a closed marine area. Fishing from a boat is not permitted in the Nahoon Estuary because the estuary forms part of the marine area in terms of the Sea-Shore Act.
- National legislation is in flux – in particular the National Coastal Zone Management Bill.
- BCM does not have authority below the high-water mark as the Marine Living Resources Act allocates this responsibility to national DEAT (Marine and Coastal Management (MCM)).
- Public awareness of the CZMP process has been a challenge – getting public visibility could have been better.
- The management guidelines given in the CZMP have not involved broad public consultation.
- Coastal by-laws are in the process of being revised, draft is currently available and some of the changes are starting to be enforced. On the smaller estuaries dead slow speed restrictions are planned. There are ecological and safety concerns relating to boat speed.
- DWAF has put in place documentation regarding boating on estuaries, as have Department of Transport and SAMSA and this creates problems. This shows that other authorities believe they have a role to play in estuary management.
- The CZMP currently does not link to the BCM budget – problem of competing priorities. BCM has funded posts for Nahoon Nature Reserve through a Council resolution.
- There is a 5.5% cap on budget increases.
- BCM is striving to get the IDP and the Budget aligned.
- The CZMP made some specific project recommendations to the IDP unit.
- The IDP is reviewed every year and at the next review, some of the CZMP issues will be included.
- The challenge is having persons to lobby for environmental projects within the Council and within the IDP process. The councillors are fairly committed to environmental management.
- At the creation of BCM, the municipality received various non-funded mandates such as the coastal villages.
- There are examples of MCM supporting investment in estuaries where investment has been made by local stakeholders
- Engaging specific people who live at an estuary has been a challenge, buy-in from the local stakeholders is beneficial and a useful to assist management.
- Projects need to be reflected in the IDP even if there is no funding from Council as funders will not look at projects that are not reflected in the IDP. Important projects are health, tourism, jobs, poverty alleviation and legal compliance.
- Divergence between politicians and officials is a real issue. There are problems in terms of communication and political agendas.

- Politicians should be aware of estuaries and associated legislation and policy – targeted education and awareness is required. Also need politicians to be aware of the new national acts and their implications for local government. SALGA is organising specific and appropriate training; ongoing training is required.
- Budgeting for upgrading of sewerage works is not seen as a priority for politicians.
- There are 45 wards in BCM, but only five along the coastline. As a result only a few politicians have an interest in the coast.
- The municipal planning section should be involved in the process of estuary management.
- Town planning has been included in the CZMP process and has indicated a coastal buffer zone, nodes, drawn coastal maps and cadastral lines with details of land use. Problem is that urban edge is on the other side of the Gonubie Estuary and this is inappropriate. Guidelines on appropriate development inside the urban edge along estuaries are included in the plan. Land use outside the urban edge is challenging.
- All the green areas around the Nahoon estuary we have been fenced and it will be difficult to develop in these areas. The land surrounding the Gonubie Estuary is a problem because it is all privately owned.
- There is specific input from the CZMP to the SDF.
- A challenge is that different consultants have different ideas about ecological sensitivities.
- Generally BCM's coast and estuaries are intact without many dense developments on estuaries.
- Some prioritisation of estuaries has taken place.
- In the Buffalo River estuary, there are serious problems with the way the port is operated. No policy for ballast water. Also removal of paint from ship hulls in the dry dock is not controlled and the paint scrapings are dumped in the estuary. Because it is a port, the Buffalo is not under the jurisdiction of BCM but the National ports Authority (NPA). BCM has attempted many times to interact with the NPA. This authority is reviewing EMPs for its large ports. There is also an opportunity to encourage major clients to put pressure on the port. Spoornet also has a big impact.
- There is uncertainty about how to manage the growth of mangroves introduced into two estuaries. This is a debatable issue. Mangroves contribute to the optimization of biodiversity but can impact the salt marsh habitat. Limits may need to be introduced to prevent the spread of the stands. Removal of the trees could cause ecological damage in that large areas of mudbank would be disturbed. In addition the mangroves could be a threat to recreational use. They are a good educationally opportunity for the Nahoon Nature Reserve.
- BCM has structured the estuary management process around an EMS and IS01400 framework to give specific procedures – also drew on the National Policy for Sustainable Coastal Development.
- BCM has a good relationship with DWAF. There has been much interaction regarding the proposed marine outfall.
- What would help to sell estuaries better?
  - Better understanding of the value of estuaries

- Environmental Cluster was allocated 30% of the BCM budget although this includes sanitation and waste management. Some of the Coastal Office's responsibility falls within the Community Services cluster e.g. recreation
- Estuaries are economic drivers – the Local Economic Development Department therefore has an interest in estuary management

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Outcome of workshop with Port St Johns Municipality

Key issues

Following questions predominantly to clarify the structure and functioning of estuaries, the Port St Johns Municipality identified the key estuary management issues as:

- There is a need for capacity building among local residents and within the municipality (officials and councillors) on the value of estuaries, their functioning and their management.
- There are limited financial resources to address all issues (projects within the IDP were identified and prioritised and the top priorities focused on addressing and financing basic service delivery).
- There is no Environmental Management Plan to contextualise estuary planning and management. This needed to commence soon as a requirement of local government. In addition lobbying would begin by the LED Manager for the municipality to appoint an environmental management officer.
- Siltation of the Mzimvubu Estuary, a key economic asset for the town of Port St Johns, is a problem.
- A broad institutional base is absent from which to lobby various government sectors (particularly the Department of Agriculture) on land use management in the Mzimvubu and other catchments.

Way forward

The following actions were agreed to:

- The municipal LED manager would recommend to the municipality that an estuary management capacity building workshop be conducted involving both councillors, officials and other key stakeholders. The municipality would host the workshop and the project team would assist in identifying participants, establishing a programme, facilitation and other logistical arrangements.
- The project team would supply a recommendation to the municipality on the process and provisional framework for an Environmental Management Plan for the municipality.

Conclusion

The three municipalities that hosted the workshops are fine examples of municipalities that cover almost the full range of management capacity. eThekweni is one of the most well capacitated municipalities in the country and Port St Johns one of the least. BCM falls at a point probably midway in the spectrum between these extremes. Inevitably each municipality has its own particular environmental and

management issues. With problems an inescapable fact, the importance of sound management is paramount. It is this process that needs to be supported as a matter of urgency. Municipalities need to be informed about the value of environmental assets and understand the mechanisms to protect their integrity. The national environmental department needs to examine the capacity of local municipalities to manage the environment under their jurisdiction and put into place a permanent body that can support local management processes.

Maximising the socio-economic benefits of estuaries through integrated planning and management:

a rationale and protocol for incorporating and enhancing estuary values in planning and management

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2006

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EXECUTIVE SUMMARY

Introduction

This study forms part of the second phase of the Eastern Cape Estuaries Management Research Programme funded by the Water Research Commission. The first phase of the programme aimed to develop a deeper understanding of the issues that confront estuary managers and to develop additional estuary management processes and tools to enhance estuary management decision-making. While concentrating in the Eastern Cape, it was recognised that many of the issues involved are relevant to or need to be seen in the context of all South African estuaries. The second phase of the programme will promote the importance of considering estuaries in development planning and will support effective management of estuaries.

Estuaries are acknowledged to be one of the most productive and valuable habitats on early, yet they are highly threatened due to demand for coastal development and freshwater supplies. Due to the fact that development to the coastal zone has lagged behind inland areas, South Africans are in the unique position of being able to plan timeously for coastal conservation and development. Several types of planning affect estuaries, falling into three main categories: conservation planning, water resource planning and development planning. All of these are interdependent. Land use planning is a spatial expression of conservation and development planning. Management gives effect to these plans at the estuary level.

The research objective of this study was to inform the development of protocols for incorporating the value of estuaries and estuary based enterprise development into strategic adaptive management of estuaries, land-use planning, integrated development planning (IDP) and other related processes. Specific aims of the study are:

- To elucidate what is known about the economic value of estuaries and measurement thereof
- To examine the potential economic role of estuaries in integrated development planning
- To examine how the values of estuaries need to be taken into account in water allocation
- To examine how economic values of estuaries need to be taken into account in local-scale land-use planning
- To examine how estuary valuation can enhance the strategic adaptive management of estuaries
- To explore best practice in enhancing the value of estuaries through enterprise development

The status and conservation of Eastern Cape estuaries

Estuaries are dynamic system which support a rather uniquely adapted biodiversity, which varies between estuaries with biogeographical zonation, estuary type and size, and within estuaries based on changes in salinity and other characteristics. Each estuary is fairly unique in terms of its physiochemical characteristics. This, together with our imperfect understanding of estuarine biodiversity, presents a challenge for conservation planning and management. Nevertheless, as long as our understanding of biodiversity is imperfect it makes sense to concentrate efforts on the maintenance of the physical and chemical health of estuarine systems as well as their more conspicuous taxa.

The main problems affecting estuaries in the Eastern Cape, as well as the rest of South Africa, are:

- Habitat alteration or loss, e.g. due to reclamation for development, marinas or harbour construction
- Change in mouth dynamics due to changing freshwater inputs or artificial breaching
- Overexploitation of resources, especially linefish stocks.
- Sedimentation and siltation, due to catchment erosion and lack of flushing of silt and/or marine sediments.
- Loss of system variability, due to management for constant conditions (e.g. in estuaries with marinas)

- Recreational disturbance, due to intense human activity
- Changes in salinity due to changes in freshwater inflow or mouth dynamics
- Increased turbidity due to siltation.
- Changed nutrient status due to increased input of nutrients or increased water retention time within estuaries.
- Pollution, e.g. due to stormwater or sewage inputs

The above threats to estuaries are linked to a number of underlying causes including accessibility, lack of enforcement, inappropriate regulation systems and planning, and can ultimately be traced to market failures and policy distortions, poverty and wealth, consumer attitudes and preferences and human population growth.

Current policy and legislation does not provide adequate protection to estuaries. They are controlled by a plethora of acts none of which pertain to estuaries in particular. Their management falls mainly under two government departments: Department of Water Affairs and Forestry and the Department of Environmental Affairs and Tourism, with management being devolved to the provincial level. Water quality and quantity are controlled in both freshwater and marine environments. Living resources within estuaries (even in ordinary protected areas) are subject to the Marine Living Resources Act. Marine Protected Areas will provide additional protection up to the high tide mark. Planning has been relatively ad hoc in the past, but will in future be guided by Integrated Development Plans at local to provincial scale. Development is controlled at the site level by Environmental Impact Assessment. In general the level of enforcement of legislation affecting estuaries is weak and EIA is effectively toothless in the face of inappropriate planning.

Guidelines for a conservation strategy have already been developed, with the following goals in mind:

1. Maintain/restore the ecological **integrity** of estuaries, by ensuring that the ecological interactions among estuaries and those between estuaries, their catchments and other ecosystems are maintained.
2. Maintain/restore the **health** of estuaries in/to a good to excellent condition, assuring that a representative set of estuaries is maintained in as close to their pristine state as possible. This includes (for all estuaries):
    a) maintenance of the natural magnitude, variability and frequency of **natural physical processes** within estuaries,
    b) maintenance of the natural characteristics and variability of estuarine **populations and communities** in terms of size, structure and functioning, through sustainable utilisation, and
    c) maintenance of the natural **taxonomic diversity** of all estuaries, without loss of indigenous taxa from any estuary other than by natural processes, and without the introduction of alien species.

The strategy includes (i) research and knowledge management, (ii) regulation and enforcement, (iii) creation of conditions and incentives that support conservation, (iv) monitoring and adaptive management and (v) rehabilitation. Elements of the strategy will be informed by conservation, development and water resource planning.

The economic value of South African estuaries

Estuaries, like other ecosystems, offer a range of **goods, services and attributes** that generate value and contribute to human welfare. The concept of ecosystem goods and services, popularised in the ecological-economics literature, stems from the perception of ecosystems as natural capital which contributes to economic production. Goods are harvested resources, services are processes that contribute to economic production or save costs, and attributes relate to the structure and organisation of biodiversity.

Environmental and resource economics typically uses a typology of values described in the Total Economic Value concept. The Total Economic Value of an ecosystem comprises Direct Use, Indirect, Option and Non-Use values.

Direct use values may be generated through the consumptive or non-consumptive use of resources. In the case of South African estuaries, most, if not all, of this use is recreational, and includes both consumptive (fishing and bait collecting) and non-consumptive (e.g. boating, birdwatching) activities.

Indirect use values are values generated by outputs from estuaries that form inputs into production by other sectors of the economy, or that contribute to net economic outputs elsewhere in the economy by saving on costs. These outputs are derived from ecosystem functioning such as water purification and nursery functions.

Non-use values include the value of having the option to use the resources (e.g. genetic) of estuaries in the future, and the value of knowing that their biodiversity is protected. Although far less tangible than the above values, non-use values are reflected in society's willingness to pay to conserve these resources, sometimes expressed in the form of donations.

A suite of methods is available to measure environmental values, each of which is suitable for different components of value and under different contexts or circumstances. These have been applied to various estuaries over the past 25 years, with research on the value of South African estuaries still only in its infancy. For example, the subsistence value of mangrove harvesting in Mngazana estuary is estimated to be worth some R3.4 million (net present value). Subsistence fishing in Knysna estuary is worth some R0.7 – R1.1 million per annum. The economics value of South African estuaries in terms of their contribution to estuarine and marine fisheries has been estimated to be just under R1 billion per annum. Several estuaries make a substantial contribution to the real estate sector due to the property price premiums associated with proximity to estuaries, in Knysna this is estimated to be in the order of R1.4 – R2 billion. People also spend a substantial amount in visiting estuaries, contributing to the local and national economy. In Knysna, the estuary itself is estimated to account for about R1 billion per year in tourism expenditure. South Africans in general express a substantial non-use value for estuarine biodiversity, with an estimated total annual willingness to pay of R93 million per annum.

Conservation planning

The protection of estuarine biodiversity is already provided for to some extent by the commitments that South Africa has made to the international community, such as the UN Convention on Biodiversity, Agenda 21, the Ramsar Convention, the Nairobi Convention, the Abidjan Convention, the World Heritage Convention, the World Conservation Union Policy framework and the UN Framework Convention on Climate Change. Backed by these, conservation planning sets the bottom-line in terms of defining minimum sets of areas to be protected. There is provision in legislation to mandate these plans though the formalisation of protected areas of various categories.

Conservation planning has become increasingly systematic, and now typically involves setting targets for conservation, gap analysis which assess the extent to which targets are already being met, and the selection of new sites. The latter step involves varying levels of sophistication, and increasingly considers not only representation but also maintenance of ecological and evolutionary processes. In addition, it is becoming increasingly recognised that conservation planning cannot take place in isolation of an understanding of socio-economic pressures and values.

There has been a flurry of conservation planning in the Eastern Cape recently, including the Subtropical Thicket Ecosystem Planning (STEP) project and the Wild Coast Conservation and Sustainable Development Project. In addition, there have also been several national level initiatives specifically on estuaries which inform conservation planning for estuaries in this province.

Ultimately, conservation planning pertaining to estuaries will need to consider the trade-offs between conservation and development In general there is essentially a trade-off between direct use values (involving residential developments, fishing, etc.) and other types of value, such as the export of fish to the marine environment, and option and existence value of biodiversity. The challenge lies in identifying the optimal spread of conservation and development among and within estuaries that maximises the sum of these values to society.

Water resource planning

Water resource planning is governed by the National Water ct of 1998, and involves resource directed measures (defining a reserve for each estuary, river, etc.), source directed controls (to control impacts on water resources), demand management and monitoring. The country is divided into 19 Water Management Areas, and the reserve will be determined following the classification of each water resource in to a class which denotes the future desired state of health of that resource. The system for doing this is under development.

Classification, which will secure a certain amount of water for each estuary, will involve consideration of the trade-offs inherent in water allocation. The higher the level of protection of an estuary (i.e. the greater proportion of natural flow that is reserved for the ecosystem), the less water can be allocated to water using activities. The trade-off is between the economic value generated by those activities and the economic value and people's wellbeing generated by estuaries in different states of health. Catchment management can affect these trade-offs, for example by providing incentives for more efficient use of water. The optimum freshwater flow into estuaries may be defined as the flow at which the marginal benefit of water use is equal to the marginal cost due to reduction in estuarine quality.

Development planning

Development planning has been rather ad hoc in the past, but has now been formalised under the Municipal Systems Act, which requires that all municipalities (i.e. Metros, District Municipalities and Local Municipalities) have to undertake an **integrated development planning** process to produce integrated development plans (IDPs). As the IDP is a legislative requirement it has a legal status and supercedes all other plans that guide development at local government level. The IDP process is one of the key tools for local governments to cope with their developmental roles and responsibilities. It is the principal strategic planning instrument which guides and informs all planning, budgeting, management and decision-making in a municipality for a five year period. IDPs are also supposed to guide the activities of other spheres of government, corporate service providers, NGOs and the private sector within the municipal area.

Integrated development planning is a very interactive and **participatory process** which requires involvement of a number of stakeholders. Because of its participatory nature it takes a municipality approximately 6 – 9 months to complete an IDP which is closely related to the municipal budgeting cycle. The IDP is reviewed annually which results in the amendment of the plan should it be deemed necessary.

Integrated Development Planning is about the municipality identifying its **priority issues/problems**, which determine its **vision, objectives and strategies** followed by the identification of **projects** to address the issues. A very critical phase of the IDP is to link planning to the **municipal budget** (i.e. allocation of internal or external funding to the identified projects) as this will ensure that implementation of projects and hence development is directed by the IDP.

Every municipality is required to produce an *indicative plan*, called a '**spatial development framework (SDF)**', showing desired patterns of land use, directions of growth, urban edges, special development areas and conservation-worthy areas. It must also produce a *scheme*, called a '**land use**

management system (LUMS)' recording the land use and development rights and restrictions applicable to each erf in the municipality. The plan should be flexible enough to accommodate changing priorities, and the scheme has to conform to the plan. The plan (SDF) is a *guide* to development, and the scheme (LUMS) is *binding*.

Environmental issues are cross-cutting, which means that they have to be addressed in IDP. It is important to note that estuaries are particularly cross-cutting, given their linkages with entire catchment areas and the inshore marine environment. Municipalities must incorporate a **strategic environmental assessment** into their spatial development frameworks, forming part of their IDPs, and that they now also take the responsibility for EIAs, in theory to help resolve environmental and planning conflicts (DLA 2001). IDPs are thus explicitly required to consider environmental issues and indicate how negative impacts will be resolved and/or avoided.

Recognition of the value of estuaries and their appropriate management could have significant implications for some district and local municipalities and their development planning. The main opening for this in the IDP process is in the State of Environment Reporting during the Analysis phase. It is during this process that issues relating to estuarine values would be identified and included in the issues prioritization. The State of Environment reporting should include a resource economics component which highlights environmental values, including those of estuaries. It should also elucidate the nature of the trade-offs involved in the development issues that affect estuarine health. Ultimately, it will be necessary to sensitise IDP planners (ranging from local to national government actors) to estuary values.

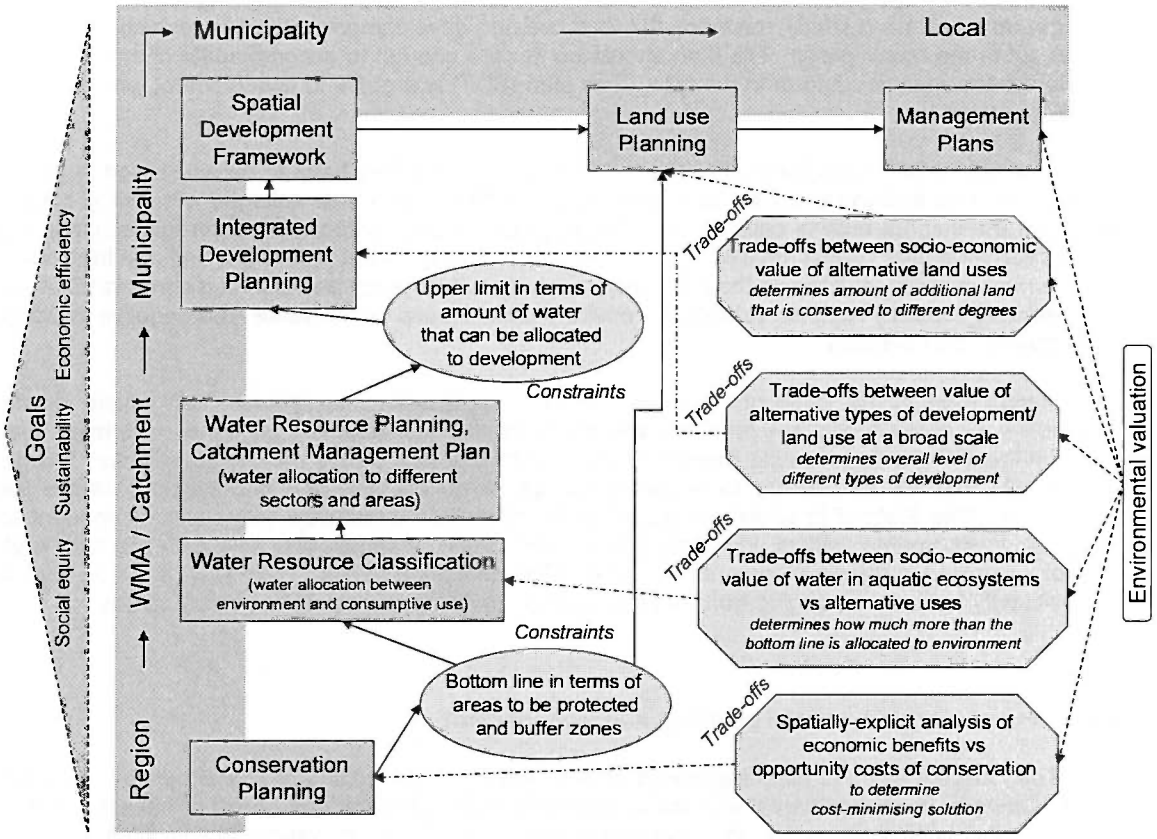
Integrating estuary values into planning and management

The different types of planning are all on a trajectory of being increasingly integrated in the sense of considering both environmental and socio-economic goals, although IDP does not have a provision to specifically link with conservation planning and is only poorly linked to water resource planning, despite the fact that water is a prerequisite for both development and conservation. Development and water resource planning embodies the goals of economic efficiency, ecological sustainability and social equity, whereas conservation planning does not necessarily seek to achieve economic efficiency.

The schematic below proposes how the different types of planning should ideally fit together, and how environmental valuation (e.g. pertaining to estuaries) informs the process. This requires defining a hierarchy of constraints, with conservation planning providing the bottom line in terms of the constraints on other types of planning. Water allocation will provide one the main constraints for development planning. Management plans are then guided by the goals set by conservation and development planning processes. Decision-making within management structures is enabled by the process of strategic adaptive management but is nevertheless constrained by the aforementioned goals and plans, and takes place at a highly localised scale.

All decisions involve making trade-offs. This is particularly pertinent to biodiversity conservation where the lack of understanding of ecosystem or biodiversity values can lead to distorted decision-making. In general, while there are certain checks to meet minimum biodiversity conservation requirements, any conservation beyond that is optional and will only occur if it is deemed economically worthwhile. Ideally, we need to determine the optimum level of conservation for society, rather than the minimum level that is set out in most conservation planning exercises. This involves analysing the trade-offs between the benefits of additional conservation and the opportunity costs in terms of the most valuable alternative form of development. At the very local scale, trade-offs are also made in management decisions such as where to locate conservation zones in an estuary. Valuation is necessary to inform these trade-offs as well as to design effective incentive measures and financing mechanisms to achieve conservation goals.

The sorts of planning and management decisions that are likely to maximise the economic value of estuaries include the following:



1. At least 20% of the estuarine area within each biogeographical should remain conserved in a largely natural state, providing opportunities for maintaining the valuable services that they provide such as nursery area function, as well as providing opportunities for wilderness experience, spiritual enrichment and research.
2. Where estuaries are developed, property values would be enhanced if one side of the estuary remains undeveloped, preferably as a nature reserve. This is a highly successful model that exists in many South African estuaries, and can successfully combine development and conservation needs.
3. Since the recreational value of estuaries is derived from multiple consumptive and non-consumptive uses which are often incompatible, their value can be maximised by zonation, which prevents one type of user's utility from impacting on another's. It also provides the opportunity to achieve some conservation goals while not prohibiting consumptive use altogether. Zonation is also a far easier way of limiting consumptive use than bag or effort limits.

Enhancing the value of estuaries through biodiversity-based enterprise development

The provision of livelihood support is commonly asserted to be one of the most pertinent ways of providing incentives to communities to protect natural resources in Africa. Out of this has grown the development of Community-Based Natural Resource Enterprises (CBNREs) which strive to reach a

symbiosis between nature conservation, sustainable development and nature tourism. These enterprises can benefit the local community members, private sector operators, NGOS, government and civil society.

CBNREs vary considerably, with the size of the enterprise being determined by many factors. These include the size of the resource, its sensitivity to impacts and conservation significance, the size of the market, level of infrastructural development, the skills of the community, availability of investment funds or investment partners, and the level of connectedness with national and international marketing agents, the size of beneficiaries, property rights arrangements and community cohesion. Most of these are poorly developed at Eastern Cape estuaries where this kind of arrangement would be desirable.

A combination of factors such as institutional design, legitimacy, livelihood support, and subsidy have implications for the CBNRE in relation to economic, ecological, political and social sustainability. The success or failure of the CBNRE feeds back into the international and state level social-political systems directing change in policies, procedures and practices for conservation and development support.

There are three main types of business model. **Community owned and operated** enterprises are characterised by lack of institutional capacity, clarity on roles, responsibilities and accountability, and often a lack of secure property rights over the resource. **Community-private sector partnerships** combine the sound business acumen and access to capital that private sector operators posses with the community's resources to optimise the balance between wise use of natural resources and economic development for the rural poor. **Community – public sector partnerships** operate in a similar way.

There is overwhelming agreement among authors on nature-based enterprises that establishment of CBNREs contributes to the reduction of poverty in rural communal areas, although there is little evidence that they contribute to conservation goals. The economic and ecological sustainability of these projects is highly variable. Therefore, a need still remains to find enterprise models that will demonstrate success on all four dimensions of sustainability described in this document.

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1. INTRODUCTION

Jane Turpie

1.1. Background

This study forms part of the second phase of the Eastern Cape Estuaries Management Research Programme funded by the Water Research Commission. The first phase of the programme aimed to develop a deeper understanding of the issues that confront estuary managers and to develop additional estuary management processes and tools to enhance estuary management decision-making. While concentrating in the Eastern Cape, it was recognised that many of the issues involved are relevant to or need to be seen in the context of all South African estuaries. The second phase of the programme will promote the importance of considering estuaries in development planning and will support effective management of estuaries.

There are some 278 functional estuaries in South Africa (Whitfield 2000, Turpie 2004a), of which about half are found in the Eastern Cape, accounting for about 10% of the national estuarine area. Many of these estuaries are important centres of recreation, and many are also important for commercial or subsistence use. As a result, a significant proportion of estuaries are heavily utilised. In addition, these estuaries provide nursery areas and refugia for species which are utilised in other habitats. The biodiversity base that provides these services is fragile, however, and dependent on maintenance and protection of the complexity of interactions that support it. This includes the protection of catchment areas that influence estuarine functioning and health, and which are also subject to tremendous pressures in some areas. The management and protection of the Eastern Cape's estuaries is particularly challenging given the diverse nature of these systems, the types of activities which threaten their integrity and the variability in their sensitivity to such threats.

Estuaries are acknowledged to be one of the most productive and valuable habitats on earth, yet they are also becoming among the world's most threatened habitats, subject to the increasing demands for coastal development and for the freshwater supplies that they depend on for functioning. South Africa is no exception, but is in the fortunate position that our estuaries have been spared to some extent by the fact that most growth in the country has historically been inland (Turpie 2004a). As a result, our estuaries are in reasonably good condition (Whitfield 2000). It is only in recent years that the threats to estuaries in this country have become a serious consideration (Turpie 2004a). Development pressures have shifted to the coast, and exponential population growth has begun to impact seriously on water supplies. But we have not woken up too late. We have the rather unique opportunity to engage in strategic planning that can include the conservation of biodiversity and accommodate South Africa's development needs. This report investigates why and how such strategic planning can come about, and concentrates on the importance of integrating development and conservation planning and incorporating economic considerations into estuary management.

Several types of planning affect the future of estuaries, determining the way in which they will be managed, and ultimately the type and amount of goods and services that they deliver to society. At first glance there appears to be a plethora of planning initiatives, which makes it very difficult to understand where the most appropriate points of intervention should be in order to mainstream estuaries in planning. Indeed, while co-ordination and alignment in planning has improved vastly in some areas, such as in the municipal IDP process (see later chapter), where some aspects of co-ordination are legislated, co-ordination among other areas of overlap are not yet very well defined.

Planning defines the conservation and development objectives and goals of defined areas. Different types of planning can be simplified into the following categories, all of which are completely interdependent:

- **Conservation planning**: the identification of important areas for biodiversity and the spatial delineation of protected area networks and their buffer areas,

- **Water resource planning**: the classification of water resources (rivers, wetlands, estuaries and groundwater) in terms of their future health status and allocation of water

- **Development planning**: the identification of development goals and directions for a defined period and in a defined area

Land use planning is a primarily a spatial expression of conservation and development planning, though both of these are also related to water resource planning (Figure 1.1). Finally, management gives effect to these plans at the estuary level.

Land use planning in South Africa is becoming more strategic and forward thinking with its increasing inclusion in new legislation such as NEMA and the Land Use Management Act, and is now an integral part of the development planning process. All municipalities are required to draw up Spatial Development Frameworks (SDFs) which are allied to their Integrated Development Plans (IDPs). These SDFs will provide indicative plans that show the desired patterns of land use, directions of growth, urban edges, special development areas and conservation worthy areas. In drawing up these plans, municipalities will be obliged to consider sustainability issues and safeguarding the environment in terms of the Constitution and NEMA. Thus instead of following the somewhat ad hoc process of the past, it is envisaged that land-use planning will ultimately encompass all areas of the country. Moreover, planning at the municipal level will be integrated with spatial and development planning conducted at broader scales, as they will be obliged to align these plans with national and provincial strategies on socio-economic development, sustainable development and bioregional planning[1]. In addition, it may soon become a legal requirement for local level planning to take regional conservation planning initiatives into account.

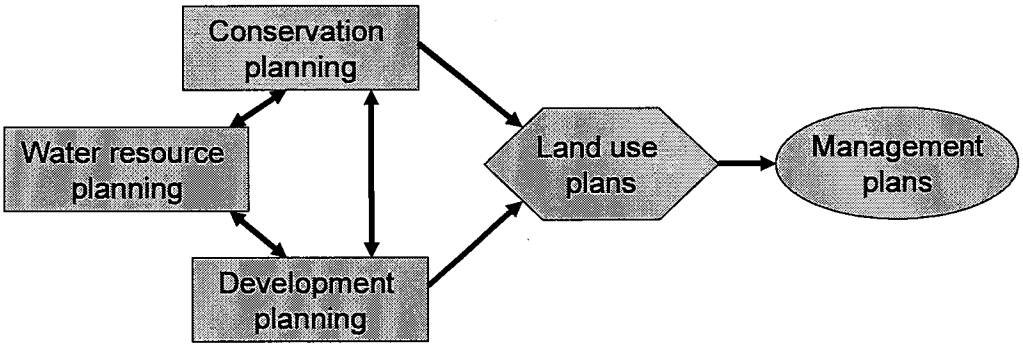

Figure 1.1. Links between different types of planning that affect estuaries

At a broader spatial level, development planning will have to take into account the effect on overall water demands in relation to supplies across the country. Decisions about water allocation will ultimately take the economic costs to aquatic ecosystems, including estuaries, into account. Local level

[1] According to the Biodiversity Bill, a **bioregion** is a specified "geographic area of any scale that contains whole or several nested ecosystems and which can be characterised by its landforms, vegetation cover, human culture and history".

development initiatives will thus eventually need to take these broader scale constraints into consideration.

Apart from catchment-level considerations, land-use planning also has important implications for land use within and adjacent to estuaries. Planning affects the extent to which estuaries can be developed. There is huge demand for the construction of marinas and housing developments which alter hydrological patterns and require the hardening of the estuary edge. The level of development around estuaries also affects the numbers and types of users that impact directly on estuarine biodiversity. Of paramount importance is the overall level of access to estuaries. For example, increased road access to estuaries along the Pondoland coast will facilitate the development of mining operations and tourism developments that will greatly alter these estuaries.

In many cases it will be shown that such developments enhance an estuary's value and provide significant opportunities for economic growth, simply because the demand for these types of facilities and opportunities is so high. However, there is also a significant demand for the ecosystem goods, services and attributes that are compromised by these types of developments. The trouble is that the value of the latter is far more difficult to demonstrate, and is in some cases downright intangible. Resource economics provides a suite of methods which allows these values to be expressed in a common currency, making them comparable with development alternatives. Ultimately, it should be possible to establish a balance in terms of the estuaries that should be developed to different degrees, in such a way that maximizes the overall value of these systems.

1.2. Aims of the study

The research objective of this study was to inform the development of protocols for incorporating the value of estuaries and estuary based enterprise development into strategic adaptive management of estuaries, land-use planning, integrated development planning (IDP) and other related processes. Specific aims of the study are:

- To elucidate what is known about the economic value of estuaries and measurement thereof
- To examine the potential economic role of estuaries in integrated development planning
- To examine how the values of estuaries need to be taken into account in water allocation
- To examine how economic values of estuaries need to be taken into account in local-scale land-use planning
- To examine how estuary valuation can enhance the strategic adaptive management of estuaries
- To explore best practice in enhancing the value of estuaries through enterprise development

1.3. Structure of the report

The report begins by recapping some of the findings of the first phase of the Eastern Cape Estuaries Management Programme with regard to the current health and conservation status of the estuaries of the Eastern Cape. This chapter highlights the threats to these estuaries and the necessity of embarking on strategic planning.

The next chapter summarises our understanding of the economic value of estuaries, giving examples from South African case studies.

The following three chapters describe three main types of planning processes that affect estuaries and discuss the degree to which environment and economy are supposed to be integrated in these processes and we examine the current state of affairs in this regard.

Following this we explore the relationships between the different planning and management processes, and the way in which environmental and estuary values should play a role. Here we also discuss the ways in which estuary valuation should be carried out in order to inform these processes.

Finally, we explore a potential means of enhancing the value of estuaries through involving local rural communities in the development of estuarine biodiversity-based enterprises.

2. THE STATUS AND CONSERVATION OF EASTERN CAPE ESTUARIES

Jane Turpie

2.1. Introduction

South African estuaries provide numerous goods and services to society, and form the basis of important recreational, subsistence use and commercial activities. The biodiversity base that provides these services is under threat due to numerous factors including increasing national demands for water, catchment degradation, and development, population growth and poverty in the coastal zone. These ultimate threats lead to proximate causes of biodiversity loss such as habitat alteration, changes in mouth dynamics, overexploitation, sedimentation, recreational disturbance, and a loss of system variability. Lesser problems are changes in water quality and alien invasion. However, the current state of biodiversity protection is relatively poor. Estuaries receive little or no attention in policy and legislation that directly affects the coastal zone. While provision is made in the new Water Act for an environmental reserve, the implementation has been slow. Current protected area systems offer little protection for estuarine biodiversity, with almost no estuaries protected from consumptive use. Despite this, the current health status of estuaries is fair overall, and suggests that many estuaries are quite robust. However, there are areas where considerable degradation has taken place, and it is concluded that the threats to estuaries are increasing exponentially and may soon have a serious impact, given the current status of protection.

This chapter recaps some of the findings and ideas developed during the first phase of the Eastern Cape Estuary Management Programme (*Turpie 2004a*), including the guidelines for a strategy for estuarine biodiversity conservation.

2.2. Estuarine biodiversity

Estuaries are among the most dynamic of ecosystems, supporting a rather uniquely adapted but varying biodiversity, which changes depending on biogeographical zonation, estuary type and size. Thus each estuary is fairly unique in terms of its physiochemical characteristics as a habitat for plants and animals. Further differences are to be found within estuaries, as one moves through different zones of the estuary from its marine to freshwater extremes. 'The overall variation between estuaries as well as the variations within an estuary (which also change over time) all play a role in determining the substantial differences in the nature of biotic communities from estuary to estuary. This presents a significant challenge for conservation planning and for management. Moreover, our knowledge of the species contained in our estuaries, especially for smaller taxa, and our understanding of community dynamics and ecosystem functioning, is very imperfect.

Nevertheless, estuarine research scientists do have a feel for the state of health of estuaries, gained from observing changes over time in perturbed systems. Thus as long as our understanding of biodiversity is imperfect, protection of estuarine biodiversity will probably concentrate on the maintenance of the physical and chemical health in estuaries. Where estuaries have to be prioritised for different types of conservation intervention, the process will have to be led by the more conspicuous taxa, with the assumption that their conservation requirements are greater than those of smaller taxa.

2.3. Problems affecting estuaries

Various authors have evaluated the threats to South African estuaries. Some of the main proximate threats to the biodiversity and functioning of estuaries of the Eastern Cape are described as follows:

2.3.1. Habitat alteration / loss

Habitat alteration or loss within an estuary can be due to reclamation for development, mining, construction of structures such as bridges and jetties, or the remodelling of part of an estuary for marinas or harbour construction. Habitat alteration or loss is a particularly serious threat because of its irreversibility. There have been substantial losses of habitat or alterations of habitat in Eastern Cape estuaries, particularly where there are resort developments. Several estuaries (e.g. Swartkops, Nxaxo) are under imminent threat, and the problem is considered to be widespread and serious.

2.3.2. Change in mouth dynamics

A change in mouth dynamics usually results in a greater frequency and duration of closure, and may change the basic type of the estuary, affecting salinity, habitat and species composition and abundance. This is mainly due to reduction in freshwater inflow, with small estuaries being most vulnerable. At least 14% of Eastern Cape estuary mouths are affected by artificial breaching or by bridge or harbour construction, particularly blind estuaries with urban settlements.

2.3.3. Overexploitation

All the large systems in the Eastern Cape are heavily overexploited, especially in terms of their linefish stocks (Britz *et al.* 2001, Lamberth & Turpie 2002). Estuarine spawning fish are not particularly threatened by overexploitation. Bait is heavily exploited but not considered overexploited in many systems, as bait populations are quite resilient. Small temporary systems (most Eastern Cape estuaries) may be more sensitive to overexploitation of fish and bait, but are not overexploited at present. Overexploitation of plants is also evident in some Eastern Cape estuaries. Mangroves have been completely removed from three estuaries in the former Transkei – the Bulungula (this happened after the mouth closed), the Mzimvubu (happened after flooding), and Mnyamei (due to overharvesting). In other systems, such as the Mngazana, there is a threat of overexploitation due to ongoing harvesting pressure. At least 21% of estuaries in the Eastern Cape are considered to be under high consumptive use pressure, and 8% are under medium pressure (*Turpie 2004a*).

2.3.4. Sedimentation (including siltation)

This can be due to intrusion of marine sediments due to lack of flushing, or silt deposits due to soil erosion in the catchment area, smothering habitats and degrading living conditions for many species. The problem is widespread in the Eastern Cape. Small estuaries are highly susceptible, but the problem also occurs in some of the larger systems such as Kowie, Bushmans and Kariega.

2.3.5. Loss of system variability

This mainly applies to systems with altered hydrology through upstream impoundments or mouth manipulation. One of the features that maintains the diversity of biota in estuaries is the variability of the systems. Reduced flooding and dampened seasonal, tidal or other fluctuation will result in a loss of diversity. The problem is widespread and potentially serious.

2.3.6. Recreational disturbance

Estuaries with reasonable access, generally the larger systems, are subject to significant amounts of human activity. This is intensified when the systems contain developments such as marinas. Human disturbance has significant effects on fish and bird abundance, and where prolonged during certain times of year, may eliminate species or reduce abundance (e.g. Turpie & Love 2000). Some 23% of Eastern Cape estuaries are considered to be subject to high levels of recreational disturbance and a further 11% are under medium pressure (*Turpie 2004a*). Recreational disturbance is higher in the western half of the province than in the former Transkei region, although disturbance levels increase to medium levels in the vicinity of resort areas on the Transkei Wild Coast.

2.3.7. Change in Salinity

Changes in salinity may occur due to changes in freshwater inflow, or due to mouth closure, affecting organisms with defined salinity tolerance ranges (most estuarine organisms), leading changes in community composition, biomass, productivity etc. The problem is thought to be widespread but not intense.

2.3.8. Increased turbidity

Turbidity, caused by suspended particles, reduces light penetration into the water column. This decreases the depth at which plants can grow and reduces water column (primary) productivity. It also hampers visual foragers, resulting in loss of visual predators and change of community structure. The effect may be carried into the marine zone during periods of high flow. Increased turbidity is not considered to be a major problem in Eastern Cape estuaries, but can be seen in estuaries with eroded catchments.

2.3.9. Changed nutrient status

Nutrient status is usually changed by increase in nutrients such as nitrogen and phosphorus from sewage, fertilisers, and concentration of nutrients due to reduction in flow. The result is increased productivity in the estuary, primarily by algae, which respond rapidly to elevated nutrient status and may smother other plant species. The increase in production is thus usually accompanied by decrease in species richness and diversity, the proliferation of alien plants, and eutrophication. The latter may involve toxic dinoflagellate blooms which deplete dissolved oxygen and result in the die-off of fish. This is not a major threat, as organisms tend to be tolerant of a lot of change, and changed water quality can be ameliorated by flushing. *E. coli* pollution is a bigger problem in Eastern Cape estuaries, affecting human health rather than biodiversity.

2.3.10. Pollution

Chemical and organic pollutants come from industrial wastes and stormwater containing heavy metals, organic phosphates, detergents, etc, and from oil spills (large scale marine spills or cumulative effects of boating within estuaries). This type of pollution can kill organisms and may result in local extinctions, genetic modification, bio-accumulation and reproductive stress. This problem is most severe where there is intensive agriculture such as pineapple farming, golf courses and urban development. There is also a problem of sewage leakage from septic tanks. The pollution threat is not particularly intense except in a few localities, but it is fairly widespread. One of the main concerns in the former Transkei region is the excessive amounts of detergents entering the systems due to the activities of rural communities doing their washing in the catchment area. For example, this is a particular concern in the Mzimvubu system.

2.4. The ultimate causes of these problems

The proximate threats listed above come about for a number of reasons. Overexploitation and recreational disturbance are linked to easy access, lack of enforcement, inappropriate regulation systems, and lack of conservation planning, and can be linked both to poverty and wealth. Habitat loss is largely a direct result of planning decisions. Pollution problems are a result of increasing residential and industrial development around estuaries, again related to planning. Changes in water quality and mouth dynamics are traced back to changes (mainly reductions) in freshwater inflows, in turn caused by increasing demands for water in the catchment areas and beyond (fuelled by low water prices), and exacerbated by the invasion of alien vegetation. Siltation is caused by loss of riparian vegetation, poor agricultural practices, afforestation and alien invasion in catchment areas, and is exacerbated by reduced freshwater inflow. Loss of system variability generally results from purposeful management to maintain a benign or constant environment for users (e.g. stable water levels). In general, the way in which decisions are made reflects a general lack of recognition of the value of estuary biodiversity to society as a whole.

While it is often fairly straightforward to pinpoint the proximate causes of biodiversity loss in estuaries, such as hydrological alteration and overexploitation, this is not always enough to set in place the most appropriate measures to stem these causes. Most, if not all, proximate causes can be traced back to economically-driven processes or causes, such as demand for agricultural use of water, which in turn may be driven by higher level causes such as agricultural and poverty-relief policies which advocate certain subsidies (Figure 2.1). It is important to understand these dynamics in detail in order to identify the most appropriate points of intervention, and if optimal and effective interventions are to be implemented.

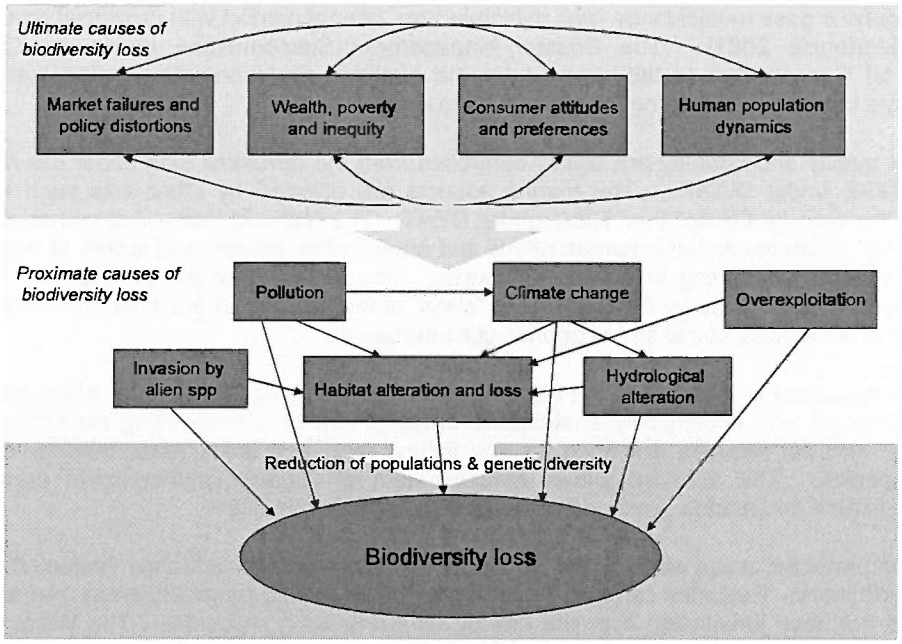

Figure 2.1. Proximate and ultimate causes of biodiversity loss. The causal links between these are not illustrated.

2.5. Current state of estuarine biodiversity protection

2.5.1. Legislation

Various estuarine resources are protected to varying degrees around the country, by a variety of laws or circumstances (Smith & Cullinan 2000, Breen & McKenzie 2001, van Niekerk & Taljaard 2002, *Turpie 2004a*). Policy and legislation which affects estuaries directly can be roughly divided into that affecting (a) water quality and quantity, (b) land use and infrastructure development, and (c) living resources within estuaries (Van Niekerk & Taljaard 2002). All legislation is underlain by the South African constitution, which states that

> *'Everyone has the right (a) to an environment that is not harmful and (b) to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation, (ii) promote conservation, and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.'*

Estuary management falls mainly under two national government departments: the Department of Water Affairs and Forestry, responsible for water resources, and the Department of Environmental Affairs and Tourism, responsible for everything else, e.g. land use, living resources. Environmental management is devolved to provincial level through whichever provincial department is responsible for

environmental matters. Provincial laws cannot conflict with national laws. At a local (municipality) level, municipal councils pass municipal by-laws, which in turn, cannot conflict with provincial and national laws (Breen & McKenzie 2001). The Coastal Management Subcommittee under the Committee for Environmental Coordination (established under the National Environmental Management Act 107 of 1998) ensures co-ordination among the various state institutions.

Water quality and quantity are chiefly controlled from the terrestrial side under the *National Water Act 36 of 1998*, under DWAF . The marine aspects are affected by other acts such as *Combating Pollution of the Sea by Oil Act 6 of 1981*, under DEAT. The National Water Act makes provision for a water "reserve" which meets basic human needs and ensures the quantity and quality of water required to protect the natural functioning of a water resource. The extent to which an estuary's functioning is catered for will be determined by the designated "class" of that estuary (A to D), which is to be determined on the basis of ecological, social and economic considerations.

Living resources are subject to the Marine Living Resources Act 18 of 1998, which aims to achieve optimum utilisation and ecologically sustainable development of marine living resources and protect biodiversity. The act requires a licence for any fishing, and sets limits (size, quantity or season) for individual species. The act also allows establishment of fisheries management areas, zones for subsistence fishers and marine protected areas (Breen & McKenzie 2001).

Marine protected areas will in future be controlled under a separate Marine Protected Areas Act (up to the high tide mark). Estuaries can also be protected within regular protected areas (see below), though the latter do not have jurisdiction over the use of estuarine living resources. The *White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1998)* commits the government to a number of strategies to protect wetlands in general, such as facilitating the development of appropriate legislation to secure their conservation, promoting the establishment of a National System of Protected Wetlands, preventing inappropriate activities and development around wetlands, finding ways to recognise wetlands in planning and decision-making, determining the impact of fishers and developing guidelines for managing them. The *Biodiversity Bill* (July 2001) provides for the conservation of biological diversity. It requires identification of important landscapes, ecosystems, ecological process and species for biodiversity conservation, and promotes monitoring of these. It also provides for the proclamation of protected areas, recognising South Africa's obligations to international conventions. Estuaries may also be protected within World Heritage Sites under the *World Heritage Convention Act 49 of 1999*.

The *Environment Conservation Act – Terrestrial and Marine protected areas* (1994) categorises protected areas into 7 categories (based on IUCN and one additional category). It prescribes the management objectives and criteria for selecting and managing each category. The policy suggests that estuaries, fish, spawning areas and seascapes should generally be treated as Category IV – Habitat and wildlife management areas, regardless of who owns those resources. In reality, estuaries could fall into any category. Those such as Kosi could be classified as Category V – Protected land/seascapes, while others could be classified as Category VI - Sustainable Use Areas. Each estuary should be classified on the basis of the management objectives of the estuary (Smith 2000).

The *National Environmental Management Act 107 of 1998* (NEMA) requires DEAT to be the lead agent in ensuring the effective custodianship of the environment. The mining industry now has to comply with the national environmental management policy under the new *White Paper concerning a Minerals and Mining Policy for SA (1998)*. Land use and infrastructure planning is primarily affected by the *National Coastal Management Act* (still a Bill). Development around an estuary is controlled at a local level, by local authority plans, local by-laws, provincial planning legislation and national planning and environmental legislation (Breen & McKenzie 2001). Planning is affected by the *Local Government Municipal Systems Act 32 of 2000* which promotes integrated development planning and the adoption of a single plan for a municipality. In addition, Environmental Impact Assessment (EIA) regulations and regulation on Sensitive Coastal Areas (SCA) from the previous *Environmental Conservation Act 73 of 1989* are still in force until there are replaced with new regulations under NEMA. The latter act also makes provision for the declaration of limited development areas. The *White Paper on Integrated Pollution and Waste Management for SA* (2000) will culminate in new pollution and waste legislation.

The *White Paper for Sustainable* Coastal *Development in South Africa (2000)* promotes integrated coastal management, emphasising the value of the coast, the facilitation of sustainable coastal management, the co-ordination and integration of coastal management, and a co-operative style of management. The policy also promotes monitoring and the production of regular state of the coast reports. It lays a framework for national, provincial and local coastal management. At the provincial level, each province identifies a department that will be the coastal lead agent, and a provincial Coastal Working Group is to be established. At the municipal level, local coastal forums are to be established where appropriate. The white paper has yet to be translated into final legislation, and until then, the primary law is the Sea-shore Act 21 of 1935, which makes the government the owner of everything below the high tide mark, including estuaries, and gives the public the right to use these areas.

In summary, the fact that estuaries contain freshwater, terrestrial and marine components, and are heavily influenced by activities in a much broader catchment and adjacent marine area, means that they are affected by a large number of policies and laws, none of which are designed for estuaries in particular. Indeed, estuaries have tended to be neglected in past legislation, though the situation has improved with newer policies and legislation.

2.5.2. Shortcomings in implementing the legislation

An important challenge that still lies ahead is the development of a conservation plan for South African estuaries, in which a system of protected areas will secure the persistence of estuarine biodiversity and functioning. At present some 41 estuaries enjoy some level of formal protection but many of these are only partly protected (Turpie 2004b), and very few systems are completely protected from consumptive use. However, because the MLRA legislation supersedes any legislation that might be in conflict with it, the status of these estuaries is not clear cut. One interpretation is that former protection under a provincial ordinance is now null and void. Another is that the law which is more specific to the estuary is the one that holds (the MLRA does not refer to any specific estuary). In reality, it is still business as usual, in that estuaries that were protected under the provincial ordinances are still being treated as such.

The level of enforcement is weak, having decreased since the introduction of the MLRA. Only 13 of MCM's law enforcement staff are employed in the Eastern Cape, and they tend to concentrate on marine fishery problems. Municipal conservation officers tend to do the estuary patrols in the Eastern Cape, but only about six have MCM conservation cards, and they only devote about 20% of their time to estuaries. Most of the estuary compliance work is carried out by a few dedicated individuals.

Outside protected areas, municipalities now use Integrated Development Plans to guide development. However, few IDP's focus on river systems or estuaries, and they are often used simply as a motivation for more intense development (Boyd *et al.* 2000). The functioning and value of estuaries is generally not well understood by planners, and perceptions of problems are often limited to high *E. coli* counts which threaten tourism. Planning processes vary, and are largely driven by wants and needs of local communities. Outside of protected areas, planning does not generally take conservation into account, unless conservation areas have a major role in the local economy. The bottom line is that developments such as marinas and mining operations attract more money into the local economy, a reality which is dominant in most local-level planning decisions. Environmental impact assessment (EIA) is effectively toothless in the face of inappropriate planning.

2.6. Guidelines for a conservation strategy

The following is a summary of the guidelines developed during the first phase of the Eastern Cape Estuary Management Programme.

A strategy should have goals that are compatible with a broader vision and overriding policy, and should ultimately converge with the government's goal of maximising societal welfare. Biodiversity protection is essential to accomplish this goal, especially if society is considered from a broader perspective than the communities that interact directly with estuaries. The goals for protection of estuarine biodiversity are proposed as follows:

3. Maintain/restore the ecological **integrity** of estuaries, by ensuring that the ecological interactions among estuaries and those between estuaries, their catchments and other ecosystems are maintained.
4. Maintain/restore the **health** of estuaries in/to a good to excellent condition, assuring that a representative set of estuaries is maintained in as close to their pristine state as possible. This includes (for all estuaries):
   d) maintenance of the natural magnitude, variability and frequency of **natural physical processes** within estuaries,
   e) maintenance of the natural characteristics and variability of estuarine **populations and communities** in terms of size, structure and functioning, through sustainable utilisation, and
   f) maintenance of the natural **taxonomic diversity** of all estuaries, without loss of indigenous taxa from any estuary other than by natural processes, and without the introduction of alien species.

Considering these goals in the light of current and anticipated future threats to biodiversity, and drawing from international experience, five core components of a strategy were identified as follows.

2.6.1. Research and knowledge management

Strategy and management action needs to be informed by quality research, which needs to be encouraged and commissioned. A fundamental element is the feedback to adaptive management: the strategy should change with improved understanding, as necessary.

2.6.2. Regulation and enforcement

It is proposed that three types of estuary management should be considered:

a) Estuarine Protected Areas (EPAs), in which part or all of the estuary is a sanctuary, providing protection from consumptive use. EPAs should be selected with both biodiversity representation and socio-economic considerations in mind.
b) Estuarine Conservation Areas (ECAs) - co-managed estuaries in which general regulation is augmented by estuary-specific regulation. These are particularly suited to estuaries used primarily for recreation.
c) Estuarine Management Areas (EMA), to which general regulation applies

2.6.3. Conditions and incentives that support conservation

This is essential to alleviate certain threats, especially where regulatory mechanisms are weak. These include the following:

a) *Incentives for improving quality and quantity of freshwater inputs.* These include catchment level water demand management (pricing incentives), and supply management through incentives for improving quality and quantity of catchment runoff, e.g. tradable pollution permits.
b) *Sensitive planning*: Threats to estuaries need to be taken into consideration in regional-level development plans as well as municipal plans.
c) *Property rights, community participation and co-management*: Open access to resources should be reduced. Commercial exploitation rights (e.g. bait collecting for sale) should be allocated to very few users per estuary. Community participation should be maximised, community management is not advised, and co-management must be applied with extreme care and only if certain conditions are met. It is argued that the conditions for successful co-management are generally unfavourable in the Eastern Cape.
d) *Poverty alleviation and alternative livelihoods.* No conservation strategy can succeed in the face of poverty, and poverty alleviation programmes are thus an essential part of the conservation of biodiversity. However, estuarine resources themselves cannot be seen as a route to poverty alleviation in highly populated areas. In this situation, creation of alternative livelihoods would be a better strategy.
e) *Communication, education and awareness raising.* General awareness and understanding is critical to the success of a conservation strategy.
f) *Institutional support.* No conservation strategy will succeed without strong institutional support.

2.6.4. Monitoring and adaptive management

This is a core element of the strategy. Guidelines for monitoring have been developed in detail elsewhere within the Eastern Cape Estuaries Management Programme.

2.6.5. Rehabilitation

This is an optional element of the strategy, for use where the current extent of degradation is unacceptable, and in instances where the strategy may fail.

2.7. The role of planning

Conservation planning is required to inform the second component of the strategy, in which all estuaries are assigned to one of three types of management category. Development planning needs to provide conditions that support conservation (component 3), in particular the alleviation of poverty amongst communities that surround estuaries and the provision of alternative livelihoods. Water resource planning needs to support the conservation and development plans through allocation of water resources. The various types of planning and their effect on estuaries is discussed in more detail in later chapters.

3. THE ECONOMIC VALUE OF SOUTH AFRICAN ESTUARIES

Jane Turpie

3.1. Introduction

Estuaries are well known as rich and productive systems that produce a wide range of benefits to society. Their unique biodiversity assemblages have arisen from the need for biota to cope with their salinity gradients and fluctuations. They derive their richness and productivity from nutrient and sediment inputs received from river and sea water, combined with the relatively sheltered aquatic habitat that they provide.

South Africa has about 258 systems that fit Day's (1980) definition of an estuary as "a partially enclosed coastal body of water which is either permanently or periodically open to the sea and within which there is a measurable variation of salinity due to the mixture of sea water with freshwater derived from land drainage" (Whitfield 2000). Despite their large number, South African estuaries are generally fairly small. They cover a total of about 70 000 ha, with St Lucia estuary accounting for over half of this (38 000 ha). Nine estuaries are between 1000 and 4000 ha, and 80% of estuaries are under 100 ha in size.

Estuaries in South Africa have benefited from the fact that most development has historically occurred inland. However, the situation has changed in recent decades, and threats such as habitat alteration, overexploitation, human disturbance, change in water quality and changes in habitat and mouth condition due to changes in freshwater inputs are increasingly becoming a problem for many of our estuaries (Turpie 2004). Many of these problems can be traced to the recent escalation in coastal development, national increases in the demands for use and pollution of water, increased use and disturbance of catchment lands, and increased poverty among coastal communities (Turpie 2004).

Part of the reason that estuaries are threatened is that the benefits of damaging activities are usually perceived to be greater than the benefits of conservation and sustainable use. Indeed, conservation is perceived by many to be costly, both in terms of management and the opportunity costs involved. Given these perceptions, and in some cases, realities, management and conservation planning will be toothless unless they take socio-economic realities into account. It is argued here that while general perceptions may be true part of the time, there is likely to be a strong economic case for conservation and sustainable use in many instances, if the value of estuaries is taken into account.

Estuary valuation serves to:

- highlight the degree to which estuaries contribute to human wellbeing and economic output
- show that estuary degradation carries a cost, and
- bring a more balanced perspective to planning and decision-making, by expressing conservation benefits in a currency compatible with conventional decision tools.

It also helps to devise more efficient incentive systems and financing tools for the management of estuaries.

1.1. What is 'economic value'?

Economic value is a measure of societal welfare or wellbeing, and is created through:

- Generation of household income,
- Generation of employment,

- Contribution to household livelihoods (e.g. cash income, food, shelter), and
- Generation of utility or satisfaction

Different measures of value are relevant to different decision-makers. Individuals and firms make decisions on the basis of their own financial and/or utility gains. Governments make decisions on the basis of overall welfare gains (contribution to national income and employment). It is important to understand value from both from an individual/firm perspective and a national perspective, since the former constitute the market forces of change, and the latter are required to make decisions that are in the overall interest of society.

A common indicator of societal wellbeing is income per capita. This is calculated by dividing a measure of national income - the Gross Domestic Product (GDP), by the total population. Thus it is highly relevant to estimate an estuary's contribution to GDP, and/or the way in which GDP would change given a change in estuary quality or size.

An estuary contributes to GDP through the expenditure generated by estuary-dependent activities. This expenditure contributes to the turnover in an industry. For example, expenditure by recreational anglers contributes to the turnover of businesses such as tackle-shops and hotels. Part of the turnover is spent on intermediate goods and services (e.g. on vegetables), the rest is direct value added to the national economy (i.e. ends up as income). The intermediate expenditure in turn contributes to the turnover of other businesses (e.g. greengrocers) in other sectors, some of which becomes value added. These contributions to value added together make up the indirect value added by estuaries. The total value added (contribution to GDP) is the sum of the direct and indirect value added. The relationship between these two reflects the multiplier effects of the direct value added. Note that the most difficult part is estimating the direct or indirect contribution of an estuary to different types of turnover, and how this turnover would change with a change in estuary quality.

Not all of the values generated by estuaries are traded in markets, however, and non-market values are not reflected in measures of GDP. For example, the consumption of estuary resources may make an important contribution to peoples' livelihoods without generating direct, tangible income. Similarly, the aesthetic benefits of a view, and the scientific and educational benefits associated with estuaries would not be directly measurable in national accounting systems. Values such as this are often best expressed in terms of peoples' Willingness to Pay, rather than actual turnover, the latter constituting proven Willingness to Pay.

1.2. Types of value generated by estuaries

Estuaries, like other ecosystems, offer a range of **goods, services and attributes** that generate value and contribute to human welfare. The concept of ecosystem goods and services, popularised in the ecological-economics literature, stems from the perception of ecosystems as natural capital which contributes to economic production. Goods are harvested resources, services are processes that contribute to economic production or save costs, and attributes relate to the structure and organisation of biodiversity.

Environmental and resource economics typically uses a typology of values described in the Total Economic Value concept. The Total Economic Value of an ecosystem comprises Direct Use, Indirect, Option and Non-Use values.

Direct use values may be generated through the consumptive or non-consumptive use of resources. In the case of South African estuaries, most, if not all, of this use is recreational, and includes both consumptive (fishing and bait collecting) and non-consumptive (e.g. boating, birdwatching) activities.

Indirect use values are values generated by outputs from estuaries that form inputs into production by other sectors of the economy, or that contribute to net economic outputs elsewhere in the economy by saving on costs. These outputs are derived from ecosystem functioning such as water purification and nursery functions.

Non-use values include the value of having the option to use the resources (e.g. genetic) of estuaries in the future, and the value of knowing that their biodiversity is protected. Although far less tangible than the above values, non-use values are reflected in society's willingness to pay to conserve these resources, sometimes expressed in the form of donations.

The relationships between estuarine biodiversity and the ecological-economics and resource-economics concepts of different types of value are depicted in Figure 3.1.

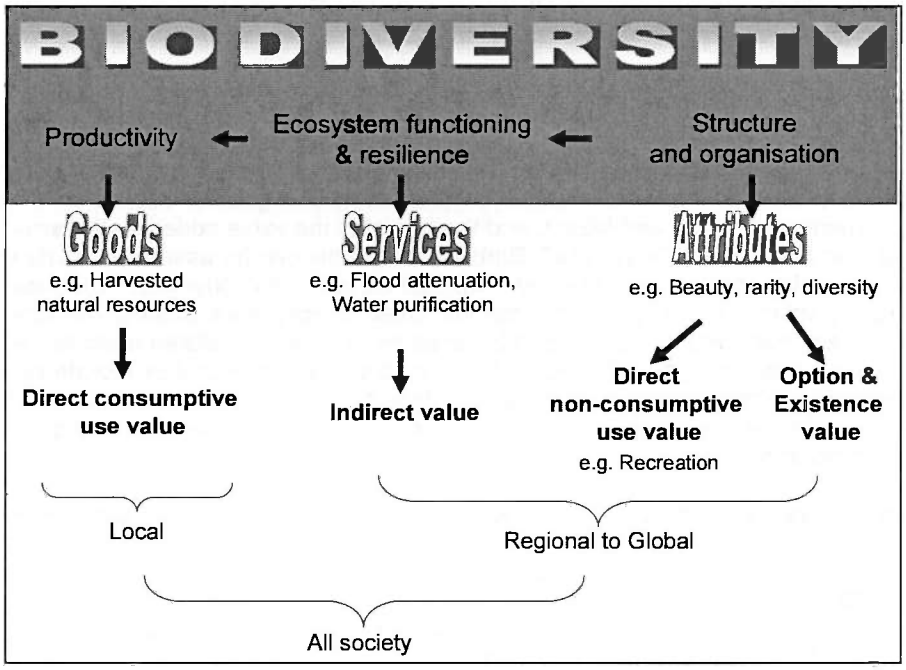

Figure 3.1. The relationships between biodiversity, the concept of 'ecosystem goods and services' and 'total economic value' typology of values (based on Turpie 2004c)

1.3. Valuation methods

Economic valuation techniques can be divided into 'market value' approaches, 'surrogate market' or 'revealed preference' approaches and 'simulated market' or 'stated preference' approaches (Table 3.1). The more intangible the type of value, the fewer the methods available for use.

Table 3.1 Different types of valuation methods and the types of value they are typically used to measure

Methods	Consumptive use values	Non-consumptive use values	Indirect use values	Option & non-use values
Market value methods				
Production function	X	X	X	
Replacement cost			X	
Surrogate market / revealed preference methods				
Travel cost method		X		
Hedonic pricing method		X		
Simulated market / stated preference methods				
Contingent valuation	X	X		X
Conjoint valuation	X	X		X

Market value approaches can be applied to measurement of direct or indirect use values. The production function approach is one which models the production of a good or service as a function of inputs such as environmental quality and labour, and then isolates the value added by the environmental component in question (e.g. Ellis & Fisher 1987, Barbier 1994). This can be used to estimate change in production when the quality or quantity of the environmental component is changed. The measurement of outputs requires quantitative surveys, prices can be taken directly from existing markets, shadow priced, or if non-existent, surrogate prices have to be used on the basis of related markets. Production costs also need to be estimated in a similar way. Other market value approaches include replacement cost methods, estimates of damage costs avoided and of defensive expenditure. The latter are applied to valuation of environmental services such as water purification, such as the replacement of a wetland with a water storage or purification facility.

Revealed preference methods include travel cost methods and hedonic pricing methods. The travel cost method is used for estimation of recreational use value, and involves the quantitative estimation of demand for visits to a site in relation to the price of a visit, using travel costs as a proxy for the site value (e.g. Clawson & Knetch 1966, Willis & Garrod 1991). The hedonic pricing method is used for estimation of the amount that an environmental amenity adds to property values in an area (Pearce & Turner 1990, Russell 2001). This method involves constructing a predictive model from existing property sales data, in which the environmental attribute is one of the explanatory variable for price of properties.

Stated-preference methods, such as contingent valuation methods (e.g. Mitchell & Carson 1989) and conjoint valuation methods (Green & Rao 1971, Stevens *et al.* 2000), provide the only means of estimating option and non-use values, although they can be used to estimate most types of value. Both involve questionnaire surveys of the affected population. Conjoint valuation methods (CVM) elicit peoples' willingness to pay (WTP) for the benefit of an environmental asset or willingness to accept compensation (WTA) for its loss. WTP and WTA are estimated by asking respondents to react to a hypothetical situation. The detailed method is usually unique to each specific situation or study. The method is very prone to biases, but if universally accepted standards are followed, these problems can be acceptably minimised (Arrow *et al.* 1993). Conjoint methods are more complex, and seek to ascertain the way in which different components of an amenity, such as species diversity or cleanliness, contribute to its value. The method borrows statistical techniques developed in the field of marketing.

In certain cases it may be possible to apply the results of other studies undertaken in similar areas, such as the transfer of international estimates to local open space areas. This is called **benefits transfer**

(OECD 1994, Georgiou *et al.* 1997, Barbier *et al.* 1997), because the measured benefits are transferred to another site. This is usually not good enough to base important decisions upon.

1.4. Valuation as a primary tool of resource economics

Valuation forms the basis of most resource-economics research and application (Figure 3.2). Its primary role was initially for lobbying the importance of sustainable use and/or conservation of natural resources. However, when put in context, an understanding of the value of biodiversity allows diagnosis of the causes of environmental degradation and biodiversity loss. This understanding is critical to identifying the problems, opportunities and constraints that would guide planning, resource allocation and environmental management. Finally understanding of values, their context, and the goals of planning allows the development of incentive measures and financing mechanisms that help to achieve these goals.

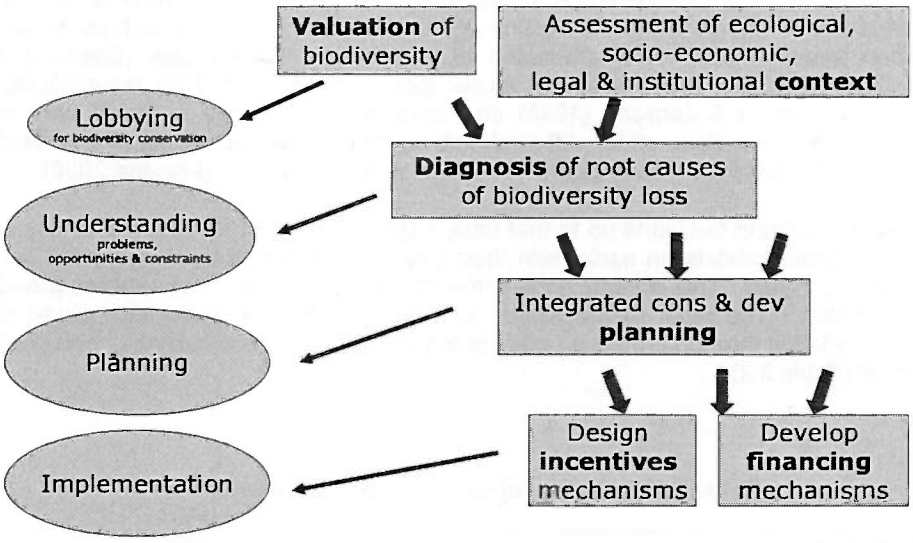

Figure 3.2. Resource economics tools for environmental and natural resource management, showing the role of valuation

It is argued above that the accurate valuation of estuaries and understanding of their dynamics could be a fundamental perquisite for the optimisation of planning and management policies and decision-making. The main constraints that are faced are that accurate valuation and social assessment methods are (1) highly specialized, requiring very technical design & analysis, (2) labour-intensive, mostly relying on extensive surveys with large sample sizes, and (3) localised in scope, in that it is very difficult to extrapolate results from one area to the next, something which is probably particularly true of estuaries.

The challenge is therefore to find the right trade-off between accuracy and cost of resource economics studies of estuaries. Studies need to be focused on the right issues to enable decision-making. Resource economics practitioners will need to devise effective ways of applying their tools which makes them both cost-effective and applicable.

1.5. The value of estuaries: an international perspective

The value of coastal wetlands and estuaries has been recognised for some time in the international literature. Almost 25 years ago, Lynne *et al.* (1981) estimated the value of marsh areas in terms of their inputs into marine production processes. Farber (1987) drew attention to the value of coastal wetlands in terms of protection against hurricane damage, and the value of mangroves for coastal protection was recognised long before the recent proof of this following the Tsunami of December 2004 (e.g. Adger *et al.* 1997).

Much of international work on the value of coastal wetlands and estuaries has concentrated on the value of mangroves (Spaninks & van Beukering 1997, de Wet *et al.* 2005). Christensen (1982) valued the uses of mangroves for land-use planning in Thailand; Lai (1990) compared the net benefits of converting mangroves to crops in Fiji; Ruitenbeek (1992, 1994) compared mangrove management options and showed that ecological – economic linkages in a mangrove ecosystem in Indonesia created a case against mangrove clearing in certain areas. Bennett & Reynolds (1993) estimated the tourism and fishery values of mangroves in Malaysia; Gammage (1994) valued commercial and community uses of mangroves in El Salvador; Spaninks & van Beukering (1997) valued management alternatives for mangroves in the Philippines; and Sathirathai (1997) valued a mangrove area in Thailand. While these studies address direct use of mangroves for harvesting and tourism, indirect values such as nurseries for fisheries and carbon sequestration, none attempted to estimate non-use values (Spaninks & van Beukering 1997). Those that use the production-function approach are limited by assumptions about ecological relationships. Gilbert & Janssen (1998) also assessed the change in goods and services produced by a mangrove ecosystem under different management regimes, although this work was criticised in that it lacked the necessary ecological understanding (Rönnbäck & Primavera 2000).

Based on studies around the world up to that time, Costanza *et al.* (1997) estimated estuaries to be one of the most valuable habitats on earth, with their global value having been estimated as in the region of US$4.1 trillion per year. This is some 12% of the total value of ecosystem services provided by the world's natural capital. The most highly valued services provided by estuaries include nutrient cycling, disturbance regulation through protection and control of storm and flood damage, food production and recreational value (Table 3.2).

Table 3.2. The estimated value of the world's estuaries

Service	1994 US$ $ha^{-1}yr^{-1}$
Disturbance regulation	567
Nutrient cycling	21 100
Biological control	78
Habitat/ refugia	131
Food production	521
Raw materials	25
Recreation	381
Cultural	29
Total	**22 832**

Costanza *et al.*'s (1997) estimates, although generalised for the entire world, and including tropical and north temperate systems, were used as the basis for estimating the value of the South African coast in the Coastal White Paper. Despite their probable inaccuracy, the sheer magnitude of these values lent much more political weight to the coastal zone than has been seen previously.

The effect has yet to trickle down to estuaries in general or even individual estuaries, however. The root cause of this problem largely lies in the fact that the economic value of estuaries is not recognised by

decision-makers, whereas that of the damaging activities is relatively well understood. The economic benefits generated by estuaries, and the costs associated with their degradation, are frequently overlooked by users and decision-makers. This results in activities being carried out which have negative impacts, and limits the potential for estuaries to generate income, subsistence and other benefits. Attaching monetary values to actual and potential benefits associated with the conservation and sustainable use of estuaries makes these activities directly comparable with alternative options.

1.6. Valuation case studies of South African estuaries

Several valuation studies have been carried out on South African estuaries in recent years, ranging from studies of a specific type of value of a specific estuary to broad reaching studies of a number of estuaries. The results of these studies are summarised below.

3.1.1. Subsistence use values

The **Mngazana** estuary in the Eastern Cape has the third largest mangrove forest in South Africa. Like most of the 13 mangrove estuaries in the country, these mangroves provide livelihood benefits to the nearby communities. A valuation study was undertaken to estimate the benefits that the Mngazana mangroves provide to the surrounding rural villages (De Wet *et al.* 2005). The study was based on social survey methods such as focus group discussions and household surveys. Mangroves were used by the three neighbouring villages for construction, they provided nursery habitat for the subsistence and recreational fishery, and were used by members of the local community to take canoe tours and for honey production. The recreational fishery, in turn, is a factor in encouraging the investment in and use of some 50 holiday cottages at the estuary. This community provides employment to men and women as fishing gillies and domestic servants. Taken over twenty years, the discounted net present value of the mangroves to the local community was estimated to be in the order of R3.4 million (R0.5 to R7.0 million; De Wet *et al.* 2005).

Several of the larger estuaries near urban areas support informal bait and line fish fisheries. One of the more important in this respect, the **Knysna** estuary, supports an estimated 30 full-time and 200 part-time subsistence fishers, involved in bait collection, mud crab harvesting, and fishing (Napier *et al.* 2005). The mud prawn *Upogebia africana* dominates the bait fishery, with estimated catches amounting to about 3% of the standing stock, suggesting sustainable use. The harvest of more valuable bait species (e.g. *Marphysa* and *Gorgonorhynchus*) is only viable through damaging methods, and threatens the endangered Knysna seahorse *Hippocampus capensis*. Most of the fishery's value lies in the set line catches of spotted grunter *Pomadasys commersonnii* and white steenbras *Lithognathus lithognathus*, while hand line fish catches are dominated by small species and individuals, particularly cape stumpnose *Rhabdosargus holubi*. Indications are that the line fishery is also sustainable at present. The subsistence fishery is worth an estimated R0.7 – R1.1 million per annum, with full-time fishers earning at least R11-17 000 per annum from the estuary. Currently operating under recreational regulations, the fishery is poorly controlled and fails to reach its full potential. Management of the fishery could be more effective if (a) mud prawn collecting and sales were deregulated, (b) *Marphysa* and *Gorgonorhynchus* use was banned, controlled primarily by targeting users, and (c) co-managed with limited access, and value added by allowing sales of certain fish species.

3.1.2. Direct and indirect fishery values

Lamberth and Turpie (2003) estimated the economic value of estuarine fishery resources in South Africa. The study considered both direct use of fish within estuaries and the role of estuaries as a nursery area for inshore marine fisheries. All types of fisheries ranging from subsistence to commercial and recreational fisheries were included. Some 80 estuarine fish are utilised, these species varying in their degree of association with estuaries. Based on available information on catches for a number of estuaries, a relationship was found between catch and estuary size, type and biogeographic zone. This was used to extrapolate existing data to the remaining estuaries. The values were estimated as value added to the economy, in the form of the contribution to GDP and, in the case of commercial fisheries, included the value added by subsidiary industries. Subsistence fisheries were taken as the gross value of landed catches, calculated on the basis of the market value of fish caught. Recreational values comprise the expenditure by anglers on equipment and travel to fishing sites. The latter may overestimate the value since fish are one part of a recreational package that may include other elements, such as enjoyment of coastal areas or alternative recreational activities in the absence of fish (Lamberth & Turpie 2003). Based on the types of association of different species with estuaries, about 21% of the value of inshore marine catches was attributed to estuaries. The total value of estuarine and estuary-dependent fisheries was estimated to be just under R1 billion (1997 Rand), which works out to an average of R13 230 per ha for all South African estuaries.

3.1.3. Recreational use values

The **Sandvlei** estuary lies within Muizenberg in Cape Town, and is an important open space area. The recreational value of the estuary was estimated using both travel cost and contingent valuation methods (Turpie & Joubert 2001). A short questionnaire was administered to users at Sandvlei during a winter survey. The questionnaire included questions about the origin and mode of travel for use in the travel cost analysis, activities at Sandvlei, preferences for different parts of Sandvlei, and influence of crime and cleanliness on visitation rates. The contingent valuation question sought a willingness to pay an entrance fee to contribute towards maintenance, conservation and crime prevention. All visitors interviewed were Capetonians, but a summer survey would yield different results on origins. In winter, the majority were out walking, bird watching, fishing and picnicking, rather than doing watersports. The nature reserve, park and water areas contributed equally to overall value. The travel cost analysis suggested a total annual recreational use value of R713 500. The demand curve also indicated that a revenue maximising fee of R5 could be charged, but this would reduce the numbers of visitors by 60%. The contingent valuation method yielded a very similar value of R640 000. These figures suggest that current expenditure on management is justifiable. This study shows that the travel cost method can be successfully applied, and may be preferable to stated preference methods, in a situation where most visitors are on single-destination trips.

The **Knysna** estuary, on the other hand, has spawned a holiday resort town which is frequented by visitors from all over the country as well as farther afield. Turpie & Joubert (2005, in prep) described resident and visitor use of the estuary and the associated recreational value on the basis of a survey of estate agents and a questionnaire survey of 1016 respondents. The estuary rates among the top three attractions in Knysna. Visiting Knysna constituted 76% and 35% of the reason for their trips for South African and foreigner visitors, respectively. The estuary contributed about 60% of the enjoyment of Knysna for all respondents. An estimated R1.4 – R2 billion of property value was attributed to views of the estuary, representing the value of the view to Knysna residents. In addition, the total value added by tourism-related expenditure attributed to the estuary was estimated to be about R1 billion per year. Consumers' surplus could not be reliably calculated using the Travel Cost Method, because of the complications of multiple-destination trips and the fact that the model was too sensitive to assumptions used. Respondents were divided over the issue of Knysna's growth, but the majority were against growth that would result in negative impacts on the estuary. Foreign and South African visitors would spend 24% and 32% less time in Knysna, respectively if the estuary's condition were significantly degraded, resulting

in a hypothetical loss of R260 million per annum. Eighty percent of respondents wanted better estuary management, and 60% were willing to pay to maintain the estuary's current conservation status. Overall willingness to pay was estimated to be R34 million per annum.

In the first such study on estuaries, Cooper *et al.* (2003) undertook a preliminary valuation of the recreational use value of five estuaries, based on existing data, key informant interviews and interviews with users. Tourism value was estimated in terms of expenditure only, thus representing a minimum rather than a realistic estimate of this value. A price-premium approach, instead of the data intensive hedonic pricing method, was adopted to establish the portion of property value attributable to estuary views. The data were obtained by means of interviews with estate agents, in which they were questioned on the prices of properties adjacent to estuaries with and without estuary views. The property value attributed to estuaries ranged from R1 million for Keiskamma to R2 billion for Knysna, and tourism expenditure ranged from R7 million at Richard's Bay to over R400 million at the Breede estuary (Table 3.3).

Table 3.3. Lower bound estimates of economic values associated with selected estuaries (R millions) (Cooper *et al.* 2003)

Values	Berg	Breede	UMhlatuze / Richards Bay	Keiskamma	Knysna
Tourism expenditure	R331.5	R414.5	R6.9	R54.0	No data
Property values	R11,9	R50.0	N/a	R 1.0	R2,000.0

A case study of the property value of the Silvermine estuary, Clovelly, Cape Town, showed that there is considerable benefit in restoring degraded systems (Van Zyl and Leiman 2005). The change in property values before and after restoration were used as a proxy for the aesthetic and recreational benefits derived. In addition, there was a minor flood attenuation benefit that was estimated in terms of preventative expenditures and damage costs avoided. A cost benefit analysis indicated a significantly positive net present value (NPV) and a benefit cost ratio of 4.58:1. The valuation study did not include the ecological benefits associated with increased ecosystem health. The Silvermine project demonstrates the significant benefits of maintaining aesthetically pleasing, healthy green open space areas within an urban setting.

Similarly, it can be shown that allowing estuary degradation can negatively affect the economy. Using benefit transfer (results of similar studies), travel cost, and contingent valuation methods, Nahman *et al.* (2005) roughly estimated the total economic value of the Kongweni Estuary in Margate, KwaZulu-Natal, to be at least R285 million. The estuary is threatened with declining water quality which could affect tourism, resulting in an estimated loss of between R58 million and R129 million per annum, and thus having a significant impact on the local economy.

3.1.4. Non-use value

A contingent valuation study was carried out by Turpie & Savy (2005) in order to estimate the non-use value of South African estuaries in general and the Knysna estuary in particular. This entailed a survey of 505 respondents in the Western Cape which sought to ascertain average willingness to pay (WTP) for the conservation of estuaries in the form of annual contributions. Some 71% of survey respondents claimed to be willing to contribute towards the conservation of South African biodiversity in general. There was a low level of knowledge on estuaries, but two thirds of respondents had at least heard of the Knysna estuary or "Knysna Lagoon". Western Cape residents had a value of R19 million for South African estuaries, which extrapolated to all South Africans, suggests a total non-use value for

South African estuaries of some R93 million per annum. Based on the proportion of their WTP for conservation that they would allocate to Knysna estuary itself, the total non-use value of the estuary to the Western Cape population was estimated as R2.7 million. Extrapolated to all South Africans, the non-use value of the Knysna estuary was estimated to be some R9.7 million per annum. Respondents' willingness to pay was positively correlated with their stated level of interest in conservation and with their income. When queried as to their motivation for contributing to estuary conservation, respondents rated biodiversity conservation and the more selfish motives, such as knowing that one's own children would be able to benefit, as most important than reasons such as others being able to make a living from estuaries.

4. CONSERVATION PLANNING

Jane Turpie and Takalani Maswime

4.1. Introduction

South Africa's estuaries play a significant role in contributing to the social and economic well being of society. They are productive systems that provide services such as nutrient cycling, nursery areas for marine species and staging sites for migratory birds (Harrison *et al.* 2001; Hockey & Turpie 1999, Turpie *et al* 2002). Estuaries, like other natural resources such as mountains, rivers and oceans, offer positive amenity values. Apart from their ecological importance, estuaries are also favourable sites for human settlement, urban development and recreation. Recreational uses of estuaries include bait collection, bird watching, boating, fishing and swimming (Harrison *et al.* 2001).

Despite their importance, estuaries still constitute one of the most threatened habitats (Whitfield 2000; Turpie *et al.* 2002). Many South African estuaries are currently under significant pressure from developments within them and in their catchment areas, and are frequently used for domestic and harbour development as well as industrial effluent discharges (Harrison *et al.* 2001). As a result of all these pressures, many South Africa estuaries have become functionally degraded with a concomitant loss of biodiversity (Turpie *et al.* 2002). There is thus an urgent need for conservation planning.

The protection of estuarine biodiversity is already provided for to some extent by the commitments that South Africa has made to the international community. Indeed, South Africa is a signatory of the UN Convention on Biodiversity (Rio 1992), Agenda 21 (1992), the Ramsar Convention (1971), the Nairobi Convention (1985), the Abidjan Convention (1985), the World Heritage Convention (1972), the World Conservation Union Policy framework (1988) and the UN Framework Convention on Climate Change (1992), and has taken steps towards planning for conservation, including for estuaries, in the form of the recent National Spatial Biodiversity Assessment (Driver *et al.* 2004, Turpie 2004b).

Backed by the above, conservation planning sets the bottom-line in terms of defining minimum sets of areas to be protected. There is provision in legislation to mandate these plans though the formalisation of protected areas of various categories.

4.2. The development of Conservation Planning approaches

Conservation planning is a rapidly evolving area of research in which numerous approaches have been explored around the world in recent years. Systematic conservation planning replaces the relatively ad hoc way of selecting conservation areas in the past, and is becoming increasingly holistic in terms of ecological goals and in terms of integrating conservation and development needs in a region. However, a major challenge for conservation planning is to identify priority areas that incorporate biological and environmental patterns and processes (Knight & Cowling 2003). In South Africa and Australia, systematic conservation planning has, over the past years, become a widely accepted methodology in establishing new protected areas to protect biodiversity (von Hase *et al.* 2003). Systematic conservation planning involves several principles, and has numerous distinctive characteristics (Margules & Pressey 2000).

Conservation planning typically involves the following steps (based on Pressey & Cowling 2001):

1. **Set targets**: Identify conservation goals for the region and set quantitative conservation targets for species, vegetation communities and estuary types, and quantitative targets for minimum size, connectivity or other design criteria.
2. **Gap analysis**: Review existing conservation areas, assessing the extent to which quantitative targets have already been achieved
3. **Select new sites**: Select additional areas using algorithms to identify preliminary sets of new conservation areas for consideration by managers as additions to established areas.

Having first concentrated on the representation of species, conservation planning has generally evolved to incorporate ecosystem processes and now gives greater emphasis to biodiversity persistence (e.g. Cabeza & Moilanen 2001). One of the biggest challenges is setting spatially-explicit targets for the maintenance of ecological and evolutionary processes. This involves identifying the processes and finding spatial surrogates for them and setting targets for these (Pressey *et al.* 2003). Another key challenge is delivering a plan that not only achieves representativeness but which ensures the persistence of targeted populations and maintenance of biodiversity (Reyers *et al.* 2002). In many respects, the C.A.P.E. programme has set the standard for systematic conservation planning (Balmford 2003). Much of its success has been attributed to its two-pronged approach of involving stakeholders early on in the process, coupled with scientific rigour, resulting in wide ownership of the terrestrial conservation plan. The C.A.P.E. planning processes also yielded some important lessons, such as the fact that species-level planning cannot be entirely substituted by a habitat-based approach (Balmford 2003).

In addition, it is becoming increasingly recognised that conservation planning cannot take place in isolation of an understanding of socio-economic pressures and values. There have been some attempts to incorporate species geography and human development patterns in order to assess vulnerability in conservation planning (Abbitt *et al.* 2000). Nevertheless, while there has been some consideration of the direct costs involved (e.g. Balmford *et al.* 2000, Frazee *et al.* 2003, Moore *et al.* 2004, Osano *et al.* 2005), there has been little integration of ecological and economic considerations in regional-level planning initiatives (see Faith & Walker 2002). Socio-economic factors are also potentially very important in identifying the most appropriate types of conservation intervention. Thus resource economics is playing an increasing role in conservation planning.

4.3. Conservation Planning in the Eastern Cape

The Eastern Cape Province is dressed with the Subtropical Thicket, one of seven biomes found in South Africa and having over 1550 plant species (Knight & Cowling 2003a). A great deal of progress has been made in developing and refining techniques to identify priority areas and safeguard Subtropical Thicket Biome through the establishment of the Subtropical Thicket Ecosystem Planning (STEP) project. STEP was a four year (July 2000-June 2004) regional conservation planning project whose goal was to "(i) conduct, together with key stakeholders, a comprehensive conservation planning exercise in the Subtropical Thicket Biome, and (ii) work closely with key stakeholders to ensure the implementation of the outcomes of the planning exercise" (Cowling *et al.* 2003). The planning domain for this project, an area of 105 454 km^2 , was centred on the Subtropical Thicket Biome and overlaps the Western and Eastern Cape Provinces (Cowling *et al.* 2003). The approach of STEP was guided by the principles and practices of systematic conservation planning (Margules & Pressey 2000).

The conservation planning component of STEP comprised seven major contractual requirements (Cowling *et al.* 2003):

1. Develop layers of potential land use pressures to biodiversity.

2. Identify targets for biodiversity features.
3. Assess the extent to which targets are achieved for biodiversity features
4. Prepare tables and data matrices for conservation planning analyses.
5. Perform conservation planning analyses.
6. Identify a system of conservation areas.
7. Present outcomes to stakeholders.

The conservation planning component of STEP has been successful because it adopted an explicit conceptual and operational system underpinned by three principles: (i) ecologically sustainable land management (ESLM); (ii) systematic conservation planning; and (iii) implementation as an integral part of conservation assessment (Cowling *et al.* 2003; Knight & Cowling 2003). The plan aimed to achieve explicit conservation targets for biodiversity pattern and process. Biodiversity features targeted were 169 vegetation types, three wetland types, 48 species of large and medium-sized mammals, and five types of spatial surrogates for ecological and evolutionary processes (Cowling *et al.* 2003). Conservation targets, which are cornerstones of systematic conservation planning (Margules & Pressey, 2000), were set for all biodiversity features used in this project. Some success has been achieved at the conservation planning of this project. As required by existing legislation (National Forests Act no. 84 of 1998; National Environmental Management Act no. 107 of 1998), remarkable targets were set at 100% for wetlands and the four forest vegetation types. This conservation target for wetlands is particularly relevant, especially knowing that estuaries are still on the lower deck compared to other ecosystems in terms of conservation planning. The STEP wetlands conservation target will promote the long-term persistence of ongoing loss and degradation of estuary biodiversity.

In addition to the STEP project, the CSIR Environmentek has been contract to undertake a conservation assessment and biodiversity action plan as part of the Wild Coast Conservation and Sustainable Development Project. This project aim is to" promote the use natural resources of the Wild Coast in a sustainable and equitable manner which maximizes the benefits for all people of the area and ensures its long-term ecological integrity"(CSIR 2004). This project will also use the systematic conservation planning approach which integrates the need to enhance benefits to the people of the area with the need to conserve priority areas and resources (CSIR 2004). The new vegetation map supported by more detailed information on forests, rivers and estuaries will be used.

The planning domain of the Wild Coast Conservation and Sustainable Development Project will be: (i) conserving biodiversity in priority areas of the Wild Coast (marine, freshwater and terrestrial), (ii) the terrestrial component will also define the estuaries used in the assessment, (iii) the planning domain, will cover the north-eastern and south western boundaries of the Kei and Mtamvuna rivers were predefined boundaries of the domain (CSIR 2005). The long-term vision for the overall project is that it will promote

> "Utilization of the natural resources of the Wild Coast in a sustainable and equitable manner which maximizes the benefits for all people of the area and ensures its long-term ecological integrity".

Estuaries were recognised as key a Wild Coast ecosystems. Conservation planning of estuaries was to be based on the biodiversity importance and sensitivity of the estuaries along the Wild Coast (CSIR 2005). Priority estuaries for conservation on the Wild Coast were selected based on the classification and prioritization of South African estuaries on the basis of health and conservation importance (see below; Turpie *et al.* (2002), taking representivity and linkages to existing marine and terrestrial protected areas into account. However, because of budgetary requirements, the study had to be conducted using expert opinion rather than quantitative algorithms or complementarity analysis. Further effort is required to refine the recommendations taking socio-economic considerations into account (Turpie 2004).

4.4. Conservation Planning specifically for estuaries

While many South African estuaries do enjoy some level of conservation status, there is still a need for systematic, integrated conservation planning of estuaries which involves a range of stakeholders as well the scientific community. A substantial amount of work has been carried out on estuaries which will be able to inform such a process. Among numerous studies which collate information on South African estuaries, Turpie (1995) prioritised estuaries in terms of waterbirds in a test of alternative reserve selection methods, Maree and Whitfield (2000) performed a similar analysis of fish, and Colloty *et al.* 2001 and subsequent work established the botanical importance of a large proportion of South African estuaries. In a collaborative effort of the estuarine research community these analyses were later updated using complementarity analysis to produce a minimum representative set of estuaries, taking plants, invertebrates, fish and birds into account (Turpie *et al.* 2002), which was also adopted by the National Spatial Biodiversity Assessment (Driver *et al.* 2004). As part of the Eastern Cape Estuaries Management Programme and in collaboration with both estuary managers and scientists, Turpie (2004) also developed guidelines for a strategy for the conservation of estuarine biodiversity in South Africa, which included the proposal for three types of management of estuaries: as estuarine protected areas (EPAs), as co-managed estuarine conservation areas (ECAs) or as estuarine management areas (EMAs) which would ensure that *all* estuaries undergo active management.

The latter studies all acknowledged a need to improve some of the datasets, and the need to take socio-economic considerations into account before finalising a set of estuarine protected areas, such as the trade-offs involved in estuary development and in the allocation of freshwater flows to alternative uses. Working towards this goal, Turpie *et al.* (2004) collated much of the existing data on all South African estuaries, identified ongoing data collection efforts and undertook additional work to fill some key gaps, and Turpie & Hosking (2005) collated existing work on the economic value of estuaries. Following national-level work on the value of estuaries in terms of their fisheries (Lamberth & Turpie 2003), Turpie recently conducted a pilot study (2005) on the estuarine attributes that generate different types of value (e.g. tourism value, existence value).

A conservation planning exercise is underway for estuaries of the Cape Floristic Region, under the C.A.P.E. programme which will integrate ecological and economic aspects into the selection of different types of protected areas. This process will later be expanded to include the rest of the estuaries of the Eastern Cape.

4.5. Economic trade-offs in estuary conservation and development

Estuary values are derived both from the direct use of estuary habitats and products, from the services such as nursery functions that yield value elsewhere (indirect values) and from the non-use values derived from the existence of certain features of biodiversity (see chapter 3). All of these values are dependent on the functional health of the ecosystem. Nevertheless, ecosystems that are exploited (generating direct use value) will have altered ecosystem functioning that affects their indirect and non-use values, even in cases where exploitation is sustainable (can be maintained into perpetuity). For example, a system in which recreational fishing levels are high may not deliver fewer fish to inshore marine fisheries than one in which recreational fishing does not occur. Thus there is essentially a trade-off between direct use values and other types of value (Figure 5.1), even where direct use is managed to be sustainable.

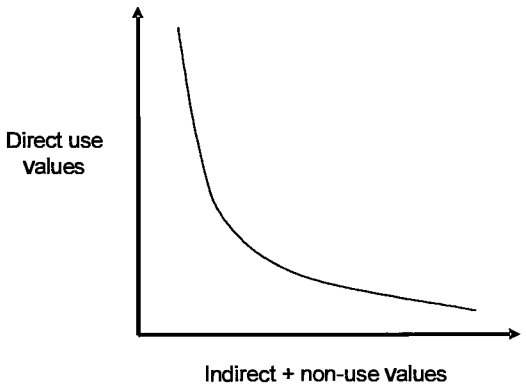

Figure 4.1. Hypothetical trade-off relationship between direct use values and other types of value generated by estuaries.

Another way of looking at tradeoffs is to consider how different types of development might affect estuary values (Figure 5.2). With no development, an estuary would be expected to have little or no direct use value (e.g. perhaps a little derived by passing hikers), and the undisturbed estuary would have high indirect and non-use value, owing to its high level of biodiversity and healthy functioning. Sensitive development around the estuary might add significant value in terms of direct uses such as ecotourism, while having negligible impact on biodiversity and ecosystem functioning. Thus overall values would be raised. As development around an estuary progresses to a resort area, direct use value increases, but the valued attributes and ecosystem services are likely to become somewhat impacted. Thus the total value of ecosystem goods and services may initially be enhanced by increased use, but would decrease again beyond some level. The point at which value is maximised would depend on the nature and relatively magnitude of the two curves described in Figure 5.2.

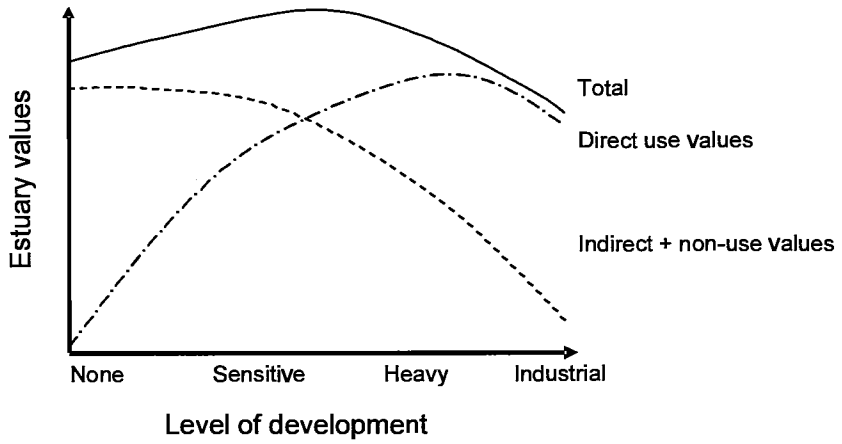

Figure 4.2. Hypothetical relationship between the level of estuary development and the magnitude of direct versus indirect and non-use values. Note that the shape of the total value curve is dependent on the relative scales of the other two curves, but is likely to be roughly hyperbolic. Note that the development scale could be logarithmic.

In general, the values associated with conservation of estuaries would be the indirect and non-use values, plus the additional direct use value that would be secured by ensuring that use levels are sustainable. The latter would accrue mainly in the future.

The opportunity cost of estuary conservation depends on the level of protection applied to estuaries. This would include any use that is restricted in the present in order to secure a flow of value in the future, i.e. a cost that is borne mainly in the present. In some cases, complete protection may be required, in which case the opportunity costs would extend to any type of use. In other cases, conservation goals may be achievable with certain types of development that are deemed compatible. Thus the values of conservation might be maintained while there are also some developmental benefits. Whichever the case, the opportunity cost of conservation would be the benefits that would be obtained by the most valuable alternative use.

Undeniably, property development is simultaneously of significant economic value and also one of the biggest threats to estuarine fauna and flora in terms of habitat loss, exploitation, disturbance and pollution. Properties adjacent to any type of wetland tend to be more expensive (Boyer & Polasky 2004), which means that the opportunity costs of protecting estuaries in urban areas are likely to be high. This creates a significant challenge for conservation planners and decision makers. Similarly, complex trade-offs are to be found with regard to the demand for development of catchment areas, which affects the health of estuarine systems through changing the quantity and quality of freshwater inputs. These trade-offs and how they should be measured and incorporated in conservation planning are dealt with further in a later chapter.

5. WATER RESOURCE PLANNING

Jane Turpie and Stephen Hosking

5.1. Introduction

The White Paper on Water Resources and the National Water Act of 1998 require the implementation of four types of regulatory activities in order to make optimal use of our country's water resources while minimising ecological damage:

1. **resource-directed measures**, i.e. defining a desired level of protection for a water resource, and on that basis, setting clear numerical or descriptive goals for the quality of the resource (the Resource Quality Objectives);

1. **source-directed controls**, i.e. controlling impacts on the water resource through the use of regulatory measures such as registration, permits, directives and prosecution, and economic incentives such as levies and fees, in order to ensure that the Resource Quality Objectives are met;

2. **managing demand** on water resources in order to keep utilisation within the limits required for protection;

3. **monitoring** the status of the country's water resources on a continual basis, in order to ensure that the Resource Quality Objectives are being met, and to enable us to modify programmes for resource management and impact control as and when necessary.

In order to achieve this, the country has been divided into nineteen Water Management Areas, roughly corresponding to major catchment basins, each of which will be managed by a Catchment Management Agency (CMA). Within these WMAs, it has been proposed to use a system of Strategic Adaptive Management (SAM), in recognition of the fact that the methods for decision making with regards to water resource allocation and management are still to be fully developed and tested. Adaptive management also lends itself to development of creative strategies for achieving the national policy objectives. Within each catchment, the agency will be involved in the development of a catchment vision and the implementation of the measures described above, as well as the development of a Catchment Management Plan.

Once there is a vision for the catchment, the CMA will carry out the resource-directed measures (RDM) for determining the resource quality objectives which describe the environmental 'Reserve' of each water resource within the catchment[2]. Water resources within a catchment include groundwater, estuaries, wetlands and river reaches. The reserve is the water quality and quantity required for the protection of basic human needs and aquatic systems. Each resource will be assigned a management class (A to D) which will determine the future level of health of that resource, and which will guide the setting of the reserve and the Resource Quality Objectives. Resources assigned to higher management classes and will be allowed less potential perturbation and will yield less water for other uses than those assigned to lower management classes.

[2] Since CMA's have not yet been established, DWAF: RDM Directorate is undertaking the RDM studies at present.

Up till now, the classification of estuaries and other resources has involved ecologists making a recommendation for the MC on the basis of the health and importance of the system. This recommendation has then been used together with other considerations (e.g. water demands), by the minister to set the final MC. The latter process has hitherto not been standardized or subject to scrutiny by the research community or by stakeholders in general. Recognising this, DWAF has embarked on the process of developing a fully integrated **Classification System** which takes ecological, social and economic factors into account in setting the MC, and hence the reserve and allocatable portion of flow.

As the main purpose of the Classification System is to ensure the protection of water resources, it could easily be construed primarily as an ecological process. Indeed, the Classification Process is required to ensure that that the ecological functioning of resources is maintained in an acceptable state (through implementing RQO and SDC). In other words, classification could be seen as something required by law, which simply serves to ensure a minimum standard of health of aquatic ecosystems, much like the Environmental Impact Assessment (EIA) process is technically designed to offer some protection to important environmental resources in the economic development process. However, classification (like EIA) is not only about achieving minimum standards, but involves choosing between ranges of options regarding the level of protection of natural resources and their economic, ecological and social consequences.

We advocate that management of freshwater allocations to estuaries should be guided by the idea of an optimal freshwater inflow rather than the idea of a freshwater reserve. In other words, the decision about how much water to allocate to estuaries should not be based solely on the minimum legal requirement. The allocations of freshwater inflow into South African estuaries are optimal when the marginal social values of the inflow are brought into equivalence with the marginal social costs. For this reason catchment management may be guided towards optimal allocation of freshwater inflow into estuaries, by reference to current estimates of the relevant marginal social costs and marginal social values.

5.2. Economic trade-offs inherent in water allocation

Economics addresses the problem of how scarce resources are allocated among unlimited wants. Water resources are scarce and have to be allocated between the environment and a number of other competing uses. If the environment is not valued then all water resources will eventually be allocated to consumptive use. On the other hand, if we are overprotective of the environment, then this will have an opportunity cost in the form of lost economic production and social welfare. An optimal balance needs to be found which maximizes societal welfare. Societal welfare stems, in part, from total economic output and its distribution (which translates into household cash income), as well as from meeting basic human needs (in terms of water supply and the supply of ecosystem goods and services needed for subsistence). It also needs to balance the needs of present and future generations.

The class of the resource affects the amount of economic production from activities which use water or affect water supply, in that the higher the level of protection of a system, the less water can be allocated to these activities. However, it also affects the amount of economic production due to goods and services produced by functioning resources, as well as other values associated with these systems.

The value of water is most readily appreciated as a direct input into economic production. Water is an essential input into all sectors that contribute to the overall economic output of the economy, although the productivity of water differs enormously from sector to sector. These values are relatively easily measured as they make a direct contribution to economic output measured in the national accounts (e.g. Gross Domestic Product). National income statistics are taken to be indicators of household income, and hence societal welfare.

Economic production cannot occur, however, without the emission of waste products. The use of water resources to dissipate the wastes is seldom quantified as economic benefits provided by the aquatic environment. Furthermore, when waste disposal into aquatic systems exceeds their absorption capacity, the environmental damages that impact on the other river users are similarly accounted for. These environmental damages, resulting from the reduction of water quantity and quality, are known as negative externalities in the economic production process.

Other activities affect water supply in the production of economic outputs. These include activities, which intercept stream flow, such as afforestation, and activities that modify return flows, such as dry land agriculture (which yields pollutants) and hydropower generation (which changes flow patterns and volumes). These activities are similarly appreciated in terms of their contribution to the national economy, but the economic consequences of the impacts that they have on aquatic ecosystems and other downstream users has not generally been taken into account.

Functioning aquatic ecosystems generate goods and services that contribute to economic production and societal welfare, though not all of these values are recognised or accounted for in conventional economic analysis or in national accounting statistics. The output of aquatic ecosystem goods, such as fish, reeds and other natural products, and services, such as water purification and flood attenuation, is affected by the quantity and quality of water flows into these resources. Until relatively recently, the value of ecosystem goods and services have largely been ignored in decision-making, to the detriment of resources, their functioning and the wellbeing of people that are directly or indirectly dependent on them.

The total value derived can be considered as a function of both the economic activities that impact on aquatic resources, and the goods and services emanating from them (Turpie & van Zyl 2002):

$$U_A = U\ (X_1, X_2, \ldots X_n; Q_1, Q_2, \ldots Q_m),$$

Where U_A is the total utility, or value, derived from the system A, (X_1, X_2, ... X_n) are the economic activities which impact on the resource, and (Q_1, Q_2, ... Q_m) are the goods and services provided by the resource. There is a complex matrix of interactions between these variables. An increase in economic activity may decrease the quality or quantity of freshwater goods and services. For example, if X_1 represents the magnitude of sugar cane production, the water abstraction and pollution associated with this production may impact on a certain wetland function, say Q_1. Similarly, an increase in one type of economic activity X_1 may decrease the output of a second economic activity, either through direct competition for water, or due to the change in function Q_1, which affects the productivity of X_2. If this example represents the utility of a single multi-user of the resource, then the costs are 'internalised' (i.e. accounted for), in that the cost of loss of Q_1 due to an increase in X_1 is borne by the user. In other words, the user would only choose to increase X_1 if the benefit of doing so is greater than the loss of Q_1. In reality, different users are involved, and a user gaining only from X_1 will thus increase production irrespective of the loss to the user who gains only from Q_1, because the costs are external to the first user (Turpie & van Zyl 2002). Thus the onus is on the decision makers (DWAF, or the CMAs in future), to ensure that the overall utility to society U_A is maximised.

Trade-offs to be made in the classification of estuaries (or allocation of water to estuaries) can be represented in terms of a simplified two-dimensional production possibilities frontier (**Figure 4**). There is limited economic value that can be obtained from resources, and the type of value generated depends on allocation decisions. The maximum value that can be obtained from different allocative combinations is illustrated by the production possibilities frontier. In reality, current allocations would probably fall within this curve, since use of aquatic resources is not 100% efficient. The production possibilities frontier illustrates the opportunity costs of licensing activities that consume or impact on water supplies to aquatic ecosystems in terms of the loss in values generated by those systems. The curve is convex because of the law of diminishing returns. The example given in **Figure 4** shows how these trade-offs might appear when viewed in terms of MCs assigned to water resources. As more water is allocated to agricultural and other uses, so the opportunity costs due to losses of ecosystem goods and services are likely to increase, and *vice versa*.

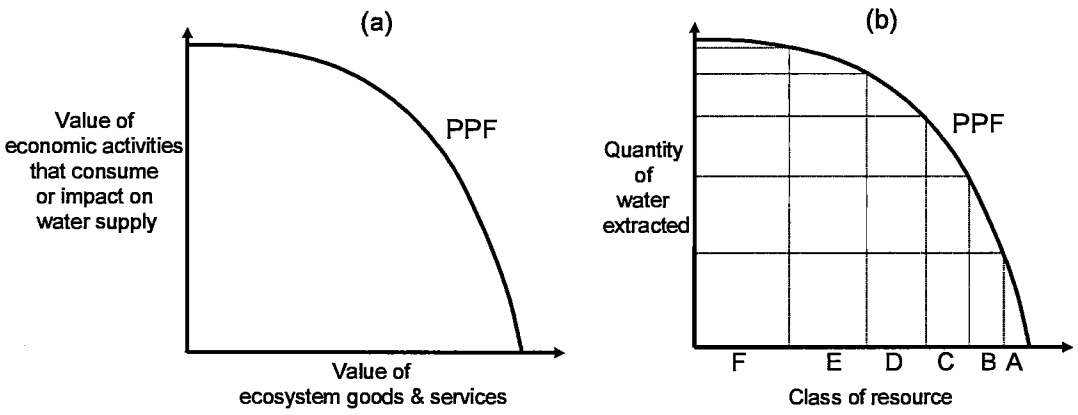

Figure 5.1. Hypothetical production possibilities frontier showing (a) the economic trade-offs between allocating water to impacting activities versus to aquatic ecosystems, and (b) an example of the trade-offs between the value of ecosystem goods and services delivered for each class (state of health) and the values generated by upstream flow abstraction.

These trade-offs are also influenced by the characteristics of the resources (aquatic ecosystems) themselves. In ecosystems whose functioning is highly sensitive to the quantity and quality of freshwater inputs, the marginal opportunity costs (in terms of losses of environmental values) of assignment to a lower future MC would be higher than for a more robust ecosystem (Figure 6.2). This has important spatial implications, in that the opportunity costs of increasing economic output from consumptive uses of water could be minimised by concentrating supply from more robust ecosystems. The importance of integrating ecological and economic issues is further highlighted by the complicating fact that in some aquatic ecosystems, conservation importance is correlated with sensitivity (e.g. rivers, small estuaries), whereas in others, it may be correlated with robustness (e.g. large estuaries).

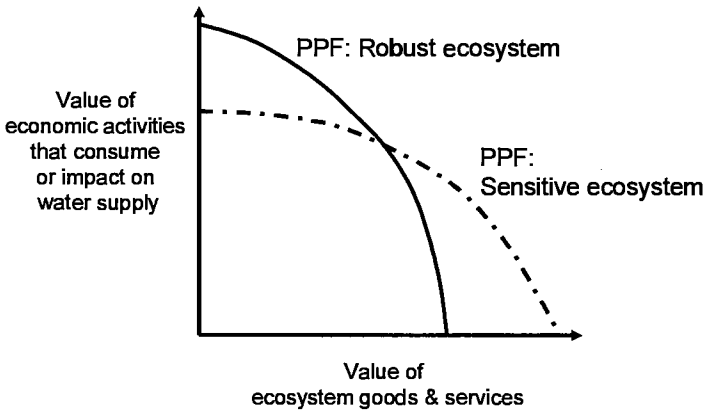

Figure 5.2. Hypothetical differences in the nature of trade-offs between values that impact on water supplies to aquatic ecosystems and the values generated by those ecosystems for sensitive versus robust ecosystems

5.3. How catchment management will influence trade-offs

Irrespective of the nature of the systems involved, and thus the types of trade-offs involved in water allocation, it is critical to address the issue of maximising efficiency of water use in a catchment at the outset. This will not only change the magnitude of the trade-offs involved, but also expand the production possibilities frontier, and changing its shape towards that of a more robust ecosystem (Figure 6.2). In other words, the primary issue to consider is how to obtain the most efficient use of water resources, so that economic returns (monetary and non-monetary) per unit of water consumed are maximised, and externalities per unit output of economic production are minimised. In this way, the opportunity cost of increasing consumptive use value of water will be reduced. This also increases the possibility of increasing economic output without changing the class of a resource.

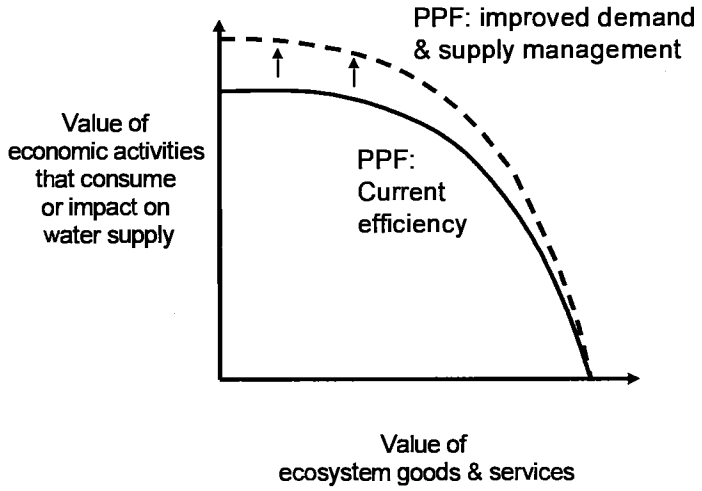

Figure 5.3. Hypothetical shift in the production possibilities frontier (PPF) resulting from improved demand and supply management of catchment resources

5.4. Defining optimum freshwater inflow

It is generally accepted that sound water resource management requires that the benefits and costs of different water allocations be compared and an optimum determined (Loomis, 1998). The same principle applies to the allocation of freshwater inflow into estuaries.

The optimum freshwater (river) inflow (Q*) into a given estuary at any given time is defined at that level where the positive difference between the total value and the total cost of this inflow is maximised, or put differently, where the marginal social value of the inflow equals the marginal social cost. The services generated from river inflow into estuaries are yielded and consumed mainly in the form of public goods, for instance, in areas suitable for boating, swimming and fishing.[3] Total benefit is what the public would be willing to pay to consume the services, and marginal benefit is what they would be willing to pay for an increment or decrement of the service, that is the sum of each individual's marginal benefit, Σ MVi.

[3] Public goods provide nonexclusive benefits to everyone in a group and can be provided to one more user at zero marginal cost.

The total cost referred to above is the opportunity cost of the water flowing into the estuary, that is, the value of the water in its best alternative use, for example, in irrigating agricultural crops.

Optimisation takes place at the level of freshwater inflow where the net benefit (total benefit minus total cost) is maximised. A necessary condition for this optimisation to take place is that the marginal cost = the marginal benefit. (Figure 9.1) If the value per m3 of water in the best alternative use to the estuary is greater than the value per m3 of inflow into the estuary, then inflow into the estuary is more than the optimum quantity and vice versa. Changing circumstances would be expected to yield different values at different moments in, or periods of, time. In addition, it is important to bear in mind that since values are based on expressed willingness to pay, the value maximising solution may not necessarily be the utility maximising solution. This depends, *inter alia*, on the relative income status of the users of freshwater and the beneficiaries of estuary goods and services. These implications need to be considered in a welfare analysis.

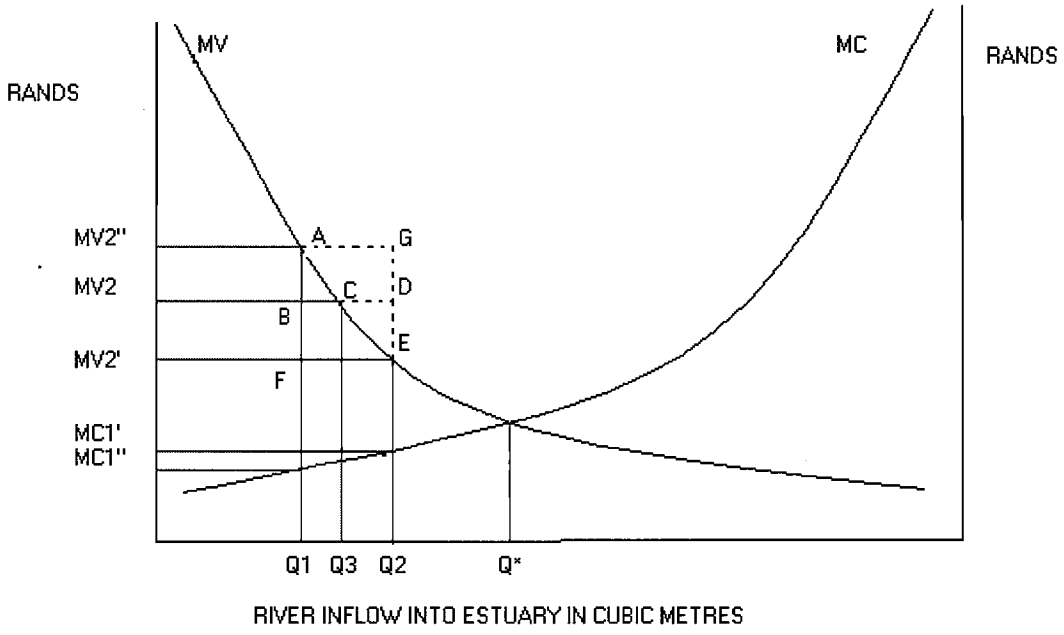

Figure 5.4. Expected Marginal Social Value and Marginal Social Cost functions. The optimal freshwater inflow is defined as Q*.

Efficient allocation of river water in South Africa requires management to be informed on both the value of water allocated to estuaries and to alternative uses. There have been numerous attempts to estimate the latter in South Africa – using marginal cost and willingness-to-pay (WTP) for agricultural land in South Africa (Hosking *et al.* 2002), but there has been less work done on estimating the former.

5.5. Proposed protocol for incorporating aquatic ecosystem values into the classification process

A proposed protocol for a National Water Resource Classification System (NWRCS) has recently been designed for the classification of resources into their management classes (DWAF 2005). This system, which is still to be refined and tested, is envisaged to comprise seven steps. Apart from including socio-economic measures, the main departure from the current practice will be that classification will take place at a catchment scale. In other words, all resources in the catchment will be classified at the same time, based on analysis of the ecological, social and economic implications of a suite of possible configurations (scenarios).

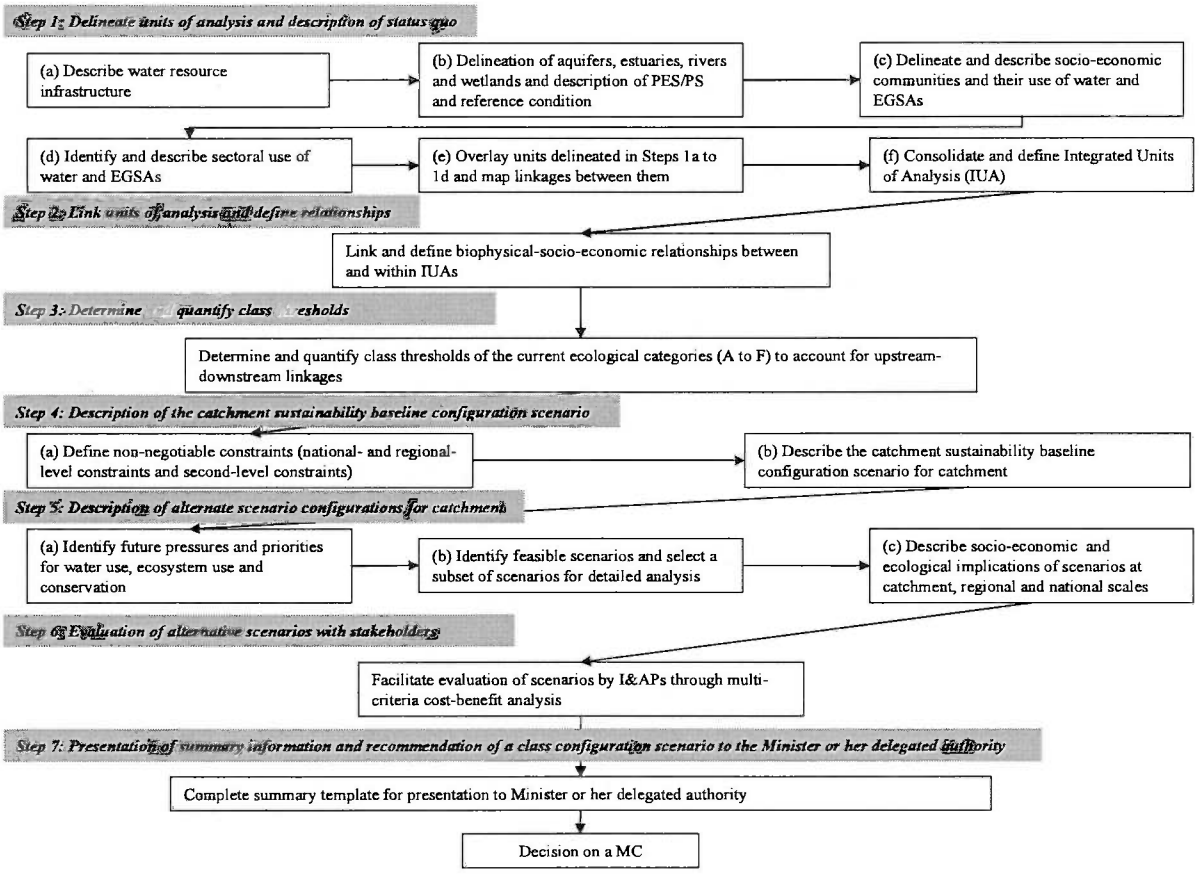

Figure 5.5. The proposed seven-step National Water Resource Classification System (DWAF 2005).

The first step of the NWRCS involves describing both household (at a community level) and sectoral use of water and aquatic ecosystem goods, services and attributes for the current situation. The fifth step involves predicting how these values change under different scenarios. It is envisaged that this predictive requirement will be met using rule-based or other models based on a general understanding of natural resource – socio-economic relationships. Such models would be strengthened as more information is accumulated over time though research and the use of the NWRCS.

6. WATER RESOURCE PLANNING

Alan Carter and Jane Turpie

6.1. Introduction

6.1.1. The role of local government in environmental management

Local govemment is at the forefront of the implementation of government's development initiatives and also have a direct role to play in the facilitation and management of private development initiatives. As such, local govemment is in a position to play a significant and pro-active role in the protection of the natural environment and estuaries, and the facilitation of planning and development processes that are environmentally sustainable.

Local govemment operates in a challenging set of circumstances in terms of ensuring environmental sustainability. The pressure for development that exists in South Africa can impose tremendous pressure on the natural environment. According to environmental policy papers, the most significant impacts include an increased demand for natural resources, such as land, water and energy as well as increased pollution and waste generation. This means that environmentally sustainable development is fast becoming a critical imperative. The pressure for development and its impact on the natural environment have to be balanced with the protection of the environment, which may require direct intervention at local level in local govemment's planning and management processes.

Local govemment's role in terms of the natural environment dimension entails different aspects. Local govemment has to ensure that environmental considerations are taken into account and that environmental principles set out in policy and legislation are adhered to in all of its planning and development processes. Local govemment also has to be aware of and ensure that it's planning and implementation is aligned with environmental management measures that are prepared by other spheres of govemment, such as Environmental Implementation Plans and Environmental Management Plans. At the project level environmental impact assessments may be required in the case of certain land use changes or development applications for environmentally sensitive areas. Depending on local circumstance, municipalities may also be involved in strategic environmental assessment processes as part of spatial and other planning initiatives.

6.1.2. Conservation and sustainable use of Eastern Cape estuaries

Since local govemment has the most direct relationship with communities and issues at the ground level, that they have a key role to play in promoting the management and appropriate use of estuarine resources. However, there is confusion conceming the roles and responsibilities of local government and civil society with regard to estuary management and particularly how estuary values and development opportunities are integrated into the Integrated Development Planning (IDP) process (Breen *et al.* 2004).

Following from the issues identified in Breen *et al.* (2004), the following specific recommendations were made relevant to integrating estuarine values into the IDP process:

- Define, delegate and formalise the role of municipalities in promoting co-operative govemance with respect to estuaries not located within protected areas.
- IDP departments within coastal municipalities act as Centres responsible for promoting co-operative govemance and management of estuaries at municipal level.
- National/provincial departments to provide municipalities with strategic guidance with regard to local estuary management.

- Establish formalized Estuary Management Forums with roles and responsibilities agreed upon with the IDP department/Centre.
- Focus more effort at the local level to stimulate participation in estuary management.
- Adopt a Rapid Assessment Matrix approach to facilitate co-operation between municipalities and Estuary Management Forums to develop and implement strategies for managing the consumptive use of estuary resources.
- Develop a national strategy for the conservation of estuary biodiversity and incorporate into IDP procedures as soon as possible.
- Incorporate monitoring protocol into the procedures used by municipalities to monitor IDP progress
- Incorporate rehabilitation protocol into the procedures used by municipalities when analysis in planning indicates the need for rehabilitation.
- Municipal IDP departments acting as Centres that promote the dissemination of data and information and coordinates activities with Estuary Management Forums.
- Finally, that a second phase of the estuaries programme be initiated specifically to incorporate estuary management into the IDP process and build this capacity in selected case studies.

An understanding of the IDP process is necessary before developing plans or initiatives for implementing some or all of the above recommendations. While the IDP process theoretically should incorporate important environmental considerations, this is not always easy in practice. Thus, the current chapter attempts to answer the following two questions:

1. How does the IDP process affect and how can it be affected by estuaries?
2. How can estuary values be taken into account in the IDP process?

The discussion below provides a brief overview of the IDP process and attempts to identify the available opportunities and challenges for incorporating estuary values into the IDP process.

6.2. The Integrated Development Planning process

6.2.1. An overview of the IDP process

According to the Municipal Systems Act (MSA) all municipalities (i.e. Metros, District Municipalities and Local Municipalities) have to undertake an **integrated development planning** process to produce integrated development plans (IDPs). As the IDP is a legislative requirement it has a **legal status** and supercedes all other plans that guide development at local government level.

The IDP process is one of the key tools for local governments to cope with their developmental roles and responsibilities. It is the principal strategic planning instrument which guides and informs all planning, budgeting, management and decision-making in a municipality for a five year period. IDPs are also supposed to guide the activities of other spheres of government, corporate service providers, NGOs and the private sector within the municipal area.

Integrated development planning is a very interactive and **participatory process** which requires involvement of a number of stakeholders. Because of its participatory nature it takes a municipality approximately 6 – 9 months to complete an IDP which is closely related to the municipal budgeting cycle. The IDP is reviewed annually which results in the amendment of the plan should it be deemed necessary.

Integrated Development Planning is about the municipality identifying its **priority issues/problems**, which determine its **vision, objectives and strategies** followed by the identification of **projects** to address the issues. A very critical phase of the IDP is to link planning to the **municipal budget** (i.e. allocation of internal or external funding to the identified projects) as this will ensure that implementation of projects and hence development is directed by the IDP. The basic cycle and linkages are shown in Figure 7.1.

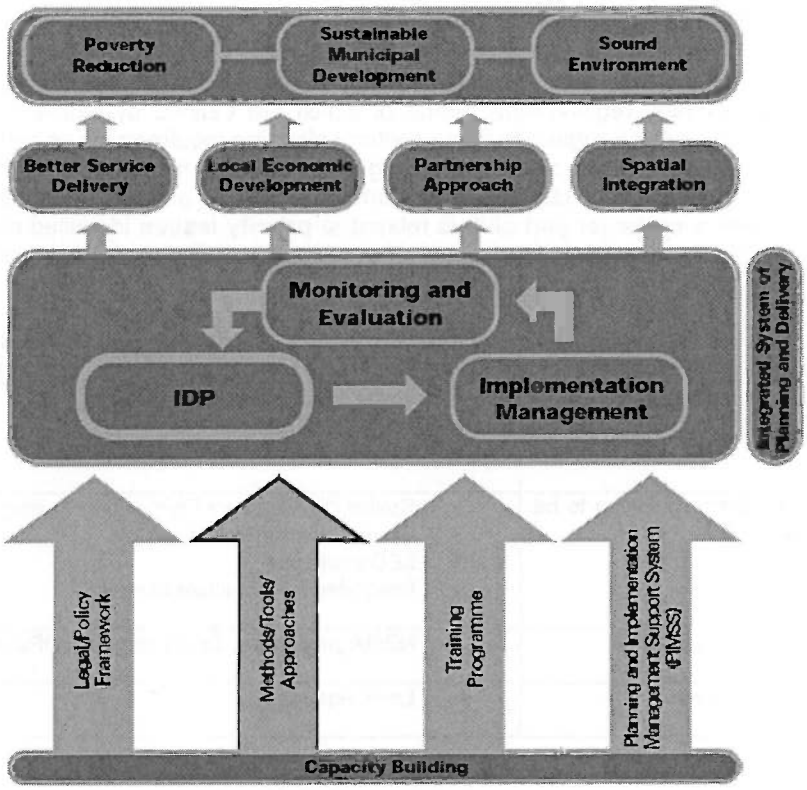

Figure 6.1. Schematic of the Integrated Development Planning Process (From IDP Methodology Guide Pack)

6.2.2. Strategic Approach

The IDP process follows a **strategic planning** approach, which implies making the best use of limited resources considering the given conditions and policy guidelines. It includes:

- **prioritising** on a few crucial issues rather than dealing in a comprehensive manner with all issues
- **focusing** analysis rather than wasting resources for collection of useless information
- **addressing root causes** of problems, rather than only symptoms
- taking given **resources and relevant context** into account
- **identifying** and **analysing alternative strategic options**

Prioritising, focusing and making choices require debate on the distribution and allocation of scarce resources, between departments, population groups and locations. The IDP tries to provide an appropriate **forum and systematic manner** of dealing with given challenges.

The IDP approach, by being a strategic planning approach, can also be seen as a **conflict-resolving process**. By providing a systematic and transparent decision-making process, it will help find acceptable solutions within given time-periods, thereby overcoming many of the decision-making deadlocks which delay the delivery of services.

6.2.3. IDP and Sectoral Planning

Sector agencies within a municipality, as well as those belonging to other spheres of government, have their own planning requirements, some of which are defined by legislation (**Table 7.1**). The IDP approach is supposed to be aligned to these sectoral planning requirements so that they are incorporated in the IDP process. As a result, sectoral planning requirements will be met by the IDP process wherever such planning requirements relate to **cross-cutting issues** (e.g. spatial planning and environmental issues) and where a sector (or part of it) is related to **priority issues** identified during the IDP process. This means that there will be varying degrees of overlap, depending on the coincidence between sectoral planning requirements and a municipality's priorities.

Table 6.1. Requirements for municipalities to undertake planning under national sector legislation

Category of requirement	Sector requirement
Requirement for a distinct plan	• Water Service Development Plan • Integrated Transport Plan • Integrated Waste Management Plan
Requirement for sector planning to be incorporated into IDP	• Spatial Development Framework Housing strategies and targets • **Coastal management issues** • LED strategies • Integrated infrastructure planning
Requirement that IDP complies	• **NEMA principles**, DFA principles, EIPs and EMPs
Value adding contribution	• Local Agenda 21

The MSA also states that development strategies must be aligned with national or provincial sectoral plans and planning requirements. It also establishes that a single, inclusive and strategic plan must be adopted which links, integrates and coordinates plans. A key concern with respect to the IDP process is how to achieve alignment or **integration** between the different development sectors that support municipal development. Development sectors such as water, sanitation, waste management, health etc. have traditionally been institutionalized (e.g. water and sanitation department, waste management department, health department, etc) and addressed through separate line functions.

6.2.4. Alignment with national policy guidelines and principles in IDP

The White Paper for Local Government (WPLG) provides guidance on those national policies that are relevant to local governance. Integral to these policies is environmentally **sustainable development** and a safe and healthy environment. The Development Facilitation Act (DFA) provides further specific spatial development principles that are relevant to environmental management such as compact towns and cities instead of urban sprawl.

With respect to considering national development policy guidelines and principles in municipal integrated planning, the IDP Guide Pack suggests the following with respect to **environmental soundness and sustainability**:

- Identification of environmental degradation and risks during the IDP analysis.
- Involvement of competent stakeholders and/or resource persons in charge of environmental concerns in the public participation process
- Making sure that major environmental problems and threats are reflected in the objectives
- Assessing alternative strategies by considering their environmental impact
- Considering environmental aspects when designing project proposals.

6.2.5. The roles and responsibilities of different spheres of government

Municipalities are responsible for the preparation and adoption of IDPs. However, integrated development planning requires involvement of all three spheres of government. Some contributions also have to be made by provincial and national govemment to assist municipal planning.

At the **local level**, the local, district and metro municipalities each have to prepare and adopt an IDP. In addition, district municipalities have to **provide support to poorly capacitated local municipalities and** facilitate the compilation of a framework which will ensure coordination and alignment between local municipalities and the district.

At the **provincial level**, the provincial Department of Local Govemment monitors the process and has an important financing, guiding and co-ordination role, ensuring alignment between municipalities and with sectors. It also co-ordinates training. Sector Departments (e.g. DEAET in the Eastem Cape) contribute their expertise, policies and information.

At a **national level**, the Department of Provincial and Local Government is responsible for IDP-related policy and legislation, IDP guidelines, financial assistance, a national training framework, and establishment of a Planning and Implementation Management Support System (PIMSS). The Sector Departments e.g. DEAT, DWAF) contribute relevant information and expertise.

In tum the Sector Departments (provincial and national) are guided by the municipal IDPs in the allocation of resources at the local level.

6.2.6. Alignment with other spheres of government

While each sphere of government is responsible for the planning of activities for which it is responsible, at the same time, these respective activities and the corresponding plans need to be aligned to one another. The White Paper on Local Govemment indicates explicitly that local govemment planning needs to be informed by and aligned with national and provincial policies, principles, strategies and standards.

Similarly, the Municipal Systems Act of 2000 (MSA) indicates that planning at the municipal level must be aligned with, and compliment, the development plans and strategies of other affected municipalities and relevant provincial and national organs of state. However, the MSA does not specify how this alignment is to be achieved. The IDP Guide Pack suggests that the municipality is responsible for this, and must adjust its plan if it is not aligned with the development plans and strategies of other organs of state.

6.2.7. Consultative/Participatory Approach

The IDP Approach is based on the principle of **inclusive and representative consultation and/or participation** of all residents, communities and stakeholders within a municipality, as well as representatives from other spheres of govemment, sector specialists, and other resource persons. However, direct participation of residents and community members through public meetings is the **exception** rather than the rule.

The approach used is based on **institutionalised participation** with an IDP **Representative Forum** as the major organisational body, and with provision of adequate time for the representatives to

consult with their communities or their membership before discussing the issue in the IDP Representative Forum.

Participation and consultation should occur **during all phases** (see below), rather than being exclusively applied during the assessment and prioritisation of needs or problems during the Analysis Phase. This would provide opportunity for public debate on ways of solving problems, for consultation on specific projects, and for public comment on the draft IDP.

6.2.8. Roles and responsibilities of district and local municipalities

A district municipality is responsible for integrated development planning for the district municipality as a whole, including a **framework** for integrated development plans of all **local** municipalities in the area of the district municipality. This framework binds both the district municipality and the local municipalities in the area of the district municipality. The district IDP framework must, *inter alia*, identify all matters that must be included in the district IDP and local IDPs and that require alignment, and specify the principles to be applied and the approach to be adopted in respect of those matters.

There has always been some confusion about the **distribution** of **roles and responsibilities** between Districts and Local Municipalities in the IDP process. Should the Districts go ahead with planning and establish a framework plan as a basis for local level planning? Or should the local level go ahead first, leaving it to the Districts to produce an amalgamated and consolidated plan on the basis of local plans? The demarcation process has resulted in a fundamental change in the distribution of roles and relationships. Previously, the roles of both levels were not strongly interrelated and the Districts were mainly expected to cater for those areas not covered by Local Municipalities. Now with wall-to-wall municipalities, Districts are responsible for the same areas as Local Municipalities. Sharing responsibilities for the same areas of jurisdiction requires cooperation in the IDP process.

According to the Municipal Structures Act and the Municipal Systems Act, both tiers of local government have to elaborate IDPs as a crucial part and tool of their management and delivery system. In order to avoid duplication of work, the two planning processes should be closely interrelated. The design of this interrelation and distribution of responsibilities has to take **four imperatives** into consideration:

1. The analysis and prioritisation of needs and problems needs to be done through a **participatory process**, involving local communities and stakeholders. Information on service gaps and on potential needs must be location-specific. This has to be done by Local Municipalities, which are close to the residents.

2. Local Municipalities and District Municipalities need their **own planning processes** and their own planning documents if IDP is to contribute to institutional transformation and if it is meant to inform municipal budgets and business plans. Therefore, one district-level plan for all local government entities within the district will not be sufficient to make IDP an effective tool for development local government.

3. There are **strategic planning and decision-making processes** which are of similar nature for all local municipalities, and which need high level facilitation and professional skills, as well as the involvement of sector specialists from provincial level. Therefore, the elaboration of strategies may be better done jointly by all Local Municipalities, together with Districts and provincial officers on District level.

4. Smooth **coordination** between adjacent local municipalities and between local and district level. Local and District-level planning should be done parallel and inform one another rather than in a one-sided bottom-up or top-down manner.

6.2.9. The IDP phases

The IDP methodology consists of five phases (Table 7.2). More detailed information on the phases is provided in Appendix A. The final outcome of the process will hopefully be an IDP document which has the support of the municipal administration, the municipal residents, the district council and all relevant agencies in charge of implementation of programmes and projects within the municipal area of jurisdiction and which is approved by the Municipal Council.

Table 6.2. The five phases of the IDP process, with a brief summary of the purpose and process involved for each phase.

Phase	Purpose	Process
1. Analysis	Identify priority needs and problems, understand available resources and dynamics influencing development	Data-based analysis of service standards/gaps, participatory problem analysis/issue prioritization, in-depth analysis – dynamics, causal factors, resources, etc.
2. Strategies	Ensure broad intersectoral debate on way to tackle priority issues, that are appropriate, innovative and cost-effective	Formulation of vision, development objectives and strategies; Project identification
3. Projects	Ensure detailed, concrete project planning process	Design and specification of projects for implementation, defining target group, location, timing, responsible agencies and budget
4. Integration	Ensure that projects are in line with municipal objectives, strategies, resource framework and legal requirements; harmonise projects	Presentation of proposals to IDP Representative Forum; Matching and alignment with municipality Revision by Project Task Teams
5. Approval	Ensure that all stakeholders, including other spheres of govemment, have been able to comment before IDP is adopted	IDP is submitted to the municipal council for approval; the council assesses whether it identifies the issues of the area, the extent to which strategies and projects will contribute to addressing these, and ensures that it complies with legal requirements; Public comment is incorporated.

6.3. Spatial Planning requirements

Land use planning used to be a relatively *ad hoc* process that took place at various spatial scales. This has changed, however, with the demarcation of the municipalities and introduction of the Municipal Systems Act and the subsequent Land Use Act. Now previous efforts will be superseded by land use planning which emerges from the Spatial Development Frameworks, which are a product of the IDP process.

Land-use planning is now an integral part of the development planning process, and all municipalities are required to draw up Spatial Development Frameworks (SDFs) which are allied to their Integrated Development Plans (IDPs). These SDFs will provide indicative plans, that show the desired patterns of land use, directions of growth, urban edges, special development areas and conservation worthy areas. In drawing up these plans, municipalities will be obliged to consider sustainability issues and safeguarding the environment in terms of the Constitution and NEMA. Thus instead of following the somewhat ad hoc process of the past, it is envisaged that land-use planning will ultimately encompass all areas of the country. Moreover, planning at the municipal level will be integrated with spatial and development planning conducted at broader scales, as they will be obliged to align these plans with national and provincial strategies on socio-economic development, sustainable development and bioregional planning[4]. In addition, it may soon become a legal requirement for local level planning to take regional conservation planning initiatives into account. Indeed, conservation of biodiversity is a prerequisite for sustainability.

'Spatial planning' can mean a number of things, ranging from government decisions on where public investment should be made, to local land-use planning and the administration of zoning and other regulatory mechanisms. It encompasses `town and regional planning' and `land-use planning'. The following definitions are given by the White Paper on Spatial Planning and Land Use Management (DLA 2001):

- **Spatial planning**: "planning of the way in which different activities, land uses and buildings are located in relation to each other, in terms of distance between them, proximity to each other and the way in which spatial considerations influence and are influenced by economic, social, political, infrastructural and environmental considerations.

- **Land-use planning**: planning of human activity to ensure that land is put to the optimal use, taking into account the different effects that land-uses can have in relation to social, political, economic and environmental concerns.

More recently, the term `**development planning'** has been favoured as representing a more integrated approach to planning (DLA 2001). The White Paper was developed following the realisation that there must be integration between the various planning processes and institutions of different spheres and sectors (DLA 2001). Indeed, the principles underlying the current planning framework include integration as well as sustainability, equality and efficiency. The spatial aspects of Integrated Development Planning are governed by the legislation of the Land Use Act and the Municipal Systems Act.

[4] According to the Biodiversity Bill, a **bioregion** is a specified "geographic area of any scale that contains whole or several nested ecosystems and which can be characterised by its landforms, vegetation cover, human culture and history". A bioregion is identified by local (human) communities, governments and scientists. It must be large enough to maintain the integrity of the plant and animal communities, but small enough for local people to think of it as home. Furthermore, a **bioregional plan** must amongst other conditions, "contain measures for the effective management of its biodiversity, and be aimed at ensuring the long term survival in nature of the species or ecosystem to which the plan relates".

The new laws pertaining to spatial planning are based on the premise that (1) local government forms the most important sphere for decision making, and (2) the IDP required by the Municipal Systems Act forms the key planning instrument. The two key elements of the spatial planning, land use management and land development function of local government traditionally known as `forward planning' and `development control' are now termed 'integrated development planning', and 'land use management'. These two elements have to be effectively linked if planning is to be successful. IN the past, the latter was performed by local government, through building regulations (zoning), before any planning took place. This meant that planning had limited impact on actual patterns of development. Under the new system, land use management will include encouraging desired types of development as well as setting limits to types of development. Land use management by municipalities will thus include regulation of:

- Rezoning;
- Development of previously undeveloped land;
- Subdivision or consolidation of land;
- Upgrading informal settlements; and
- Facilitation of land development e.g. through public-private partnerships.

The last is the main departure from earlier ways of doing things, requiring proactive participation on the part of municipalities.

Every municipality is required to produce an *indicative plan*, called a '**spatial development framework (SDF)**', showing desired patterns of land use, directions of growth, urban edges, special development areas and conservation-worthy areas. It must also produce a *scheme*, called a '**land use management system (LUMS)**' recording the land use and development rights and restrictions applicable to each erf in the municipality. The plan should be flexible enough to accommodate changing priorities, and the scheme has to conform to the plan. The plan (SDF) is a *guide* to development, and the scheme (LUMS) is *binding*.

Each municipality's **spatial development framework** has to have four components:

- a policy for land use and development;
- guidelines for land use management;
- a capital expenditure framework showing where the municipality intends spending its capital budget; and
- a strategic environmental assessment.

The SDF has to produce guidelines regarding the following:

- directions of growth;
- major movement routes;
- special development areas for targeted management to redress past imbalances;
- conservation of both the built and natural environment;
- areas in which particular types of land use should be encouraged and others
- discouraged; and
- areas in which the intensity of land development could be either increased or reduced.

It is not supposed to be comprehensive but should guide decision makers in respect of development applications, providing clear arguments as to the approach taken. In rural areas it will have to deal specifically with natural resources and management issues, land rights and tenure arrangements. The **land use management system** (LUMS), which sets out development rights applicable to each parcel of land, can be range from simple to very complex, depending on the urban-rural nature of the municipality, and its complexity. Once the spatial development framework is approved it will be binding for the private sector and for all spheres of government. It will thus be a central element in the system of cooperative governance.

6.4. Provision for incorporating the environment in IDP and the current reality

6.4.1. Provisions

Environmental issues are cross-cutting, which means that they have to be addressed in IDP. Indeed estuaries are particularly cross-cutting, given their linkages with entire catchment areas and the inshore marine environment. Municipalities must incorporate a strategic environmental assessment into their spatial development frameworks, forming part of their IDPs, and that they now also take the responsibility for EIAs, in theory to help resolve environmental and planning conflicts (DLA 2001). IDPs are thus explicitly required to consider environmental issues and indicate how negative impacts will be resolved and/or avoided. This is done in the form of:

- Strategic Environmental Assessments and/or State of the Environment Reports (Analysis Phase), and
- Environmental Implementation Plans (Strategy Phase)

6.4.2. Capacity

Most Eastern Cape municipalities are well underway in the development planning process. However, there is presently somewhat limited capacity in the environmental sphere (Appendix B), which also affects the capacity for consideration of the estuaries.

While some municipalities have dedicated environmental management units or officers, others have no such arrangement. Capacity is particularly lacking among some of the smaller local municipalities. Local municipal IDPs are often prepared by Planners with little or no environmental input or knowledge or do not appreciate the significance of environmental issues and values of estuaries (e.g. Great Kei IDP). Environmental (and therefore estuarine) issues are typically considered a low priority. Thus, to some extent, the onus is on the district municipalities to ensure that local municipalities are identifying environmental issues.

Indeed, local municipalities are supposed to receive support in this regard. Municipalities that lack capacity or resources should be able to look to district, provincial and national spheres of government for guidance and resources to meet their environmental planning obligations. The problem is that, apart from Amatole, District Municipalities generally do not have dedicated environmental departments, and support for local municipalities is limited.

At a provincial level the Eastern Cape Department of Economic Affairs, Environment and Tourism (DEAET), has a Provincial Coastal Committee, although attendance by municipal officials is sporadic, and a Coastal Manager has recently been appointed. The National Department of Environmental Affairs and Tourism (DEAT) provides ongoing support to DEAET, but limited support at the municipal level.

6.4.3. Progress and challenges

The development of IDPs is well under way, but relatively few municipalities have completed their SDFs. In most cases integration of natural environment into the IDPs has been somewhat superficial. This has been because it is considered irrelevant or because planners have not known how to accommodate it. Both of these problems urgently need to be addressed. It is also important to note that the problem is at the scale of the environment in general, of which estuaries form just a small part.

Integrating estuary conservation into these plans thus presents an even greater challenge. Nevertheless, the fact that much work is still to be done in completing municipal SDFs provides an opportunity to integrate environmental issues that have so far only been given lip-service in the IDPs.

A start has been made with the preparation of State of the Environment reports or Strategic Environmental Assessments that are meant to identify significant environmental and estuarine issues and several municipalities are taking into account the findings of the Subtropical Thicket Environmental Planning project (STEP) in the compilation of their Spatial Development Frameworks.

In the Eastern Cape, SoERs have been completed for Amatole District Municipality and Buffalo City Municipality. However there are still some coastal District Municipalities (e.g. OR Tambo DM and Cacadu DM) and many local municipalities (e.g. Great Kei, Mbashe, Nqushwa, etc.) that have not. Environmental Implementation Plans (output of the strategy phase of IDP) have also been completed for Amatole District Municipality and Buffalo City Municipality.

The following are some examples of the way in which environmental considerations have been incorporated into IDP in the Eastern Cape municipalities, and the implications for estuaries.

Amatole District Municipality (ADM)

The ADM State of Environment Report indicates that there are 98 estuarine systems in the district. The challenges facing estuaries include pressure from development, lack of good scientific information on systems, water quality, siltation, over utilization of resources etc.

ADM appointed a dedicated Environmental Manager in January 2004 based on recommendations coming out of the State of the Environment Report and Environmental Implementation Plan, which was completed in May 2003. ADM was one of the first (if not the first) DM to produce a State of Environment Report in the country.

The appointment of an Environmental Manager has been a vast improvement where important environmental input is provided on ADM projects (housing, sanitation, water etc.). The environmental manager's position has also recently facilitated the initiation and completion of two important studies in the area that are relevant to estuarine management. Recent drafts of the ADM Coastal Zone Management Programme (CZMP) and Environmental Management Plan/System (EMP/S) have also recently come out for comment. Again, this achievement is a significant milestone for the DM and reflects its commitment to meeting its legislated obligations in terms of environmental management.

The recently revised IDP Report (2004/2005) indicates that in order to facilitate integration, ADM has adopted a cluster approach, where priority issues are clustered within four strategic clusters. Environment is grouped with Local Economic Development (LED). The IDP contains several priorities, objectives, strategies and projects that are relevant to estuaries (Table 7.3).

Table 6.3. Environmental management priorities, objectives and strategies in the Amatole District Municipality IDP that are relevant to estuarine management

Priority area	Objective	Strategy	Funded projects relevant to estuaries
Environmental Management System	District wide coordination of environmental management	Develop an environmental Management System/Plan/Manual Implement environmental programmes and projects Update SoER	Develop and implement an EMS in line with ISO14001
	Enhance ADM and LM institutional capacity regarding environmental management	Designated environmental officers at DM and LM levels Establish Environmental Management Forum Promote community environmental capacity and awareness	
	Promote sustainable utilization of renewable resources	Implement projects that promote sustainable utilization of renewable resources	
	Preserve the natural vegetation of the ADM	Eradicate alien vegetation in ADM	
Coastal Zone Management	Manage coastline in terms of the Coastal Zone Management Bill	Develop and implement CZMP Coastal zone programmes developed by LMs	Develop and implement an ICZMP Develop municipal coastal management plans for all LMs Implement pilot projects
Renewable resource use	Promote sustainable utilization of renewable resources	Develop and implement projects that promote sustainable utilization of renewable resources	
Biodiversity protection	Promote protection of biodiversity	Lobby to protect areas of high biodiversity	
Pollution	Promote and unpolluted environment	Comply with legislation by building capacity of community environmental representatives	
Legislation	Compliance with SA legislation		

Although the appointment of an environmental manager and the completion of various reports are positive developments, ADM faces significant challenges in managing particularly the environmental and estuarine issues associated with the smaller and less capacitated LMs within its jurisdiction. ADM has a legal obligation to provide support to poorly capacitated local municipalities. The challenges include:

- Estuarine issues may not get the attention required where other competing problems are more urgent, such as poverty alleviation, provision of housing, sanitation services, etc.
- Lack of capacity and skills relating specifically relating to estuarine issues.
- Extensive areas need to be covered by one person.
- ADM has to deal with environmental issues associated with its own roles and responsibilities, activities and projects, *let alone* those of LMs.
- Public and municipal awareness concerning environmental and estuarine threats are not adequately addressed.
- The legal obligations of the municipality and private landowners in terms of policy and legislation are not being adequately adhered to or enforced.

Buffalo City Municipality (BCM)

BCM has 11 estuaries within its jurisdiction which are under threat from development and in the case of those located close to urban centres, water quality is a problem.

The Municipality established an Integrated Environmental and Sustainable Development Unit in 2001 and appointed an Environmental Manager to head the Unit. The Unit is designated as a "strategic" function that reports directly to the IDP Manager and the City Manager on certain projects.

Environmental issues have been integral to the IDP process right from the outset, and out of which a number of projects have been funded and initiated, including:

- The IEMP Unit provided considerable input into the first IDP report, so environmental management issues have been on the IDP agenda for some time.
- A draft State of Environment Report has been completed
- A draft State of the Coastal Zone Report has been completed
- Currently completing Integrated Environmental Management Plan and Coastal Zone Management Plan
- SDF has included environmental input

The IDP contains several priorities, objectives, strategies and projects that are relevant to estuaries (Table 7.4). Some relevant projects have been funded and initiated.

While environmental and estuarine issues receive appropriate consideration in the BCM IDP process, challenges relate mostly to integration of environmental and estuarine values into other operational functions.

- Various operational departments such as engineering are required to provide various services. However, projects are being planned in isolation of other important stakeholders both within and outside the municipality.
- There is significant pressure for development along estuaries and clear spatial planning policy guidelines are needed to control development in environmentally sensitive areas.
- Positions taken on environmental issues are seen by some as obstructing economic progress.
- Public and municipal awareness concerning environmental and estuarine threats are not adequately addressed.
- The legal obligations of the municipality and private landowners in terms of policy and legislation are not being adequately adhered to or enforced.
- Environmental issues are competing with problems that are deemed more urgent, such as poverty alleviation, provision of housing, sanitation services, etc.
- Rezoning and other land use change applications are being approved without appropriate environmental consideration.

Table 6.4. Environmental management priorities, objectives and strategies in the Buffalo City Municipality IDP that are relevant to estuarine management

Priority Issue	Objectives	Strategies	Funded projects relevant to estuaries
High pollution levels in the water	Improved water quality and management	Obtain SABS accreditation for the Scientific Services Laboratory within 4 years Establish and implement a Water Quality monitoring programme in compliance with national standards A structured and well-functioning institutional framework, with sufficient and well-trained staff.	Partial funding in 2005/6
Lack of capacity to provide effective Environmental Management and Pollution Control			
Spatial fragmentation	A well structured, efficient and sustainable city	Manage land use sustainability in urban, peri-urban and rural areas Implement the principles of integrated environmental management (IEM)	All SDF initiatives have had environmental input and will also be informed by IEMP and CZMP
Uncoordinated spatial development	Environmentally sustainable and spatially co-ordinated sectoral practices		
Unsustainable management and use of the environment by different stakeholders	A safe, healthy and sustainable environment within the BCM	Formulation and adoption of an Integrated Environmental Management Programme (EMP)	Funded in 2004
High pollution levels in water, soil and air	Improved air and water quality and land pollution management	Establish and implement a Land and Water Quality monitoring programme in compliance with national standards and permit conditions set by regulatory authorities	Partial funding in 2005/6
Lack of capacity to provide effective Environmental Management and Pollution Control services.	A comprehensive, effective and acceptable water quality monitoring programmes throughout the BCM		
Negative environmental and health impacts due to unsustainable solid waste management (e.g. lack of long-term planning).	Comprehensive integrated long-term waste planning	Formulation, adoption and implementation of an Integrated Waste Management Plan (IWMP) Investigation of alternative uses and treatment of waste	
	Efficient, effective and appropriate waste collection and treatment services in the entire BCM		

Great Kei Local Municipality

Great Kei Municipality (GKM) has some 14 estuaries within its jurisdiction. Estuarine issues relate mainly to pressure for development, siltation from poor farm practices, and to a limited extent, water quality.

While there is a general awareness of the need for environmental conservation, the GKM has very limited environmental management capacity. This role is currently largely being carried out by the technical manager with the assistance of various service providers. A Spatial Development Framework (SDF) is currently being formulated for GKM together with a Strategic Environmental Assessment (SEA), with an emphasis on spatial issues and opportunities along the coastline.

It is clear that environmental and estuarine issues are recognized in the GKM IDP process. However, they are not deemed to be a priority against other developmental objectives. The revised 2005/6 GKM IDP has the following to say about the current state of the environment:

The formulation of IDP's is of critical importance to coastal management efforts. The recognition of coastal principles and issues in the formulation of these plans is important to ensure that coastal features, systems and assets are not degraded. In the Amatole IDP (1999 - 2000) it is concluded that the environmental management responsibilities of District Municipalities are unclear and the finalisation of powers and functions is only expected in June/July 2002. Subsequently, the Amatole District Municipality has decided to prepare an Environmental Management Plan.

In this regard numerous pieces of legislation (Acts, Ordinances and Bills), policy strategies and instruments (White and Green Papers, spatial planning policies) are relevant to managing the human and natural components of our coast. However, legislative and regulatory instruments are seen to be merely as one of many options for coastal management

There is a range of roleplayers currently involved in coastal planning and management within the Great Kei Municipality. These actors undertake a range of activities, both formally and informally. The effectiveness of their involvement is highly variable and depends on a range of factors, such as financial and administrative constraints, available human resources, level of skill and training and political will. It is apparent that significant scope exists for other stakeholders, not traditionally involved in coastal management, to play a greater role. The Great Kei Municipal area boasts opportunities for eco-tourism development with features related to its cultural and historical heritage.

The Coastal Forest Reserves are noted as a distinct land use of the area to be incorporated into the spatial and strategic components of the IDP (refer to Table 21). Associated with this is the proposal by the Friend's of Morgan's Bay for an extension of the Cape Morgan Nature Reserve by rezoning adjacent commonage in a north westerly direction. This proposal would enable the establishment of a Biosphere Reserve linked to the streams feeding into the Incarha Estuary. A number of benefits would accrue to the community in the form of resource utilization (grass for building and craft manufacturing) traditional ceremonies, tourism activities, research projects, eco-tourism job opportunities, protection of flora and fauna and re-introduction of locally extinct species.

Despite the above and the ever increasing pressure for development on coastal ecosystems, it should be noted that **environmental concerns were not included as a priority issue in the IDP as the following excerpt reflects:**

The IDP process did not highlight Environmental issues as a priority/key issue in the formulation of strategies and projects. However, it was recognised that effective Environmental Management is critical to the survival of Tourism and Agriculture which are the backbone of the municipal Economy. The Great Kei Municipality lacks adequate capacity to manage and monitor the various activities and development projects from an environmental point of view. It is anticipated that the District municipality will assist in monitoring new projects and existing operations where detrimental environmental impacts can result. Examples include the establishment of cemeteries in flood plains, dumping of hazardous waste and effluent, burning of waste material and exploitation of natural resources.

With respect to development strategies, the IDP states the following:

The environment of the Great Kei Municipal area is in many respects unique and fragile which enhances the area as a tourist destination. Strategically, the municipality proposes to achieve a well managed environment through fostering a partnership with the District Municipality and the Government who are accountable for this function.

Generally, decision-makers in GKM are not sufficiently aware of environmental issues, although consultants have not been obliged to use the STEP information in relevant reports, proposals, plans etc. There is no dedicated environmental department nor is this responsibility formally allocated to a particular official (this role is being managed informally by the technical manager).

- The municipality is seriously under-capacitated from a manpower perspective and also specifically in terms of environmental awareness.
- Other problems are deemed to be more urgent than environmental, such as poverty alleviation, provision of housing and services, etc.
- Rezoning and other land use change applications are being approved without appropriate environmental consideration.
- There is significant pressure for development along estuaries and clear spatial planning policy guidelines are needed to control development in environmentally sensitive areas.
- Public and municipal awareness concerning environmental and estuarine threats are not adequately addressed.
- The legal obligations of the municipality and private landowners in terms of policy and legislation are not being adequately adhered to or enforced.

Other district and local municipalities

The environmental capacity within other DMs and LMs within the Eastern Cape is known to be very limited, if not completely lacking. Other social and poverty related developmental needs understandably tend receive greater emphasis than environmental related issues, while capacity and awareness is also lacking.

However, recent funding from the DBSA has been allocated to assist LMs in developing SEAs with the specific intention of informing SDFs and spatial planning. This should contribute to elevating the status of estuaries in the IDP process. Tenders have recently been awarded for Ngqushwa LM and invitations for proposals have been invited for Mbhashe LM. In both instances, emphasis will be on providing spatial planning guidelines for coastal areas.

6.4.4. Relevant ongoing programmes

There are a number of programmes that are currently assisting municipalities in meeting their legal responsibilities in terms of environmental management.

Municipal Mentorship Project (MMP)

The MMP is a non-government body that provides a support service to government agencies. It is not a decision-making body and has a dedicated Development Planning section. The safeguarding of the natural environment is perceived as being a key function of this agency, but this function is considered in relation to the agency's other functions and obligations. However, the MMP's experience in the education of councillors, politicians and officials is proving to be a significant challenge particularly LMs, with substantial lip-service being paid to the environment.

The C.A.P.E., STEP and SKEP planning tools are being used by this agency to provide advice to municipalities. The MMP has obliged consultants to use the STEP information in relevant reports, proposals, plans etc.

However, it was proposed that these tools be made more readily available to municipalities, due to limited resource sharing within agencies and these tools being misplaced. The hosting of regular education and training workshops is seen as essential to the development of an institutional memory within agencies regarding bioregional programmes.

Capacity Building Project for Eastern Cape Land-use Planners and Decision Makers

The South African National Biodiversity Institute (SANBI), in partnership with the WESSA Biodiversity Conservation Unit, the Development Bank of Southern African and the Mazda Wildlife Fund, has initiated the Mainstreaming Biodiversity into Planning and Development: Capacity Building Project for Eastern Cape Land-use Planners and Decision-makers.

This project aims in a participative manner to:

(i) Assess existing capacity levels and needs (within the selected agencies);
(ii) Identify, develop and distribute appropriate planning tools (to supplement the existing STEP Handbook and Mapbooks);
(iii) Develop and implement appropriate situated training programmes to enable the meaningful use of planning tools;
(iv) Establish and implement effective project management, monitoring and evaluation mechanisms;
(v) Fosters skills transfer and collaborative learning;
(vi) Promote co-operative governance through consistent use of common planning tools.

A number of pilot municipalities and government departments have been targeted for the first year of the project, but the aim is ultimately to achieve a province-wide roll-out of the programme. Direct project beneficiaries will include municipal and provincial land-use planners and decision-makers, municipal and provincial politicians, environmental consultants servicing local and municipal government departments, and relevant NGO and CBO agencies.

Local Government Biodiversity Network Project (SALGA)

A workshop facilitated by the National Department of Environmental Affairs and Tourism (DEAT) and the South African Local Government Association (SALGA), was recently organised (East London, October 2004) as part of the National Biodiversity Strategy and Action Plan National Biodiversity Strategy and Action Plan (NBSAP) consultative process.

The objectives of this workshop were to:

- Discuss the National Environmental Management: Biodiversity Act (NEM:BA) and implications for local authorities
- Present the National Biodiversity Spatial Assessment, with an emphasis on priority areas for conservation
- Present the National Biodiversity Strategy and Action Plan
- Identify the way forward.

The workshop also identified many challenges to the implementation of the NEM: Biodiversity Act, including limited capacity of local government, and lack of political will to support biodiversity conservation.

6.5. Conclusion

The IDP process is an excellent mechanism for promoting structured development within municipalities. However, due to a number of constraints, environmental and more specifically, estuarine values may not receive the attention and priority status needed to ensure that associated threats, opportunities and values are adequately recognised and addressed in the IDP process.

Although environmental and estuarine issues are cross-cutting and in terms of legislation must be addressed in the IDP process, there are significant limitations in terms of capacity and awareness which prevent this from happening. There also appears to be a lack of awareness of the legal obligations of municipalities in terms of environmental management.

Estuarine values could also fail to be recognised in the IDP process due to a lack of participation of persons with relevant and appropriate knowledge of the value of estuaries or estuarine management issues. In addition, since the IDP process focuses on addressing priority issues, important estuarine issues may fail to achieve priority status needed in order for these issues to be addressed in the IDP.

Possibly the most important challenge with respect to estuaries is ensuring that estuarine issues are brought into the IDP process in the first place. The identification of environmental issues in the IDP process hinges on knowledgeable stakeholders raising and lobbying on these issues and to ensure that they receive the appropriate priority status against other municipal challenges. The ADM Integrated Coastal Zone Management Programme recommended that each LM should appoint a dedicated coastal manager. However, given the resource constraints, this is not practicable. This responsibility should fall to the DMs such as ADM and OR Tambo DM who should appoint a **dedicated district coastal manager** to assist LMs on coastal and estuarine issues.

There should also be alignment and coordination between other municipal capacity building initiatives that contribute to promoting estuarine values and management such as MMP, SANBI and NBSAP.

Recognition of the value of estuaries and their appropriate management could have significant implications for some district and local municipalities and their development planning. The main opening for this in the IDP process is in the State of Environment Reporting during the Analysis phase. It is during this process that issues relating to estuarine values would be identified and included in the issues prioritization. The State of Environment reporting should include a resource economics component which highlights environmental values, including those of estuaries. It should also elucidate the nature of the trade-offs involved in the development issues that affect estuarine health. Ultimately, it will be necessary to sensitise IDP planners (ranging from local to national government actors) to estuary values.

7. INTEGRATING ESTUARY VALUES INTO PLANNING AND MANAGEMENT PROCESSES

Jane Turpie

7.1. Introduction

What is clear from the preceding chapters is that the different types of planning are all on a trajectory of being increasingly integrated in the sense of considering both environmental and socio-economic goals. What is also clear is the need to integrate the different types of planning. Indeed, the relatively new process of Integrated Development Planning obviously aims to improve the integration of development plans, but although it gives major attention to the environment, it does not explicitly link with conservation planning. Similarly, there is no explicit policy that requires Conservation Planning to take development planning into account. Both planning areas are only poorly linked to water resource planning, despite the fact that water is a prerequisite for both development and conservation.

This chapter explores these relationships in a bit more detail, highlighting how they are fundamentally connected by the consideration of environmental values, and showing how estuary values are among the most important of these. We argue that the elucidation of estuary values can fundamentally affect all planning, land-use and management decisions. Finally, we consider how valuation studies should be carried out in order to inform these processes.

7.2. The overarching goals of planning and management

A common thread among almost all planning and management activities is a policy framework which embodies the goals of economic efficiency, ecological sustainability and social equity (Figure 4.1). For example, these goals are reflected in the motto of the National Water Policy: "*some, for all, forever*", and are explicitly included as the main goals in the White Paper on Spatial Planning and Land Use Management. One exception is conservation planning, which is governed by the Biodiversity policy, which does not seek to achieve economic efficiency.

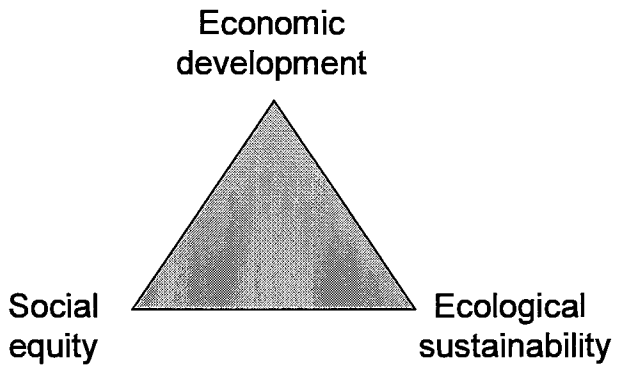

Figure 7.1. Three pillars upon which most South African policy rests

The goal of efficiency relates to maximising economic returns to aquatic resources, or achieving the greatest possible net benefit. This can also be seen as fulfilling a goal of economic development.

The goal of equity is to ensure that the economic benefits obtained from aquatic ecosystems, and the costs incurred in water supply development, are distributed fairly. Social goals include meeting basic human needs for water and aquatic ecosystem goods and services. Social goals are also concerned with the optimal allocation of resources in terms of the equitable distribution of costs and benefits among members of society.

The goal of sustainability recognises the limits to resources in the light of population growth and economic development, and promotes the use of resources in such a way as not to compromise the economic opportunities and social wellbeing of future generations. Ecological goals include meeting national and international biodiversity conservation obligations as well as ensuring an acceptable state of health of resources in the short- and long-term.

However, economic, social, political and ecological goals are potentially conflicting and are not simple to solve simultaneously. A number of trade-offs therefore have to be considered in all planning and management process that requires a suitable, integrated analytical and decision-making system.

7.3. The relationship between different planning and management processes

There is no defined way in which different types of planning are meant to relate to one another. Figure 4.2 provides a schematic on the way in which different planning processes affecting the estuarine environment should ideally fit together.

It should first be noted that different types of planning take place at different spatial scales. This is important in determining how they relate to one another. While conservation planning generally takes place at a national or regional scale, water management takes place at a catchment scale and development planning takes place primarily at a municipal scale. Management, which translates the plans into action, is ultimately carried out at a local scale.

Essentially, some types of planning produce constraints on other types. Thus linking different types of planning requires defining some sort of hierarchy of constraints. Subject to the constraints at each level, one can then examine trade-offs in the light of the goals of efficiency, sustainability and equity, in order to come up with "optimal" plans (or which approximates optimality in a world of imperfect information).

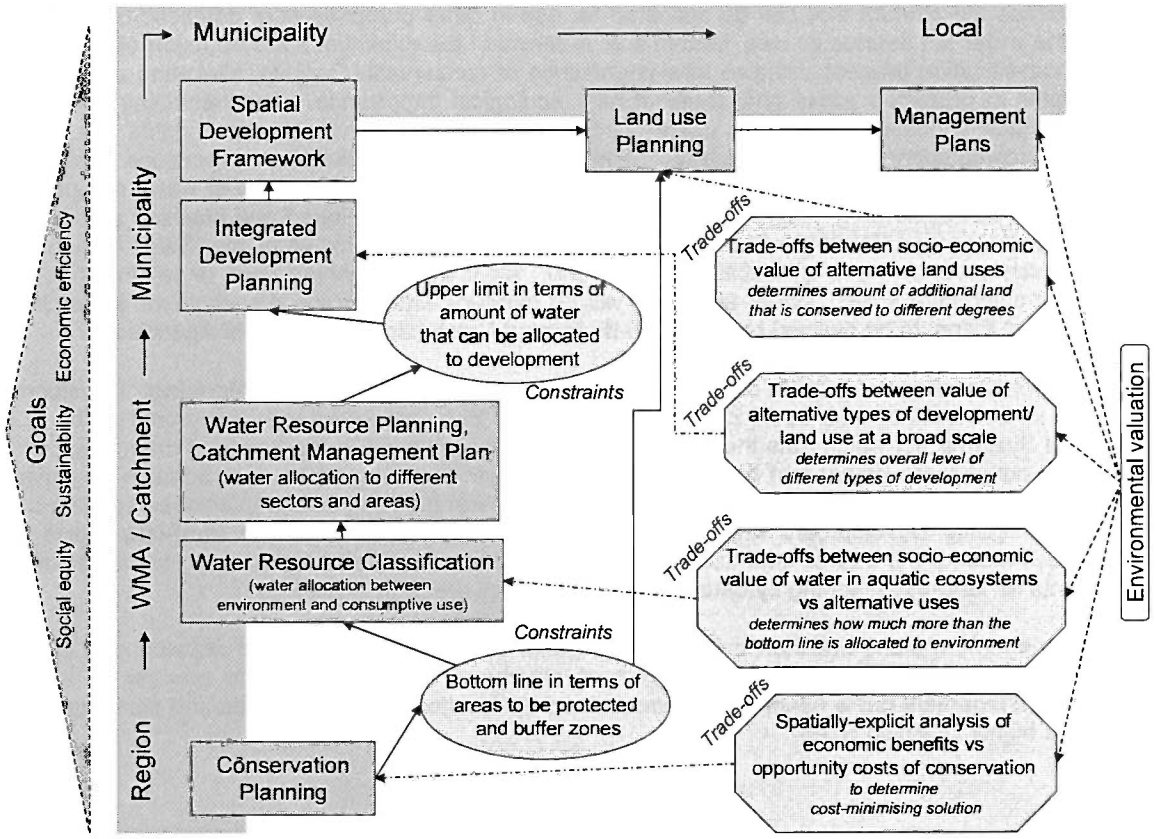

Figure 7.2. A proposed protocol for how different planning processes fit together, and where trade-offs are evaluated, and where estuary valuation fits in. This does not list all of the constraints and trade-offs, but is intended to concentrate on the most pertinent aspects. Similarly, environmental valuation is just one of many types of study that would be needed to input into the decision processes.

7.4. Defining a hierarchy of constraints

In Figure 4.2 **conservation planning** is shown to provide the 'bottom line' in terms of constraints on other types of planning. This is supported by South Africa's national and international obligations to protect biodiversity. Conservation planning identifies areas that need to be protected in order to reach the levels of protection required, defined in terms of biodiversity targets. Because most targets are defined at a national level, conservation planning tends to be national or regional. All other types of planning are affected by these conservation targets, particularly once they have been identified spatially.

The way in which **water resource planning** is carried out is still in a state of development and refinement following the proclamation of the National Water Act of 1998. Water resource planning begins with the classification of all of the country's water resources (rivers, wetlands, estuaries and groundwater) which determines the proportion of water that will be safeguarded for the environment and basic human

needs versus the amount that can be allocated for use in other purposes (e.g. domestic or agricultural use). The water act defines its own 'bottom line' in terms of the minimum state of health of all systems, but the classification process will also take cognisance of conservation targets, allocating proportionally more water to protected areas and areas of high ecological importance. The remaining 'allocatable' portion is then allocated to different users using various planning processes and rights are secured through a compulsory licensing process. The classification and allocation processes replace the fundamentally different system of water allocation of the past, and the allocation of water resources for future use is still at an early stage, with methodologies still being developed and finalised at this stage. Meanwhile **Integrated Strategic Plans** (ISPs) have been developed for all of the Water Management Areas, which describe water availability and demand. Most water planning does or will in future, take place at a catchment scale. Water allocation will go hand-in-hand with the development of Catchment Management Plans, to be devised by the yet-to-be-formed Catchment Management Agencies.

Water allocation will provide one of the main constraints for **development planning**. Development planning in South Africa has been somewhat overhauled in recent years with the promulgation of the Municipal Systems Act which puts the main responsibility for planning in the hands of the municipalities, through a compulsory process of **Integrated Development Planning** (IDP). In addition to providing guiding the type of development to be carried out, development planning is also expressed spatially in the form of a Spatial Development Framework. This is translated into detailed **land-use plans**, and supersedes most of the *ad hoc* land-use planning of the past. Conservation planning provides additional constraints for land-use planning by determining which areas are to be protected.

Management plans are then guided by the goals set by conservation and development planning processes. Decision-making within management structures is enabled by the process of strategic adaptive management but is nevertheless constrained by the aforementioned goals and plans, and takes place at a highly localised scale.

7.5. Evaluation of trade-offs and the role of environmental valuation

All decisions involve making trade-offs (Figure 4.2). This is particularly pertinent to biodiversity conservation where the lack of understanding of ecosystem or biodiversity values can lead to distorted decision-making. In general, while there are certain checks to meet minimum biodiversity conservation requirements, any conservation beyond that is optional and will only occur if it is deemed economically worthwhile. Ideally, we need to determine the optimum level of conservation for society, rather than the minimum level that is set out in most conservation planning exercises. In other words, are we better off if we sacrifice the remaining estuaries to "development", or would we derive more social welfare and economic output by putting more resources into conservation of estuaries than required by national policy and international convention?

Decisions as to which areas to conserve involve trading off biodiversity values against the opportunity costs of conservation. These opportunity costs are the benefits of the best alternative use of the areas in question. Similarly, decisions as to how much water to allocate to the environment above the minimum reserve required by law involves trading off the benefits of having healthier aquatic ecosystems versus the opportunity costs of the use of that additional water. The amount of conservation of natural resources above the minimum required in order to meet obligatory conservation targets is something that needs to be considered in Integrated Development Planning. This involves analysing the trade-offs between the benefits of additional conservation and the opportunity costs in terms of the most valuable alternative form of development. These trade-offs might become more specific in land-use planning at a local scale. At the very local scale, trade-offs are also made in management decisions such as where to locate conservation zones in an estuary.

7.6. The importance of estuary values in planning

Estuaries are recognised as being one of the most valuable habitats on earth (Costanza *et al.* 1997), with their global value amounting to some 12% of the total value of ecosystem services provided by the world's natural capital. Yet estuaries are increasingly under threat from activities that undermine their ability to provide these goods and services. The root cause of this problem largely lies in the fact that the economic value of estuaries is not recognised by decision-makers, whereas that of the damaging activities is relatively well understood. The economic benefits generated by estuaries, and the costs associated with their degradation, are frequently overlooked by users and decision-makers. This results in activities being carried out which have negative impacts, and limits the potential for estuaries to generate income, subsistence and other benefits. Attaching monetary values to actual and potential benefits associated with the conservation and sustainable use of estuaries makes these activities directly comparable with alternative options.

Valuation thus provides important information that can guide the management of estuaries and lead to their more sustainable use. Estuary valuation serves to:

- *Demonstrate the high value associated with estuary conservation.* This is achieved by showing how they contribute quantifiable economic benefits to households, the national economy and even the international community. Estuary conservation must compete with or be shown to be compatible with national priorities for economic development and growth, poverty alleviation and equity considerations. Valuation emphasises the fact that estuaries contribute to national income, export earnings, employment and subsistence, and fiscal revenues.

- *Highlight the significant costs associated with their degradation.* Valuation studies can show the long term costs that estuary degradation can have to all of the values highlighted above;

- *Justify estuary conservation as an economically beneficial investment and land-use option.* This can be demonstrated both at a local and national scale;

Understanding the values of estuaries and the opportunity costs of their conservation has a fundamental influence on all types of planning. Because estuaries have a unique position in the landscape, they have tended to be ignored in planning and legislation, often under the presumption that they would be taken care of by other plans. However, the status of estuaries has been elevated by increased research activity and understanding in recent years, and emerging understanding of their tremendous economic value, and their position in the landscape could be turned to their advantage. In fact, estuaries can effectively be considered to be a hub between freshwater, marine and terrestrial landscapes, and as such, they are likely to be taken into consideration in freshwater, marine and terrestrial conservation planning. Indeed, estuarine conservation planning has the potential to become central to all conservation planning. Hence, where estuarine conservation planning takes economic values into account, estuary values may end up having a significant influence on land-use planning in general. The position of estuaries in the hydrological cycle also puts them in a particularly strong position with regard to water resources planning. Because no part of a catchment can be allowed to be in less than a D class in terms of its future health, the D-class limitation of the estuary sets the minimum classes of the rest of the catchment. Where conservation importance requires a higher class, this raises the bottom line for the rest of the catchment. By the same token, if water requirements are to be met for estuaries of biodiversity importance, this will require that there is a very strong economic argument for doing so, given the ramifications for water supply in the rest of the catchment.

7.7. Incorporating estuary values into integrated conservation and development planning

Up to now, development planning has shown little appreciation of ecological systems, and conservation planning has tended to ignore economic realities and development needs. The former reflects a failure to recognize the values of ecosystems. Furthermore, planners may be failing to realise that the conservation and wise use of these systems provides as yet unforeseen opportunities for sustainable development. Conservation planning that fails to take cognizance of socio-economic factors may lead to the identification of priority areas that are suboptimal from a broader societal perspective. If conservation planning is to be taken seriously by development planners, in an integrated planning framework, then it will need to take factors such as economic opportunity costs into consideration in selecting areas for different types of conservation management (Figure 4.3).

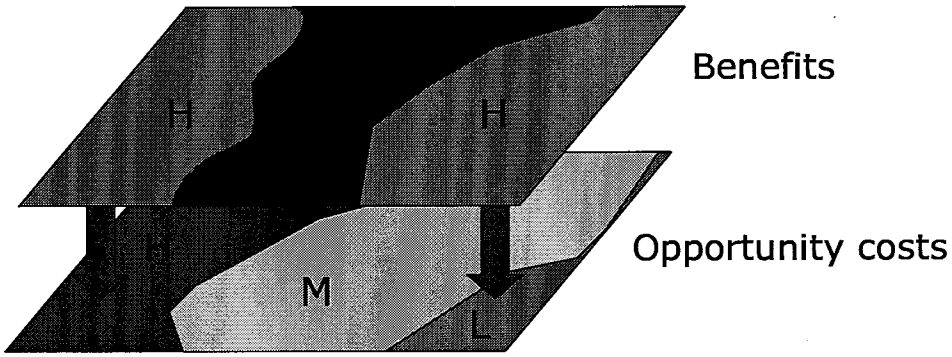

Figure 7.3. Hypothetical coverages of benefits and opportunity costs of different parts of the landscape to be integrated in conservation and development planning.

Estuaries provide an excellent opportunity for demonstrating the value of integrating environmental considerations into land-use planning. This is because they are affected by land-use management over the entire planning domain at any planning scale. The economic value of estuaries is affected by land use in their catchment areas, as well as in the coastal zone. In other words, there is no corner of the country in which land use management does not potentially affect estuaries.

Up to now the value of estuaries has not been appreciated, and has thus not been taken into account in planning, with the result that many estuaries have become degraded. For example, certain land uses consume more water than others, lead to more soil erosion, or yield more polluted return flows. These affect the functioning of estuaries by altering the quantity and quality of freshwater inflows into estuaries. This functioning, in turn, affects the provision of goods and services by estuaries that contribute to peoples' livelihoods and to the economy as a whole. It does not make a great deal of sense to plan for developments in the catchment areas whose benefits are negated by losses of values in downstream areas. A better understanding of the impacts of different land-uses on the value of estuaries is thus a fundamental prerequisite for their integration into these planning processes. After all, development planning should lead to increasing economic welfare without incurring costs on any sector of society.

In many cases it will be shown that developments enhance an estuary's value and provide significant opportunities for economic growth, simply because the demand for these types of facilities and opportunities is so high. However, there is also a significant demand for the ecosystem goods, services

and attributes that are compromised by these types of developments. The trouble is that the value of the latter is far more difficult to demonstrate, and is in some cases downright intangible. Resource economics provides a suite of methods which allows these values to be expressed in a common currency, making them comparable with development alternatives. Ultimately, it should be possible to establish a balance in terms of the estuaries that should be developed to different degrees, in such a way that maximizes the overall value of these systems.

7.8. How valuation can enhance the management of estuaries

The basic aim of valuation is to determine people's preferences, and how they would be affected by a change in the supply of goods and services provided by estuaries. Valuation provides a means of quantifying the benefits that people receive from estuaries, the costs associated with their degradation, and the relative value of land and resource uses which are compatible with estuary conservation versus those which contribute to estuary degradation.

The information provided by valuation studies can be used to carry out further economic analyses which aim to identify the most productive, sustainable and equitable management options and inform management decision processes. An important aspect of this process is to assess how the benefits and costs of alternative management options are distributed among different stakeholder groups. Ultimately, the analysis should be able to describe the trade-offs involved in choosing different management alternatives. The analysis should be sufficiently sophisticated to be able to determine the best mix of uses, and not only all-or-nothing alternatives.

7.8.1. Evaluating management alternatives for living resources

Valuation of natural resource use, in conjunction with ecological understanding, can be used to construct ecological-economic models with which to analyse management alternatives. Ecological-economics modelling highlights the ecological linkages and is a potentially very powerful tool for informing stakeholders of the economic consequences of overexploitation, or of the benefits of preserving part of an estuary as a source area for a fishery.

7.8.2. Designing incentive measures

Valuation also helps to predict and understand why people engage in activities which are damaging to estuaries, and hence to develop measures that encourage people to engage in more sustainable activities. Valuation studies identify the stakeholders that benefit from and those that bear the costs of their conservation, and vice versa. This helps to identify measures that need to be implemented to achieve the optimal and sustainable use of estuaries.

It is increasingly being realised that wherever the optimal situation for society as a whole is dissimilar to the preferred behaviour of individuals, incentives are more effective in achieving the desired goals than regulatory measures alone. It is thus necessary to create incentives to promote conservation and/or reduce damaging behaviour. This entails making damaging behaviour less profitable or beneficial than sustainable practices, which in turn, requires a good understanding of the private costs and benefits of alternatives. Estuaries present an interesting challenge in this regard, since they are publicly owned, and incentive measures depend heavily on the allocation of clear property rights.

7.8.3. Identifying financing mechanisms for conservation

Estuary conservation, and the groups who bear its costs, require funds. Valuation ascertains the magnitude and distribution of costs and benefits associated with conservation efforts, and also highlights conservation financing needs. It identifies the stakeholders that benefit freely or at low cost from estuaries, or who carry out activities which degrade estuaries without being penalised. These all present opportunities for capturing additional revenues which can be redistributed to those who bear the costs associated with estuary conservation.

Valuation studies elicit the public's willingness to pay for environmental goods and services, specifically to prevent or effect a change in their delivery. Much of this willingness to pay may be in the form of 'untapped' consumers' surplus. The understanding of demand for estuary goods and services provided by valuation studies can guide the design of revenue raising tools such as User Fees and Payments for Ecosystem Services.

7.9. Protocols for estimating estuary values for planning and management

7.9.1. Valuation for conservation and development planning

The protocols for estimating estuary values for the purposes of conservation and development planning are likely to be similar, but may differ from those for water resource planning or for management.

In the case of conservation and development planning, valuation can take place at a relatively broad-brush level, as it will primarily be used to determine which estuaries would be left in a largely natural state versus which might become more heavily developed.

In order to inform conservation and development planning it will be necessary to identify the types of values and trade-offs that are relevant in the region or municipality. These will include values associated with biodiversity conservation (such as existence value and indirect use value), and values associated with consumptive or non-consumptive use (such as subsistence and recreational values), as well as the values associated with catchment developments that put demands on water quantity and quality. Recognising that some of these values will be difficult to estimate accurately, it will also be necessary to decide on the most appropriate measures to use.

It will be necessary to classify estuaries in terms of their economic importance based on relevant economic data on:

1. Subsistence/commercial use of estuary resources,
2. Tourism and property values
3. Indirect use values (e.g. nursery function for fisheries) and
4. Non-use values

It will also be necessary to ascertain

5. The opportunity cost of conservation of estuaries in terms of water entering the estuary, based for example on catchment activities
6. The opportunity costs of conservation of estuaries in terms of foregone development or activities in and around the estuary, and
7. The costs of management

There is a suite of methods that informs the valuation of each of these types of value. However, it may be appropriate to develop relatively rapid assessment methods in order to evaluate these values for large numbers of estuaries in a region or municipality. Nevertheless, rapid methods should be developed and applied by experienced resource economists, especially if the findings of one area are ever to be compared with those of another.

7.9.2. Valuation for water resource planning

Since the protocols for valuation in water resource planning are already under development by DWAF's Classification Project, they will not be dealt with here.

7.9.3. Valuation for management

The types of management questions addressed in a valuation study would include questions concerning the zonation of the estuary for different types of use, and the optimal level of exploitation of the estuary.

Key questions would include:

1. If an estuary is to be developed, how should development be sited around the estuary in order to maximise its value plus the values to other users.
2. How much of an estuary should be open or closed to activities such as motorboating or fishing?
3. How much utilisation of bait and fish resources should be permitted?

Thus valuation studies should try to ascertain the attributes that contribute to the value of property, and the recreational opportunities that determine the demand for utilisation of the estuary. The last question will require understanding the value obtained from conserving resources versus the value obtained from their utilisation.

7.9.4. Guidelines for maximising the economic value of estuaries

There has been relatively little research on the questions posed in the above sections. However, common sense can provide some simple guidelines as to the sorts of planning and management decisions that are likely to maximise the economic value of estuaries:

4. At least 20% of the estuarine area within each biogeographical should remain conserved in a largely natural state, providing opportunities for maintaining the valuable services that they provide such as nursery area function, as well as providing opportunities for wilderness experience, spiritual enrichment and research.
5. Where estuaries are developed, property values would be enhanced if one side of the estuary remains undeveloped, preferably as a nature reserve. This is a highly successful model that exists in many South African estuaries, and can successfully combine development and conservation needs.
6. Since the recreational value of estuaries is derived from multiple consumptive and non-consumptive uses which are often incompatible, their value can be maximised by zonation, which prevents one type of user's utility from impacting on another's. It also provides the opportunity to achieve some conservation goals while not prohibiting consumptive use altogether. Zonation is also a far easier way of limiting consumptive use than bag or effort limits.

8. ENHANCING THE VALUE OF ESTUARIES THROUGH BIODIVERSITY-BASED ENTERPRISE DEVELOPMENT

Nhlanhla Sihlophe

8.1. Introduction

A range of economic incentives is being promoted and applied in different parts of the world to promote biodiversity conservation (Emerton, 2000). What is apparent is that different combinations of incentives appear to be applicable and relevant in different contexts. For example, some incentives are suitable for application in the majority of the world (Lynch, 1999), while others tend to be more suitable for application in the developed world.

While a range of international funds can and is being used to finance biodiversity conservation, most funding is being channelled to conservation by international donors (Emerton, 2000). Other arrangements that are being used to finance biodiversity conservation include debt relief, offsets and credits, international compacts, concessions or prospecting rights, as well as international transferable development rights. It is worth noting that these arrangements and international donor funds have given rise to great controversy, especially with respect to issues of national sovereignty, ownership and control over biological resources and the balance of power between developed nations and those of the majority world (ibid). Further, critical questions have been raised about approaches to implementation of economic incentives for conservation derived from international donors. This is because such funding is perceived to promote policies, procedures and practices that are preferred by the donor agencies, and that may, at times, be at odds with local conditions. The observation by Leach *et al.* (1997:14) that "the policies of donor agencies play an important role not only in shaping local approaches to community-based natural resource management, but also in influencing domestic macroeconomic policy and governance in ways that cascade down to affect local natural resource management" confirms the reality of this perception. While this is so, economic incentives for conservation are being successfully applied to promote conservation of biodiversity that is increasingly under severe threat in many parts of the world (Belsky, 2000; Wood, 1998).

There are five main categories of economic incentives for biodiversity conservation (Emerton, 2000). While in theory it is possible to apply any type of incentive measure to any group, activity or sector, in reality different categories have particular relevance for different groups and activities (Emerton, 2000). For example bonds and deposits are particularly applicable to infrastructural, residential and industrial developments; and fiscal instruments function well in formal markets – hence such categories of incentive measures are most relevant in developed contexts. In rural areas where communities live in areas of high biodiversity, with limited economic opportunities, infrastructural development and where there is high dependence on the harvesting of biological resources for income and subsistence – such conditions mostly found in the majority world - livelihood support is the most commonly applied incentive measure for biodiversity conservation (Emerton, 2000). Property rights, in particular, apply both to conditions in developed contexts and to those prevailing in the majority world as they provide an effective way of ensuring community participation in biodiversity conservation. Evidence pointing to the application of economic incentives for biodiversity conservation seems to indicate that a combination of economic incentives is being promoted and applied in the majority world (Emerton, 2000). And, prominent among these, particularly in Africa, is livelihood support (ibid).

Livelihood support aims at strengthening livelihoods, diversifying them and making them more secure thereby decreasing reliance on biodiversity (ibid). It also aims to provide options that reduce vulnerability to perverse incentives that encourage people to engage in activities that degrade biodiversity. Livelihood support activities can be divided into two broad categories, that is, direct livelihood

and indirect livelihood incentives. Direct livelihood incentives focus on increasing the efficiency and scope of biodiversity based activities while indirect livelihood incentives attempt to strengthen and diversify livelihoods in the hope that as they become more secure people would rely less on biodiversity. Establishment of local enterprises is one form of livelihood support incentives commonly applied to conserve biodiversity either as direct or indirect livelihood incentives for conservation.

This chapter focuses on biodiversity based enterprises as incentive measures for promoting biodiversity conservation including coastal resources, in particular estuaries. Biodiversity enterprises including those found in coastal and estuary environments are described in terms of types, sizes, values and beneficiaries. While recognizing that varying biodiversity-based enterprises and models exist, the focus of this chapter is on those enterprises that are founded on common property resources such as estuaries, in particular those with community engagement in their operation, management and ownership. Throughout this chapter these enterprises which strive "...to reach a symbiosis between nature conservation, sustainable socio-economic development and nature tourism (Reid, 1999:34)" are referred to as Community-Based Natural Resource Enterprises (CBNREs).

There appears to be growing concern among both practitioners and researchers about the sustainability of CBNREs and therefore their potential to promote biodiversity conservation (Bond, 2001; Murombedzi, 2001; Salafsky, *et al.*, 2001). While the intention is to support the establishment of viable and sustainable CBNREs which would continually yield benefits of conservation to the rural poor, evidence of this phenomenon appears to be limited (Bovarnick and Gupta, 2003; Salafsky, *et al.*, 2001). Notably, the number of interventions aimed at understanding the sustainability of entrepreneurial activity in rural conditions has increased over the last few years. Along this vein, this chapter examines the determinants of the sustainability of CBNREs. In this regard a conceptual and analytical framework for CBNREs (Figure 1) has been included to enhance understanding of the broader socio-ecological and economic system within which CBNREs operate. It is postulated that the determinants of the sustainability of CBNREs include: resource use governance and management institutions at local level, enterprise institutions, livelihood support measures, as well as legitimacy and subsidy. Therefore, the relationship between these determinants and CBNRE sustainability is highlighted in relation to their contribution to achieving economic, ecological, social and political sustainability. The chapter is concluded with a synthesis of the different sections encapsulated in the discussion and conclusions section.

Initially the intention was to draw heavily on coastal and estuary based enterprises in carrying out this literature review. However, due to the dearth of literature on CBNREs founded on coastal resources, in particular estuaries the author had to draw heavily from terrestrially based CBNREs. The positive side of this is that the CBNRE concept is far more developed in such contexts and valuable lessons have emerged from terrestrially based enterprise experiences. And, since many of the lessons are generic they will inform the establishment of estuary based enterprises.

8.2. Community-Based Natural Resource Enterprises (CBNREs)

Common types of linked service enterprises that have been established in estuaries and other coastal areas in various parts of the world include: ecotourism enterprises involving canoe visits to sacred caves- for example sea canoe (an ecotourism enterprise) in Thailand transports tourists to a number of small islands where they are taken on tours by guides aboard inflatable kayaks (Kontogeorgopoulos, 2005), horse and hiking trails in near pristine coastal environs that comprises spectacular estuaries, canoe trail enterprises , that is, canoe tours around the mangroves and tours of the estuary (Lewis, *et al.*, 2005), tourism trail camps and camp sites, and in some cases whale watching activity (Russell and Kuiper, 2003).

Enterprises based on goods supplied by the estuary and coastal resources include non-consumptive fly-fishing operations, beekeeping enterprises (Lewis, *et al.*, 2005), consumptive fishing where fishing quota are issued to subsistence and small-scale fishers who in tum may sell their fishing rights among themselves, enterprises based on non-timber forest products and other medicinal plants found in adjoining forest (Grima, *et al.*, 2003). Although craft enterprises may not be directly associated

with estuary resources, tourism activities that take place in and around estuaries provide a market for craft produced by local community members. Other enterprise activities which also take place at estuaries include bird watching, and it should be realised that low-impact ecotourism enterprises such as those found in estuaries have to diversify in order to establish income streams that ameliorate the variability of income flow. Therefore, it is common that a combination of ecotourism activities would take place at one estuary as it is intended at Mtentu estuary.

Nature based enterprises in general and estuary enterprises in particular vary. This is because the size of the enterprise is determined by many factors. Among others, these include the size of the natural resource, its sensitivity to impacts and its conservation significance (Van den Berg, 2001). Further, these factors also include availability and size of the market, level of infrastructural development, literacy and skills levels among community members, availability of investment funds or investment partners, and the level of connectedness with national and international marketing agents, the size of beneficiaries, property rights arrangements and community cohesion (relationships of trust, social norms, networks, and membership of groups) – an indication of the level of social capital that exists within a community (Flyman, 2001; Wood, 1998).

Some estuaries are of high conservation significance because of plant and animal diversity that they support and may also be highly sensitive to anthropogenic impacts. Under such circumstances, the size of the enterprise established on and supported by the resource base may be limited by the conservation significance of biological diversity and the sensitivity of the resource. Therefore, enterprises established on such estuaries would be low-impact enterprises targeting the high income-end of the tourism market. There are numerous examples indicating the application of such an approach in highly sensitive terrestrial ecosystems (Flyman, 2001; Gujadhur and Motshubi, 2001; Rozemeijer, 2001; Wood, 1998). A common thread that defines enterprises in such contexts is the low-impact nature of activities and the small size of the enterprise.

Poor infrastructure, in terms of access roads and telecommunications, coupled with a tourism product that is not well developed contribute to limiting the size of the enterprise. Because it may take a considerable period of time to develop a tourism product and to promote that product in the target market, it is common that ecotourism enterprises start small and increase in size as their ecotourism product develops (Wood, 1998). While resources such as estuaries and other associated natural resources may support reasonably sized ecotourism enterprises, that is, enterprises capable of providing permanent and temporary employment to approximately thirty three (33) people or more (Lourens, 2004), the remoteness of the area in which the enterprise is located coupled with inaccessibility of the location may deter potential investors from investing in the enterprise. In addition, investors may not be willing to engage in ecotourism enterprises or would limit their investment where property rights arrangements do not provide for security of investment (De Beer and Elliffe, 1997). Furthermore, a local community – regardless of size - that is perceived to be fraught with divisions and internal conflicts would not easily attract potential investors (Wyne and Lyne, 1995). A disadvantage of being unable to attract investors is that it limits the ability to raise equity capital that is so vital to improving and promoting the tourism product (Ibid). Further, private-sector investors often bring the necessary business management knowledge and skills, networks, and the business acumen that is so essential to achieving sustainability. Therefore, the inability to attract private sector partners has often meant that the enterprise has to be kept simple and has to develop on the strengths that are already available within the community (Rozemeijer, 2001). Keeping the enterprise simple has also meant limiting the size to that which is manageable under the prevailing constraints. However, it should be stated that size per ser is not a good indicator of how simple or sophisticated an ecotourism enterprise is. There are a few well known estuary-based enterprises in South Africa that could be considered to be small, that is, that employ ten or less employees per operational season but that generate substantial incomes relative to income potential in the absence of those enterprises and whose marketing and management systems are highly sophisticated and designed to attract up-market tourists. One example of these enterprises is the Ufudu fly-fishing experience (Pretorius, 2003).

The sizes of CBNREs or ecotourism enterprises involving local community participation and / or ownership could be described in terms of total income contributed towards community level development and the number of local community employees deriving benefits in the form of permanent and temporary

employment. A review of literature, particularly on ecotourism enterprises established in southern Africa, seems to indicate direct proportionality between income generated and the size of the ecotourism enterprise (Kontogeorgopoulos, 2005; Murphree, 2001; Van den Berg, 2001). However, there are enterprises which appear to be smaller in terms of the number of people they employ, but which provide substantial contribution to community level development compared to others which appear to be bigger in relation to the number of people they employ. For example Ufudu fly-fishing – a saltwater catch and release fly-fishing enterprise operated over the last three months of the year at Mtentu estuary in the Eastern Cape region of South Africa - contributed far more to the community Trust compared to Amadiba Adventures (a community owned horse and hiking trail enterprise involving more community members) over the period 1999 to 2002 (Pretorius, 2003). Therefore, what is established from extensive review of literature is that the sizes of nature-based enterprises vary from those providing temporary and permanent jobs for less than ten (10) people to those providing a maximum of about eighty (80) full time employment (depending on the season) (Kontogeogropoulos, 2005; Rozemeijer, 2001, Gujadhur and motshubi, 2001; Van den Berg, 2001, Lewis *et al*, 2005, Wood, 1998 Murphree, 2001; Ashley, 2000; Lourens, 2004). Examples of these enterprises are the Mngazana canoe trails which provide approximately ten casual jobs for local community members and the Ufudu fly-fishing operation at Mtentu estuary which provide almost the same number of jobs, though the revenue generated by Ufudu is by far greater than that generated by canoe trails at Mngazana.. What is apparent and confirmed by various authors on the subject is that wildlife based enterprises have generated the highest incomes and have demonstrated significant benefits to local communities as compared to other nature-based enterprises such as those based on estuaries (Murphree, 2001; Rozemeijer, 2001). Temporary and permanent jobs that have been created by CBNREs in the nature-tourism sector have reached up to 80 jobs, in some seasons even more, with total revenues per annum exceeding one million in rand terms (Rozemeijer, 2001;). Revenues generated by CBNREs based on estuary and coastal resources in South Africa can be estimated to fall within the range of five thousand to five hundred thousand (R5 000.00 – R500 000.00) (Lourens, 2004). Also agreed by authors on the subject of nature-based enterprises is that these enterprises do not often generated a large number of permanent jobs, but community members benefit from temporary jobs and from other economic activities made possible by the presence of these enterprises (Ashley, 2000; Rozemeijer, 2001).

Since the focus of this Chapter is on CBNREs, the value of these enterprises to neighbouring communities and society at large cannot only be reduced to economic value, but also has to consider the social, political, cultural, and environmental importance of these enterprises to communities, and by extension to society (Rozemeijer, 2001). Consideration of these dimensions make valuation of CBNREs a complex exercise since the political and social dimensions, for example, cannot be easily expressed in monetary terms. Therefore, it is not surprising that limited comprehensive valuation of CBNREs, if any, has been undertaken, beyond valuation in terms of rewards from employment and financial contributions towards community development. In this regard Pretorius (2003) indicates financial contributions from Ufudu fly-fishing operation to the Amadiba Community over the period 1999 to 2000. These contributions are in the form of income to the community trust, as well as income to staff and others such as craft producers (Pretorius, 2003). Similarly, Rozemeijer (2001) lists seventeen community-based tourism initiatives in Botswana and indicates the value of each of these initiatives to their communities in respect of annual revenues and the number of jobs they create for the locals. From his list it appears that, during the year 2000, the number of jobs created by these medium to large scale wildlife-based tourism enterprises ranged from three (3) to seventy five (75) permanent jobs and revenues ranged from two hundred and eighty six thousand (286 000.00) to one point three million (1.3 million) Botswanian pulas. Unlike Pretorius, Rozemeijer does not indicate how much of the total revenue generated by each of the enterprises was contributed to the community trusts. While providing such information may be useful in indicating the economic value of these enterprise to their communities, assigning the importance of CBNREs on the grounds of economic value alone is likely to ignore the very basis on which CBNREs and other nature-based ecotourism enterprises are founded. That is, to empower rural people to be the champions of development and natural resource management processes in their areas. There are numerous examples of CBNREs, particularly those involving partnerships with the private sector, which have ignored the important role of CBNREs as vehicles for promoting: sovereignty and decision making power by the locals, local traditions and values, as well as harmony and cooperation among community members (Ashley, 2000; Murombedzi, 2001; Sindiga, 1999). In this regard Belsky (2000:300) writes

"...widespread and grassroots participation in ecotourism activities has not developed, nor has anything close to empowerment been achieved in Gales Point." Similarly, in the context of CAMPFIRE in Zimbabwe, Murombedzi (2001) observed a situation in wildlife-based tourism-cum-conservation enterprises where community members were relegated to nothing more than providers of cheap labour. According to Murombedzi (2001) in these enterprises community members were not effectively engaged in decision-making on the utilisation and management of wildlife, neither were they given control over wildlife management nor equity in wildlife utilisation. While there are many negative accounts of ecotourism and other nature-based enterprises in the literature, there are equally many positive ones (Ashley, 2000). However, it could be suggested that the point that emerges from the review of literature is that assigning value to CBNREs is not a simplistic task, and goes beyond economic value to consider other aspects. For example the value of ecotourism enterprises for the Bushman community in Botswana is not so much the economic benefits that they derive, but the knowledge that their history and culture is valued by the tourist who come to experience cultural tourism in their area (Gujadhur and Motshubi, 2001). This, in turn, results in self-esteem and motivation that will spur the people of /Xai-/Xai to invest in their future and to pursue self-development. In that sense, tourism and other nature-based enterprises are a jumping-off point (Gujadhur and Motshubi, 2001).

While the establishment of many CBNREs has involved significant investment from donor funds, counted in thousands and millions of rand (Wood, 1998). There is general acknowledgement among those who support CBNRE establishment and sustainability that it would take a good number of years for many CBNREs to exhibit properties of sustainability (Bovarnick and Gupta, 2003; Salafsky, *et al.*, 2001). Salafsky, *et al* (2001:1593) state that, if their experience of supporting community-based biodiversity enterprises aimed at promoting conservation in rural contexts is any guide, it is that "it will at best take a number of years for most community-based enterprises to become self-sufficient." It should also be noted, however, that Salafsky's statement was based on their study of various types of biodiversity-based enterprises all of which employed the community owned and operated business model approach and excluded other models. Nevertheless, while many CBNREs may take time to reach a state of self-sufficiency, they remain of high value to their communities because of the other dimensions that contribute to their importance (Rozemeijer, 2001). The importance of CBNREs should be viewed in the broader sense of who the beneficiaries of these enterprises are.

CBNRE beneficiaries include local community members, private sector operators, NGOs, government and civil society (De Beer and Elliffe, 1997). While this is so the most often pronounced beneficiaries are communities and private sector operators because, in most cases, they provide capital investment that is essential to the establishment and operation of the enterprise. Also, they are the recipients of the most obvious benefits derived in the form of income from employment, livelihood support and profits from the revenue generated by the enterprise. However, this short-sighted view of the beneficiaries of CBNREs tends to limit the ability to optimise potential benefits that could be derived from CBNREs. The argument below provides reasons at to why non-governmental organisations, organs of government and civil society in general are beneficiaries of CBNREs and should be seen as such so that benefits arising from CBNRE establishment could be optimised.

That knowledge and skills required for setting up and operating CBNREs are, in most cases, not available within rural communities is irrefutable reality (Kontogeorgopoulos, 2005; Naguran, 1999; Wood, 1998). As such, Non Governmental Organisations (NGOs) have offered their services to facilitate processes leading to the establishment of institutions responsible for the governance and management of natural resources upon which CBNREs are based. Also, they have provided training to local rural communities on the management of natural resources such as estuary resources (Lewis, *et al.*, 2005; Wood, 1998) Furthermore, they have facilitated setting up of CBNREs and have provided training on the management and operation of CBNREs (Flyman, 2001; Wood, 1998). In line with their definition, CBNREs are established to promote sustainable use of natural resources whilst demonstrating social, economic, and political benefits at community level. This being the case, it is only logical that CBNREs would be considered by most environmental NGOs to be contributing to the attainment of sustainable resource use or conservation goals that they strive to achieve According to Meyer (1995) NGOs are entrepreneurial economic entities which offer opportunities for the attainment of congruency of objectives between those of donor agencies and local environmental resource dependent communities. This

suggests that NGOs, in particular environmental NGOs provide an important brokering service between donor agencies and local communities, and in the process benefit by rendering services to the community on behalf of donors and by contributing to the attainment of their objectives. According to Harris, *et al* (1996) NGO support plays a vital role towards achieving CBNRE success.

While it is commonly recognised that governments throughout the world including southern Africa are the custodians of the nation's natural resources (Ashley, 2000; Emerton, 2000), their role as beneficiaries of CBNREs has not been adequately appreciated, more so, by the very governments in the majority world. Failure to recognise benefits and potential benefits that could accrue to government if adequate support was accorded to CBNREs has meant that government in most parts of the majority world would not sufficiently address issues of resource use access, and would not delegate authority for resource use governance and management to local level institutions (Campbell, *et al.*, 2001; Grima, *et al.*, 2003). Consequently, this impacts negatively on CBNRE sustainability as it undermines one of the critical ingredients for achieving the sustainability of cooperative enterprises such as CBNREs. That is, delegation of resource use rights and responsibilities to local level institutions. However, where sharing of natural resource management responsibilities, control, and decision-making authority has been implemented by governments, the results have been positive as evidenced by Grima, *et al* (2003) who provide accounts of successes of joint forest management between government and local communities in India.

Studies indicate that varying percentages of revenue generated by CBNREs are channelled to developing infrastructure and other facilities at community level in an attempt to demonstrate benefits of sustainable resource utilisation to local communities (Murphree, 2001; Rozemeijer, 2001). This has benefited government as such responsibilities of infrastructure and facility development are otherwise the responsibility of central government. Furthermore, as evidenced by Hulme and Infield (2001) that as people realise the benefits of sustainable resource use, they appreciate and value those resources thereby alter their unsustainable resource use patterns. From this it follows that sustainable resource use management at local level reduces the burden on government of ensuring conservation of natural resources. Therefore, on this basis alone, government could be construed as a beneficiary of CBNRE success and should give due support to CBNREs by creating enabling conditions and through interventions that contribute to their sustainability. Along this thread (Harris, *et al.*, 1996) observed the fundamental role of government's contribution in turning around traditional cooperatives characterised by efficiency robbing effects that undermined their viability and sustainability to new generation cooperatives that are viable and sustainable enterprises free of those efficiency robbing effects.

Natural resources and associated ecosystems provide a variety of goods and services to society. This supply of goods and services is determined by the nature, state and functioning of the ecosystem. An ecosystem in good ecological state and which is characterised by rich biodiversity and natural environs would provide a wider and varied range of goods and services, while that in poor ecological state would offer a limited range. Estuary ecosystems, in particular, offer goods such as fish, plant fibre and bait to members of civil society, as well as services such as waste treatment, floodwater control, disturbance regulation through control of storm and flood damage and nutrient cycling (Mander, 2001). In addition estuaries offer attractive views which often attract up-market housing development providing secure fiscal revenue that accrues to local councils. Those in near pristine natural environs offer a unique sense of place and opportunities for special quality experience which attract tourism and ecotourism development (ibid). The goods and services offered by estuarine and other ecosystems can be used both directly and indirectly, and it is for this reason that they should be utilised in a sustainable manner.

CBNREs are established to capitalise on the recreational or ecotourism opportunities offered by ecological systems in a manner that does not significantly affect the functioning of ecological systems such as estuaries (Murphree, 2001; Reid, 1999). According to (Salafsky, *et al.*, 2001) biodiversity based enterprises are established to conserve biodiversity and to demonstrate benefits of conservation to the local rural communities. From this statement it could be inferred that the intention is to protect the goods and services supplied by ecological systems in a manner that ensures equitable distribution of costs and benefits of conservation. While ecotourism activities enhanced through establishment of CBNREs contribute to improving livelihoods and household income at local level (Murphree, 2001)

, at national level they contribute to increasing domestic income to the economy (Sindiga, 1999). Because ecotourism attracts foreign currency to the economy (Ashley, 2000; Sindiga, 1999), non tourism related enterprises also benefit from income attracted by ecotourism because of the multiplier effects (Ashley, 2000; Aylward, 2003). Also, CBNREs provide recreational opportunities for local citizens to enjoy whilst supporting conservation efforts by rural communities (Rozemeijer, 2001). According to Murphree (2001) the Department of National Parks and Wildlife Management (DNPWLM) granted the local community of Mahenye, in Zimbabwe, permission to appropriate, manage and benefit from sustainable wildlife-based enterprises. This situation which resulted in a decrease in wildlife poaching activities points to the fact that well functioning CBNREs reduce the burden and associated costs on government of ensuring compliance. The benefit to society of such reduced expenditures on compliance enforcement is that achieved savings on fiscal spending could be directed to other socio-economic development imperatives. Well managed resources provide opportunities for tourists to enjoy and for advancing knowledge on the functioning and management of our socio-ecological systems through research. In this sense both tourists and researchers could be seen as beneficiaries of CBNREs. There are, possibly, many other beneficiaries of CBNREs which have not been mentioned in this document.

The following section presents the framework that is proposed and that has been used to guide reflection on the postulated determinants of CBNRE sustainability.

8.3. Conceptual and analytical framework

At local level approaches to promotion of biodiversity conservation and economic development are determined by the prevailing governance environment, natural resources to be conserved, and opportunities for economic activity and how they are realised. The interaction between variables operating at different scales and how these affect biodiversity conservation and enterprise development at local level is depicted in Figure 14.1– a framework used for analysing CBNREs in this study.

At the largest scale (International level), shown on the top left box of the diagram, policies, procedures and practices of global donor agencies (e.g. World Bank, European Union, and other world foundations) direct approaches to natural resource management and economic development in ways that have profound influence on domestic policies, legislation and practices for support of natural resource conservation and economic development.

At National or State level policy and legislation are key instruments that affect the social-political and economic system, and governance in ways that shape the demand for goods and services, and that determines institutions for natural resource management at various level.

Institutional dynamics at national and provincial levels intersect with local institutions thereby affecting the perceptions of how the natural resource system should be used, and this determines the potential supply of goods and services and the demand for goods and services at local level.

The supply of goods and services and the demand for goods and services is mediated by the local level resource use, governance and management institutions to determine opportunities for nature-based enterprises. Local level institutions also influence the business models (CBNRE models) that are adopted to realise an opportunity.

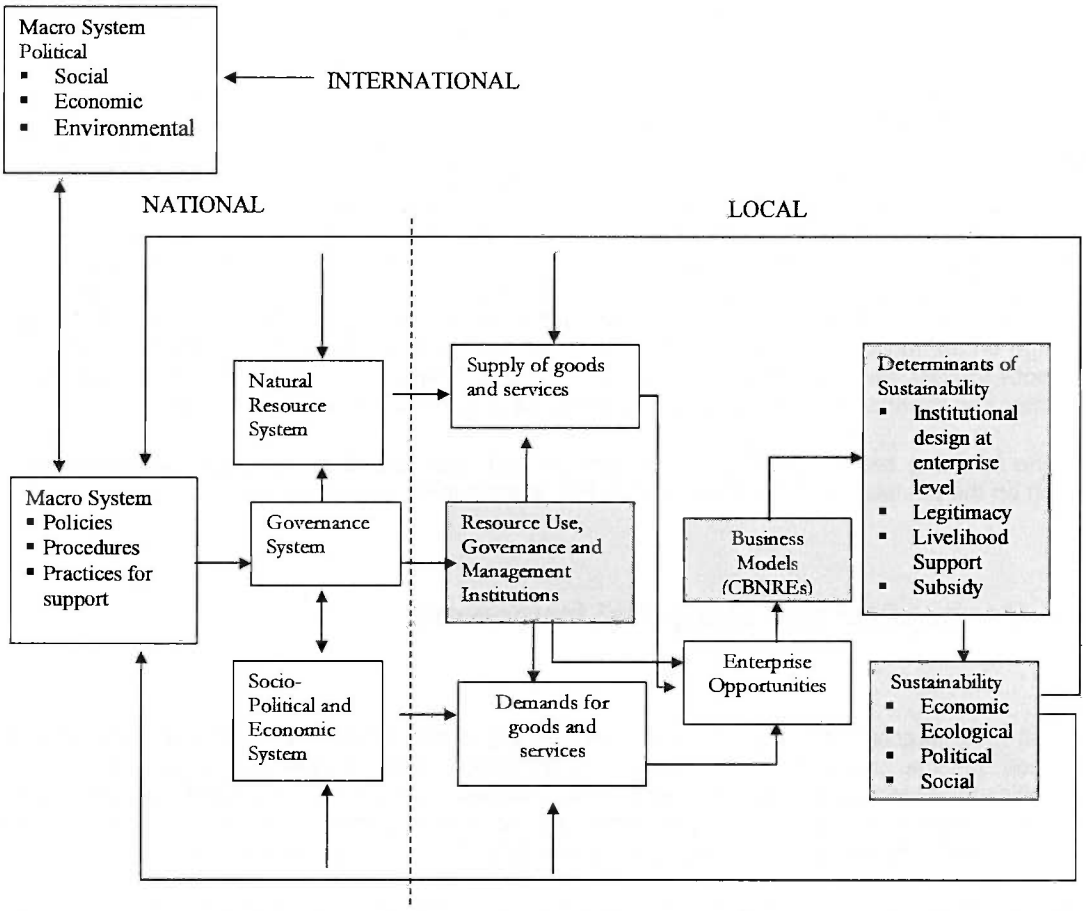

Figure 8.1. Conceptual and analytical framework for CBNREs

Different categories of business models are recognised and exhibit differences emanating from their institutional design. These differences impact on their economic performance. It is recognised that it is only under exceptional circumstance that CBNREs demonstrate sufficient benefits at local community level to drive processes that promote conservation. As such, other livelihood support measures play an important role towards achieving the sustainability of CBNREs. Subsidy and the legitimacy of structures and processes that promote conservation and development at local level also play a fundamental role towards achieving CBNRE sustainability. Because this study assumes that the types of enterprises that suit the CBNRE definition have stringent requirements for legitimacy it considers the different types of legitimacies in order to reflect on their impact on CBNRE sustainability.

It is postulated that a combination of factors such as institutional design, legitimacy, livelihood support, and subsidy have implications for the CBNRE in relation to economic, ecological, political and social sustainability. The success or failure of the CBNRE feeds back into the international and state level social-political systems directing change in policies, procedures and practices for conservation and development support.

This conceptual framework can be applied to aid different foci on the study of the sustainability of CBNREs such as focus on the influence of policies, practices and procedures at various scales and how

they shape local conservation and development interventions. In this study, in particular, the framework is being applied to aid review of the literature and to focus the analysis on the role of institutional arrangements as determinants of CBNRE sustainability; the focus is at the local level depicted in the diagram. The framework has been applied to help conduct a systemic reflection on the different aspects of conservation and development influencing the sustainability of CBNREs. One aspect that is being considered in this study is the role of subsidy in aiding effective management and operation of CBNREs, particularly, during inception stage and beyond. The other is livelihood support and its contribution to combating rural poverty thereby reducing demands on the CBNRE and dependency on natural resources resulting in subsistence uses that compete or conflict with CBNREs. As stated earlier, it is postulated that a combination of determinants of sustainability such as CBNRE institutions, other livelihood support measures, legitimacy and subsidy leads to sustainability or lack thereof in terms of economic, ecological, political and social sustainability. As such, this chapter provides an explicit explanation of what is meant with respect to the mentioned dimensions of sustainability.

8.4. Determinants of enterprise sustainability

8.4.1. Institutions

While a number of scholars have examined the role of institutions in shaping how local people use and manage their natural resources, as well as factors that bear a causal relationship with the sustainability of institutions for managing the commons (Agrawal, 2001; Agrawal and Gibson, 1999; Bond, 2001; Campbell, *et al.*, 2001; Emerton, 2001; Nemarundwe, 2003; Ostrom, 1990), others have examined benefit-based approaches to conservation from a perspective of drivers for institutional change – change from weak to strong institutions (Bond, 2001; Emerton, 2001). In addition, a new body of scholarship, which emerged in recent times, suggests that economic performance of enterprises be explained through an in depth analysis of institutions (Furubotn and Richter, 1991; Libecap, 1991). Further, Knight *et al.* (2003) observed that, in South Africa, enterprises established in rural areas, with high quality natural resources face institutional problems and challenges facing group settlement schemes created under the government's settlement / land acquisition grant programme which emanate from succumbing to weak institutions. Clearly, a focus on institutions can be used to aid understanding of the determinants of success or failure at nature-based enterprise level and their relationship with successful collective action in the management of the use of natural resources at the level of the resource – for example an estuary.

Recognising that different explanations have been put forward by scholars as to what constitutes institutions, in this particular study institutions are considered to be "regularised patterns of behaviour that emerge, in effect, from underlying structures and sets of rules in use, and are maintained by people's practices, or indeed their active investment in those institutions (Leach, *et al.*, 1997)." In this sense structures and rules giving rise to certain behaviours either lead to successful or unsuccessful CBNREs. However, "as rules of the game", institutions are distinguished from organisations which along with individuals are considered as " players in the game" (Leach, *et al.*, 1997). Because of this, institutional arrangements are considered to be critical determinants of success at resource use, management and governance level as well as at enterprise development level.

8.4.2. Resource Use Governance and Management

In rural communities positive impacts of resource management can be broadly ascribed to collective resource management institutions in general than to CBNRE components in particular (Ashley, 2000). However, the desire to establish a CBNRE and to realise benefits provides momentum for the broader process and also presents specific challenges. These challenges, that is, managing community

tourism enterprises, negotiating partnerships, and deciding on how to spend income from the enterprise, became evident when community tourism enterprises were being established in Kunene and Caprivi regions of Namibia, and it was recognised that addressing these challenges require development and change of community institutions (Ashley, 2000).

According to Ashley (2000:17) "...rural households need effectively functioning community institutions to manage and mediate relations between households and the land, natural resources, social networks and informal markets on which they all depend, and to represent the community." According to (Knight, *et al.*, 2003) the fact that some business organisations tend to perform better than others highlight some important institutional differences that impact on economic performance. The statement by Ashley 2000 and Knight *et al* 2003 suggest that institutions have a causal relationship with success of collective natural resource management and enterprise success or lack thereof. It is therefore against this backdrop that different business models are reviewed below, the intention is to highlight institutional differences which impact on their economic performance.

8.4.3. Business Models

What is discerned from literature is that there are three broad categories of business models that are commonly adopted during the establishment and operation of nature-based enterprises (De Beer and Elliffe, 1997; Naguran, 1999). These are the community owned and operated business model, the community private sector partnership model, and the community public private sector partnership model. Because the last two models are very similar, save for the public sector involvement in the last one, which in most instances involves investment in the enterprise by organs of government, detailed consideration has been given to the community owned and operated model and the community private sector model. However, differences which arise in the latter model as a result of public sector involvement have been highlighted. To provide a clear and systematic account of the differences between the business models applied in the nature-based business sector, involving rural communities, for each of these models consideration has been given to enterprise institutions, property rights, transaction costs and contracts.

Community Owned and Operated Business Model

"In this model, the community can own and develop all infrastructure services and facilities relating to tourism development. They would be responsible for mobilising the necessary capital and expertise to plan, construct, operate and maintain the necessary infrastructure, facilities and services, as well as be responsible for environmental management" (Naguran 1999:50). Gujadhur and Motshubi (2001) state that in this type of a model the community, and the women especially, enjoy a great deal of employment and autonomy. Furthermore, because distribution of benefits are based on participation, income directly filters down to household level in the form of cash, and community members do not have to wait for the trust to make a decision on income that accrues to the trust as it is the case with other business models (Ibid). Nevertheless, if lessons coming out of practical application of this model are anything to go by, the mentioned potential is yet to be fully realised (Salafsky, *et al.*, 2001).

Enterprise Institutions

Numerous examples of this enterprise model exist. This model has been applied in both coastal and terrestrial natural resource-based enterprises. Evidence of the application of this model include the Amadiba Adventures (Russell and Kuiper, 2003)), Mngazana canoe trails (Lewis, *et al.*, 2005), community-based cultural tourism in /Xai-/Xai and the Dqae-Qare game farm in Ghanzi. The last two being enterprises established in Botswana. There are many other nature-based enterprises that have been established in the majority world which have employed this model. While this model is being widely applied and is potentially the most empowering (Naguran, 1999), it entails many difficulties. And, in the short term constitute extremely high risk for the community because they lack the institutional capacity to apply it (ibid).

Because of the lack of institutional capacity in terms of experience and skills, as well as lack of clarity on roles, responsibilities, accountabilities (Van den Berg, 2001) necessary for effective and efficient operational management of the enterprise, significant amount of time and financial resources have to be spent on building the capacity of local community members to operate and manage their enterprise effectively, efficiently and profitably (ibid). Further, for clearly specified use and management rights to be assigned to a community, it has to organise itself into a representative accountable and legally registered entity with adopted regulations and procedures (Rozemeijer, 2001) This way, it will be able to engage government authorities on the delegation of such rights. However, establishment of such a structure may be a lengthy, and complicated process since adequate representation of community members has to be ensured. It is reported that in /Xai-/Xai the process of establishing a legitimate community representative structure, which was not dominated by powerful groups within the community, took nearly four years (Gujadhur and Motshubi, 2001). Similarly, in relation to the establishment of a structure to take ownership of the Dqae-Qare game farm, Van den Berg (2001:43) states that "the formation of a representative community-trust to take up ownership of the farm proved to be a lengthy process that could not be finalised on schedule." Partly, this situation arose because in an effort to establish an adequately representative and legitimate community structure, in which the most marginalised members of the community had a voice in decision-making, the criteria adopted resulted in the most deprived community members becoming the majority members in the committee. Hence, this structure had to be changed to make it more efficient, while improving the involvement of all participants in decision making. This made it more difficult to achieve the anticipated results within the intended schedule (ibid).

The need to focus effort on building the capacity of a community management structure to manage its enterprise efficiently and profitably also results in a lengthy process that is characterised by costly transactions (Furubotn and Richter, 1991). These costs are incurred during the process of: structuring accountability and transparency in the operation and management of the enterprise, devising rules that clearly set out the roles, responsibilities, powers and obligations of the enterprise governance and operational management structures, as well as setting out rules defining the limits within which management can operate. Knight, *et al.* (2003) have attributed much of the difficulty with operating and managing community owned and operated enterprises with weak institutional design upon which many of these enterprises are founded. This observation is confirmed by van den Berg (2001) who attributed the changing of the initial farm management committee (FMC) in Dqae-Qare to a weak institution that had to be changed due a lack of effective skills transfer and lack of clarity on roles and responsibilities, and the accompanying relations between the manager and the advisor, the manager and the board of trustees, and the FMC and the advisor. According to Van den Berg (2001), these management problems resulted in a tangled-up web of consultation and non-transparent decision-making. Consequently, the body ultimately responsible for the management of the enterprise (FMC), was, by far, not ready and had to be changed. Amadiba Adventures has changed the operational management structures at least four times in a period of six years (Ntshona and Lahiff, 2003). Russell and Kuiper (2003) also point out that the problems that led Amadiba Adventures to go through a series of institutional changes arose out of imprecise mandates given to the various structures and lack of congruency between roles-cum-responsibilities and decision making authority.

Property rights

Property rights, in the context of this study refer to a secure claim to the use of a resource and to the exclusion of others from the use of the resource; the right to bear the costs of use and the costs of excluding others from the use of a resource; the right to trade use rights, wholly or partially and temporarily or permanently and to appropriate returns; and the right to bear the consequences of the change in value of the resource (Gibbs and Bromley, 1989; Furubotn and Richter, 1991).

While many nature-based enterprises have adopted and implemented the community owned and operated business model on the strength of de facto resource use and access rights, others have been implemented on the strength of de jure public group rights (as described by (Lynch, 1999) that are secure and tradable at group level. Examples of enterprises established on the basis of relatively insecure property rights (for example the permission to occupy) commonly assigned to communities in rural areas include Amadiba Adventures (Lourens, 2004), Mngazana estuary canoe trails (Lewis *et al*, 2005), the cultural tourism enterprise in /Xai-/Xai, Botswana (Gujadhur and Motshubi, 2001), Sea canoe in southern Thailand (though not a community owned and operated model) (Kontogeorgopoulos, 2005) and the Playa de Oro ecotourism enterprise in northern Esmeraldas (Wood, 1998). Based on extensive review of literature, it appears that very few communities with clearly defined rights that are secure and tradable at group level over utilisation of natural resources, particularly in the ecotourism sector, would opt for the model discussed in this section. The only example established during the review of literature is the Dqae-Qare game farm in Botswana. However, even in this particular case, the authenticity of the decision to proceed with the adoption of this model is suspect because it followed unsuccessful attempts to solicit a private sector partner in the enterprise (Van den Berg, 2001).

Relatively insecure de facto resource use and access rights make it difficult to entice potential private sector partners to invest in community owned and operated enterprises. Because rural communities often lack skills and enterprise operation, management and marketing experience, the inability to involve experienced partners in the enterprise leads to institutional weakness alluded to above. In addition, the difficulties facing community owned and operated enterprises are exacerbated by the fact that most of these enterprises are owned by community members represented by community trusts. And, since community trusts cannot pay dividends to shareholders (Knight, *et al.*, 2003) it is difficult to retain competent management through equity sharing arrangements so as to maximise their utility.

In cooperative theory, vaguely defined property rights lead to efficiency robbing problems such as the free-and-forced rider problems (Cook and Iliopoulos, 2000b). These efficiency robbing cooperative problems are the underlying causes of the institutional weaknesses that tend to undermine collective natural resource management and enterprise sustainability. To illustrate this point the Sea canoe experience is considered below.

Sea canoe was the first ecotourism enterprise to conduct daily visits to the near pristine island caves and open air lagoons of Ao Phangnga in southern Thailand (Kontogeorgopoulos, 2005). In doing this it truly embraced many of the principles of ecotourism development such as involvement of community members in the enterprise (though from position of junior management downwards) and carried out its business in an environmentally sensitive manner (ibid). However, establishment of this enterprise occurred in the absence of clearly defined and exclusive rights. Neither the community nor the private sector enterprise owners enjoy exclusive rights to the use of the resources in the form of public-group rights or private-group rights (Lynch, 1999). This situation combined with a lack of licensing requirements being introduced and enforced for sea kayaking enterprises in southern Thailand (Phuket and Ao Phangnga), has led to the recent proliferation of other sea kayaking companies (ibid). Hence, treacherous and ruthless competition characterised by severe tensions between the operators of the Thai owned kayaking companies and managers of Sea canoe – an American expatriate founded and owned company – has emerged, and has resulted in despicable incidents such as the shooting (though not killed) of one of the managers of Sea canoe (ibid).

Of even greater concern is that Sea canoe competitors have caused a chaotic situation to arise. In carrying out their business they do not give due consideration to the environmental sensitivity of the

ecological system (ibid). Despite the fact that a total of twenty companies transporting tourists to the small island caves is bound to result in the overcrowding of the caves and lagoons, the fact that the boats transporting tourists to the caves and lagoons are often overloaded has ensured the recent overcrowding of the caves. This has resulted in the recently observed steady degradation of what was once sacred caves and lagoons in near pristine condition (ibid). Because of the observed overcrowding and steady degradation of the ecological system, some tour operators have threatening to remove tour visits to these caves from their lists. Lack of clearly defined rights and regulation by the responsible authorities has led to a situation of lawlessness in Ao Phangnga (ibid). Free-riding is steadily leading to environmental degradation and the eventual shut down of an ecotourism enterprise that provides significant benefits to local community members (ibid).

Because such free-riding problems are pervasive in the context of vaguely defined property rights, as is the case in many of the contexts where the community owned and operated business model is applied; it is for this reason that the Sea canoe example has been included in this section (though not in itself a typical example of the model described) to illustrate some of the problems that arise out of insecure and inadequately defined rights. The intention is to highlight some of the many problems contributing to the complexity of establishing viable and sustainable community based and operated enterprises (Gujadhur and Motshubi, 2001; Naguran, 1999).

Bond (2001) observed that establishing sound institutions to operate and manage CBNREs and to demonstrate benefits of institutional change is difficult in the absence of strong and clearly defined resource use and access rights. The Sea canoe example clearly confirms this observation. Unfortunately, many community owned and operated business models are adopted in an environment of weak and inadequately defined rights. And, as Bond (2001) states, many of them do not provide financial incentives for institutional change.

Transaction costs

Transaction costs include the costs of establishing an institution, using an institution or changing an institution or organisation (North, 2000). They also include the costs of negotiating and enforcing rules (Wyne and Lyne, 1995). In theory an enterprise forced to deal with costly transactions would perform poorly compared to a similar enterprise operating with minimal transaction costs (Libecap, 1991).

Review of literature on community owned nature-based enterprises in general (that is regardless of the model applied) seems to indicate that the formation of a representative and legitimate structure is a complicated lengthy process that requires clear definition of the community, as well as the roles and responsibilities between operational management and governance structures (Flyman, 2001; Van den Berg, 2001; Gujadhur and Motshubi, 2001). Because rural communities lack the skills, experience and the right attitude towards operating a financially viable and sustainable enterprise (Flyman, 2001), a series of engagements is required to build the capacity of rural communities to effectively manage their enterprises, particularly where the community owned and operated model has been adopted and applied. Generally, this leads to high transaction costs of establishing enterprises that are founded on common property resources. In the case of a community owned and operated business model, higher transaction costs arise out of frequent institutional changes which appear to characterise this business model (Ntshona and Lahiff, 2003 ; Van den Berg, 2001). Both Amadiba Adventures (Ntshona and Lahiff, 2003) and the Dqae-Qare game farm (Van den Berg, 2001) had to change operational management structures at least more than twice in an effort to eliminate the weaknesses of preceding structures and achieve effective management and economic sustainability of the enterprise. While it is logical to change from one structure to another in an attempt to eliminate weakness and establish sound enterprise institutions, the downside of these frequent institutional changes is that they are companied by transaction costs (North, 2000), and add up to already high transaction costs of establishing an enterprise based on a common property resource, thus increasing transaction costs even further. Therefore, it can be postulated that community owned and operated enterprises suffer from high transaction costs which comprises initial

transaction costs of establishing the enterprise and transaction costs associated with frequent institutional changes.

The evaluation of the economic viability of Amadiba Adventures conducted by Lourens (2004) reported that in its current form, Amadiba Adventure is not financially viable. Furthermore, Lourens (2004) reported serious financially losses experienced by Amadiba Adventures in the 2003 financial year. Although the evaluation of the Dqae-Qare enterprise did not provide any guidance on the financial performance of the enterprise; nevertheless, it stated that the enterprise was not financially viable – hence the institutional changes made (van den Berg, 2001). Perhaps, it is these high transaction costs that contribute to the mentioned financial losses and to the lack of financial viability, as well as the rareness of economically successful cases of community owned and operated enterprises (Kontorgeogopoulos, 2005) It is, however, unfortunate that such problems appear to be pervasive where a model considered to be the most potentially empowering is applied.

Contracts

A classic contract can be understood to be a two-sided legal transaction in which two parties agree on certain mutual obligations (Furubotn and Richter, 1991). The strength of such a contract is in its legal enforceability. Parties to the agreement, which is legally binding, specify the rights, responsibilities and obligations of each party (ibid). Above that, procedures for dealing with breach of the agreement are also outlined. Because contracts are legally enforceable, they encourage parties to the agreement to fulfil their obligations in terms of the contract.

As with Amadiba community in the Eastern Cape, South Africa, nature-based tourism businesses in the /Xai-/Xai community in Botswana comprises two business models, that is, the community owned and operated model for cultural tourism and the community private sector partnership model for the trophy-hunting operation (Gujadhur and Motshubi, 2001). In the Amadiba case, Amadiba Adventures has adopted the community owned and operated model while the salt-water catch and release fly-fishing operation resembles a community private sector partnership model (Ntshona and Lahiff, 2003).

During the funding phase, the /Xai-/Xai cultural enterprises were supported by the advisor from SNV-Botswana – an NGO that supported tourism development in the /Xai-/Xai area. Despite there being no mention of problems with capacity building carried out by the SNV advisor, what is evident from the review of this case is that no mention is made of any agreement being entered into between the community representative structure and the NGO regarding obligations and expectations on capacity building. Furthermore, the review of this case conveys the impression that not at any stage did this enterprise enter into formal agreements with any of its service providers or suppliers.

In the Amadiba case, Ntshona and Lahiff (2003) report the reasons that led to the disbanding of the RDP Committee, which was originally entrusted with the responsibility of operating and managing Amadiba Adventures. According to Ntshona and Lahiff (2003) the main reason was that an NGO which participated in this committee and which was assigned the responsibility of managing the enterprise while building the capacity of local community members to effectively engage operation, management and decision making, failed to fulfil its obligation. However, what is discerned from this case is that while this was the expectation from the community members, it was not contained in any agreement between the parties concerned and neither did any agreement exist between the community and the NGO in question. Like the /Xai-/Xai cultural enterprises, review of the case suggests that Amadiba Adventures has not entered into any formal agreement with any of its suppliers or service providers.

A similar experience is reported in the Dqae-Qare game farm, where an NGO called Kuru Development Trust was entrusted with ensuring accountability in the operation and management of the activities on the farm (Van den Berg, 2001). In this particular case, the NGO showed lack of commitment to the project and did not honour its obligation in terms of building the capacity of the locals. However,

later this situation changed following an evaluation report which pointed that lack of commitment by the NGO was undermining the viability of the enterprise (Van den Berg, 2001).

Clearly, evidence points to the lack of application of legally enforceable agreement between community representative structures and other parties in the enterprise, where the community owned and operated business model is applied. Partly, the problem has to do with that rural development is funded by Donor Agencies who fund local NGOs to implement development and natural resource management projects. While funding arrangements between these parties, (Donors and NGOs) are cemented on formal contracts, between local NGOs and communities formal contracts are not entered into. This being so, it is not surprising that some NGOs have failed to fulfil their promise in relation to capacity building ((Ntshona and Lahiff, 2003; Van den Berg, 2001). Consequently, community members continue to lack understanding and appreciation of legally enforceable agreement as instruments for reducing risk in commercial transactions. Such lack of understanding of the importance of contracts adds to the complexity of establishing successful community owned and operated enterprises.

The Community Private Sector Partnership Model

The community private sector partnership model is a business model that combines the sound business acumen and access to capital that private sector operators posses with the community's resources to optimise the balance between wise use of natural resources and economic development for the rural poor (Naguran, 1999). Under this model four types of arrangements are discerned from literature, that is, lease agreement, management contract, joint venture, and a partnership between few individual members of the community and the private sector operator (private sector community entrepreneurs partnership model). In this document the three arrangements are referred to as variants of the community private sector partnership model. Issues discussed below relating to institutions, property rights, transaction costs and contracts appear to be cross-cutting on all of these arrangements including the community public private sector model.

Lease Agreement / Management Contract

In this arrangement the private sector is mobilised by a lease agreement or a management contract to operate facilities that have been developed by the community on communal land (normally from donor funding) and to employ locals in the operation and management of the enterprise (Naguran, 1999). The community remains responsible for the development and maintenance of infrastructure and other facilities. The private sector may be assigned the responsibility for environmental management, capacity building and facilitating the Small Medium and Micro Enterprise (SMME) development and support (De Beer and Elliffe, 1997). With respect to benefit flows, in the case of a lease agreement, the community would receive an agreed upon lease fee on a regular basis (ibid). In the case of a management contract, the community would receive all returns less the costs of the management contract and costs associated with the operation of the infrastructure and facilities (ibid).

Joint venture between the community and the private sector

In this model the community mobilises the private sector to develop the tourism potential of a particular area or the intended enterprises (ibid). Normally, the joint venture agreement is underpinned by the philosophy that the private sector would Build-Operate-Maintain-Transfer (BOMT) all tourism infrastructure and facilities to the community at the end of the agreed period (ibid). The responsibility for operational management of the enterprise(s), environmental management and SMME development and support is assigned to the private sector partner to lead (ibid). This model offers a range of benefits to the

community in the way of genuine equity share in the enterprises, short term concession fee payments, employment and SMME opportunities. It is often claimed that partnerships with the private sector including joint venture partnerships, create or maximise opportunities for empowerment in the form of training and capacity building for local community members (Ashley, 2000). Contrary to this claim, there is sufficient evidence in the literature pointing to the limited extent to which this is achieved in real life situations (Belsky, 2000; Murombedzi, 2001; Sindiga, 1999).

Community entrepreneurs private sector partnership

In this model community members (entrepreneurs) partner with a private sector operator to establish a private business entity and to then develop the tourism potential of a particular area (De Beer and Elliffe, 1997; Wood, 1998). It is this business entity which in turn negotiates an agreement with the community as to how the tourism potential of the area should be develop and the benefits that should accrue to the broader community from the agreed development. This model is based on the philosophy of mixing a small community business partnership with cooperative enterprises. While this approach aims to demonstrate benefits to the broader community, through the creation of a small community business partnership, it also tries to offset some of the cooperative enterprise problems that reduce the natural incentive to work associated with benefits that are too diffused to motivate each individual community member (Wood, 1998). A small community business partnership serves to reward those who work the hardest, while not undermining the larger community's ability to benefit from cooperative enterprises, such as sale of craft and lease of community facilities (e.g. community lodges) (ibid). In this model environmental management is a joint responsibility of the private company and the community. However, the private company may assume a lead role in environmental management and in SMME development and support. As regards the development of community infrastructure and facilities, the community would mobilise resources for development and the private company would then manage and market these facilities as part of its tourism package (ibid). In this arrangement benefits accrue to the community in the form of employment opportunities from the enterprises, SMME opportunities such as craft outlets and profits from the use of community facilities. Because community associates are required to work in the enterprise and, in retum, eam a percentage of the profits, they benefit through equity share and enterprise operation and management training carried out by their private sector partner. This model has been applied and has proved to be a tremendous success in Ecuador (ibid) in Kenya - the Il Ngwesi lodge run by a Masai business partnership (De Beer and Elliffe, 1997) - and Sea canoe in Thailand (Sea canoe is an example of this model – although it is experiencing some difficulties alluded to earlier, for many years the business operated very well) (Kontogeorgopoulos, 2005).

Community public private sector partnership model

In terms of institutional features, this model approximates the community private sector partnership model. It has been applied in cases involving land and natural resources owned by the state (for example game reserves) (De Beer and Elliffe, 1997). The model is primarily founded on the logic that through the issuing of concessions, the state can induce the private sector to form viable partnerships with the community to develop or use existing infrastructure and facilities and to run viable enterprises. This way, the state would leverage the crowding in of the private sector expertise, investment and lending. At the same time it would ensure that the neighbouring communities are involved in, and benefit from the issued concessions (ibid). In terms of this model the responsibility for environmental management becomes the joint responsibility of the private sector community partnership. Benefits to the community arise in the form of income from equity share, employment and in the form of a percentage of turnover that accrues to the state which is invested in community projects.

Enterprise Institutions

Because all three arrangements mentioned above engage an experienced private sector operator, and because the terms of the partnership are commonly outlined in agreements that form the basis of the partnership, management has to adhere to stringent rules for transparency and accountability in the execution its functions. Further, the agreement outlines the roles, responsibilities and accountabilities of each of the parties in the agreement. In turn, such clearly outlined roles, responsibilities and accountabilities filter through to lower operational levels. According to (Knight, *et al.*, 2003) the advantage of engaging experienced private sector operators in these enterprises (community-based enterprises) is that they bring the experience that is so vital to enterprise success, that is, clear operational procedures and mechanisms for monitoring the performance of management thereby reducing the effect of the control problem. In addition to enterprise operation and management skills, experienced operators have an in-depth understanding of the target market and its dynamics, and – through existing linkages - can establish the necessary connection with the target market (Wood, 1998).

Property Rights

While the community owned and operated business model is normally applied in the context of unclearly defined and insecure property rights, this is not the case with the community private sector partnership model. Where this model is applied rights arrangements are normally clearly defined, secure and tradable. In most cases this model has been applied where the community gives up some or all of their resource use rights for benefit rights (Ashley, 2000; Wyne and Lyne, 1995).

In Mahenye (in Zimbabwe), safari-hunting and non-consumptive ecotourism enterprises were established under CAMPFIRE. These enterprises were based on a partnership between the community and the private sector (Zimbabwe Sun Limited - ZSL) which was founded on a lease agreement entered into between the Chipinge Rural District council and the Zimbabwe Sun Limited (Murphree, 2001). While the partnership was said to be between the ZSL and the Mahenye community, the fact that de jure rights in terms of formal authority over Mahenye's land and natural resources is vested in the Chipinge Rural District Council (CRDC) – a local government authority - and had not been formally delegated to the community, meant that the agreement had to be entered into between ZSL and CRDC. However, the agreement stated that the council undertook to use its best endeavours to ensure the continued popular support of the Mahenye ward community for the projects and stipulated that the council would make some revenue available to the Mahenye community (ibid). The agreement specified rights to land development and natural resource use which could be exercised by the ZSL over a period of ten (10) years, and the obligations of each of the parties to the agreement (ibid).

At Mtentu estuary, located in the Wild Coast of the Eastern Cape, South Africa the lease agreement entered into between the Amadiba Community and Ufudu – a private sector operator - was founded on a catch and release fly-fishing permit issued by the Directorate for Marine and Coastal Management to the Amadiba community (Pretorius, 2003). This secure public-group right which is tradable at group level served as the basis for the agreement. The agreement specifies that Ufudu has exclusive rights to use the Mtentu estuary for a catch and release fly-fishing operation over the last three months of the year. In turn, Ufudu has to pay to the community trust twelve percent (12%) of the daily tariff and has to provide employment opportunities for the local Amadiba community members (ibid). The agreement between Ufudu and Amadiba community is renewable every five years.

In Namibia, wildlife is the property of the state, but under a 1996 legal amendment, communities that form defined management units can register with government as a " "conservancy" and receive conditional use rights over wildlife (Ashley, 2000). On the basis of these rights, conservancies have been able to mobilise private sector investment in rural tourism development (ibid). For example, the residents committee of Bersig area which fringes the Namib Desert in Kunene Region (North West Namibia) negotiated and concluded a joint venture business activity with Wilderness Safaris. On the strength of secure and tradable rights over wildlife granted by government to the community conservancy, Wilderness Safaris was willing to invest in a sixteen (16) bed tented 'Damaraland Camp' (ibid)

In Zabalo, Ecuador, Randall Borman - a private sector entrepreneur – together with ten (10) Cofan community members established a wilderness travel enterprise on the strength of tribal land ownership rights gained from the Ecuadorian government (Wood, 1998). In order to provide ecotourism benefits to the broader community, Borman and his associates supported a local community craft store by arranging regular tourist visits to the craft store. In addition, they also assisted the community in building community owned tourist cabins. These cabins are rented out to Borman and his company and the community receives all profits from the rental, but has to pay a caretaker to maintain the cabins. In Zabalo, establishment of these enterprises was made possible by the existence of a strong community level institution that manages the use of natural resources by members of the local community (ibid). This institution sets limits for hunting zones and fines levied against transgressors. The fines levied to transgressors increase with subsequent infractions (ibid).

In southern Thailand, an American expatriate named John Gray, along with two Thai partners, founded Sea Canoe, the first marine ecotourism company in southern Thailand ((Kontogeorgopoulos, 2005). Sea Canoe is the oldest, successful and most renowned environmentally sensitive ecotourism enterprise in Ao Phangnga. In order to subscribe to the principles of community based ecotourism, Sea canoe employs a large number of local community members – about 40 to 60 depending on the season; it is also involved in environmental education and other environmental conservation efforts in the area. As already stated, Sea canoe operates sea kayaking daytrips in Ao Phangnga, where tourists are brought aboad escort boats to a number of small islands and then transported by guides into caves aboard inflatable kayaks (ibid).

While Sea canoe was established by a private sector operator together with other two Thai citizens and provides significant benefits for the local community, it does not enjoy clearly defined rights to the use of the resource base. As a result, when tensions emerged between Mr Gray and his two partners, they decided to establish their own operation which was similar in every respect to Sea canoe (ibid). Because of the lack of exclusive and defined rights to the use of the resource base, there has been an explosion of other sea kayaking companies that conduct ecotourism activities in the small islands. According to Kontogeorgopolous (2005) the significantly high number of sea kayaking companies (20 companies) crowding narrow caves and open air lagoons has forced wildlife to flee those regions of Ao Phangnga limestone islands such as coastlines and open air lagoons. This is largely a result of a lack of industry standards or licensing requirements in tandem with the absence of enforcement capabilities among tourism authority officials of Thailand or the unwillingness of the National Parks Department to clamp down on illegal operators or activities. Govemment corruption and apathy have led to environmental degradation caused by shoddy industry practices (ibid)

That, for the most part, the community private sector model (and its variants), as well as the community public private sector model are based on clearly defined resource use and access rights that are secure and tradable is an obvious reality pointed out in this literature review. The fact that many authors on the subject have associated these business models with success and economic sustainability (Ashley, 2000; Bond, 2001; Flyman, 2001; Naguran, 1999; Wood, 1998) is evidence that corroborates suggestion by cooperative theory that failure of cooperative enterprises can be traced on ill-defined property rights (Cook and Iliopoulos, 2000a). However, the Sea canoe example provides evidence to the effect that emergent external factors arising from vaguely defined rights have the potential to undermine the success of the most renowned successful enterprises - regardless of the model applied.

Transaction costs

According to Naguran (1999) in the community private sector partnership model environmental management is commonly the responsibility of the private sector operator. However, in a community public private sector partnership model such functions may fall within the domain of the public sector partner (ibid). Because in either case management of the use of the resource base falls within the domain of an experienced partner with sufficiently high capacity, it is often effective and the requirements for

training and capacity building are generally lower than for community owned and operated enterprises. Furthermore, in theory, demonstrating the benefits of sustainable resource utilization or conservation create incentives for compliance (Wyne and Lyne, 1995). And, the fact that the community private sector partnership and the community public private sector partnership models are considered to be the most financially viable (Bond, 2001; Lourens, 2004; Nemarundwe, 2003; Wood, 1998) suggest that enterprises which adopt either of these business models demonstrate benefits of conservation to the rural communities thereby creating further incentives for compliance. Under such circumstances, the cost of monitoring and enforcing rules becomes minimal (Wyne and Lyne, 1995). This suggests that the community private sector model or its variants could be associated with low transaction costs compared to the community owned and operated business model.

The community owned and operated model appears to suffer from pervasive institutional deficiencies resulting in recurring institutional changes at the level of the structure charged with the management of the enterprise. The Amadiba Adventures institutional changes described by Ntshona and Lahiff (2003) as institutional evolution and the Dqae-Qare game farm (Van den Berg, 2001) institutional changes are two cases of typical institutional changes that tend to undermine the sustainability of the community owned and operated enterprise models. Russell and Kuiper (2003) have associated these changes, which occur in an effort to devise institutional forms leading to enterprise sustainability, with lack of clearly defined mandates and accountabilities, as well as lack of enterprise operation and management skills and mechanism to monitor performance of management. Engaging experienced private sector operators who adhere to sound business principles ensures a clear definition of accountabilities and mechanisms to monitor the performance of management. Also, it ensures congruency between decision making authority and responsibilities. Stringent requirements for accountability, transparency and general adherence to business principles in the operation and management of the enterprise counteract many of the institutional deficiencies facing community owned and operated models (Knight, *et al.*, 2003). Also, it lowers transaction costs through eliminating those associated with frequent institutional changes (ibid). Therefore, because – from an institutional changes vantage point - the community private sector partnership and the community public private sector partnership models have to deal with relatively lower transaction costs compared to the community owned and operated business model, it is not surprising that, with respect to economic sustainability and viability, they perform better than the community model (Bond, 2001). And, the fact that neither of the community private sector business models reviewed above appear to have been affected by frequent institutional changes as it is the case with Amadiba Adventures and the Dqae-Qare game farm confirms the theory that an enterprise forced to deal with costly transactions would perform poorly compared to an otherwise similar enterprise operating with minimal transaction costs (Libecap, 1991).

Contracts

As stated earlier, the partnership between the Chipinge Rural District Council and Zimbabwe Sun Limited was founded on a lease agreement which runs for twenty one (21) pages and was a subject of extensive negotiations, drawing the comment from one legal reviewer that "This document should stand as one of the most mulled over agreement in existence." (Murphree, 2001) This agreement, which was binding on both council and ZSL, also specified a whole range of obligations for each of the parties, as well as the duration of ten (10) years during which the agreement would be effective (ibid).

According to Ntshona and Lahiff (2003) the Ufudu fly fishing operation involving a partnership with the Amadiba Community was founded on an agreement entered into between the two parties. This agreement specified the rights and obligations of each of the parties, the period during the year over which Ufudu could exercise its exclusive resource use rights, as well as the duration of the agreement beyond which it would have to be renewed (ibid).

The joint venture business activity entered into between the residents committee of the Bergsig area in Kunene Region, Namibia and Wilderness Safaris was founded on a negotiated and agreed to contract between the two parties (Ashley, 2000). Among others, this contract stipulated the period beyond

which ownership of the enterprise would be transferred to the community (that is, in a period of 11-15 years), the income that would accrue to the community per annum (N$ 50 – 70 000 per annum), the contract period (that is, ten (10) year contract with five (5) year renewal) (ibid). Further, it clearly specified the obligations of each of the parties in terms of the agreement (ibid).

Review of the Ecuadorian enterprises operated in Zabalo does not seem to indicate that formal contractual agreement was entered into between the community and the enterprise operators. However, it would appear that because of the strong community level resource use management institution and the strong enterprise institutions, informal contractual arrangements – described by Furubotn and Richter (1991) as relational contracts to which the parties stick for as long as it is mutually beneficial to honour obligations in terms of those informal contracts – have been entered into and have served as the basis for the establishment of this successful ecotourism enterprise - as described by Wood (1998). Although not stated, it is possible that some agreement was reached on the lease of community cabins to Mr Borman and his company. Similarly with Sea canoe, nothing suggests that there was any formal agreement between the owners of the enterprise and the local community. However, it is indicated that Sea canoe negotiated contracts with a number of multinational tour operators in order to assure that its trips are sold by tour representatives based in other areas of Thailand.

Clearly, the above examples indicate distinct differences between the community owned and operated model and the community private sector partnership models with regard to the use of contracts in conducting business activity. While most of these cases indicate application of classic two sided legal agreements, the Zabalo enterprise in Ecaudor provides an example of an enterprise where informal contracts have been successfully applied. However, it should be noted that such successful application of informal contracts has been aided by the conducive contextual environment characterised by sound resource use management institutions.

8.4.4. Legitimacy

"Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper and appropriate within some socially constructed system of norms, values, beliefs and definitions" (Suchman, 1995:574). In the context of CBNREs community representative structures seek to gain or maintain legitimacy for the purposes of achieving continuity, credibility as well as both passive and active support from the broader community members which they represent. And, because CBNREs are founded on common property resources involving a variety of stakeholders, constituencies that pronounce on legitimacy vary, and legitimation requirements are determined by each entity's mandate. In this regard Suchman (1995) points out that organizations or representative entities act in ways that are consistent with gaining and maintaining legitimation requirements of their constituencies. This being so, while the actions of an entity - as it pertains to access, use and management of particular natural resources - may be perceived to be desirable, proper and appropriate to a particular constituency, this may not be the case with other constituencies with a similar level of interest in the same resources. Therefore, legitimacy as an organizational resource that affects the internal functioning of an organization and its relationship with other entities/organizations with different legitimation accounts has to be carefully managed. Hence, legitimacy is considered in this literature review in relation to its implications on the sustainability of CBNREs.

As indicated in the preceding section, communities commonly establish some form of a representative structure to take forward their business interests. Nature-based tourism or ecotourism literature is replete with examples of attempts to ensure the legitimacy of such structures so as to facilitate the establishment of viable and sustainable enterprises. For example, in response to Wilderness Safaris' offer to negotiate a joint venture with the Bergsig community, a legal body or Residents Association was formed. This association comprises all households as registered members, and it is these members who democratically elected a Residents Committee that entered into negotiations with Wilderness Safaris (Ashley, 2000). In the case of the /Xai-/Xai hunting and cultural tourism a ward system was used to

promote adequate representation in the community committee. Because of the observation that residents organize themselves into family groups according to ethnicity and class, a ward system was decided upon and each ward had to independently choose one man and one woman to sit on the committee. This ensured that the wealthier families or one ethnic group did not dominate (Gujadhur and Motshubi, 2001). In the Amadiba area, Ntshona and Lahiff (2003) report that in order to gain legitimacy, the original RDP Committee, set up to establish and operate Amadiba Adventures comprised representatives of all structures that were already existing in the area and included a few others.

In KD1, Botswana, hunting and photographic safari enterprises were established as part of community-based natural resources management initiative (Flyman, 2001). These community private sector partnership enterprises were established based on resource-user rights granted to the Nqwaa Khobee Xeya Trust – a community representative trust – after an intense and genuinely participatory process to establish this trust, and to develop the land-use management plan (*ibid*). The local governance structure (trust) is based on family groups (*ibid*). The decision to form the trust as such was based on the recognition of the fact that family groups are seen as the appropriate cultural units of co-operation and decision-making in KD1(*ibid*). KD1 residents in each settlement have formed family groups, and each settlement has a representative settlement committee with two people (one man and one woman) representing each family group (*ibid*). Four people from each settlement committee represent their settlement on the board of the trust (*ibid*). The trust was structured, as described so as to ensure adequate representation of community members and to promote accountability in the leadership, hence achieve legitimation of its activities.

Suchman (1995) describes different types of legitimacies; these are pragmatic legitimacy, moral legitimacy and cognitive legitimacy. According to Schuman (1995) pragmatic legitimacy rests on the anticipated benefits that are derived by the constituents from the actions of a representative structure. Furthermore, pragmatic legitimacy hinges on the perceived ability to influence the actions of a representative structure, and achieving pragmatic legitimacy is determined by whether the constituents identify with the representative structure (*ibid*).

Moral legitimacy rests on normative evaluation of the entity and its activities. And, unlike pragmatic legitimacy which rest on judgments about whether a given activity benefits the evaluator, moral legitimacy rests on judgments about whether the activity is the "right thing to do" within the cultural definition of what is considered to be right (*ibid*). It usually takes on three forms: evaluations of outputs and consequences (consequential legitimacy), evaluations of procedures and techniques (procedural legitimacy), and evaluations of categories and structures (structural legitimacy), as well as evaluations of leaders and representatives (personal legitimacy) (*ibid*).

Cognitive legitimacy involves affirmative backing for a representative entity that is based on comprehensibility or mere acceptance of the entity as necessary or inevitable based on some taken-for-granted cultural account (*ibid*). It is premised on the understanding of the world as a chaotic cognitive environment in which participants must struggle to arrange their experiences into coherent, understandable accounts. Suchman (1995) states that legitimacy becomes harder to manipulate as the focus of legitimation moves from pragmatism to morality to cognitive. This is because pragmatic legitimacy reflects direct exchange and influence relations between a representative entity and its constituents. As such it is easier to manipulate exchange and influence relations as opposed to more generalized cultural concerns underpinning moral and cognitive legitimation.

Based on this theoretical review of legitimacy as described by Suchman (1995), it is quite apparent that, in CBNRE establishment, the focus of legitimation has been based on promoting good influence and exchange relations between the representative entities and their constituents. In addition, efforts to achieve this pragmatic form of legitimation have meant that procedures for electing individuals to community representative structures, as well as the configuration of these structures have to be consistent with established norms and standards that obtain in a particular setting. These aspects of moral legitimation are clearly illustrated by the KD1 example above. However, while legitimacy is attended to in the context of community representative structures and procedures for electing representatives and developing the resource use management instruments such as management plans, generally, the

literature on nature-based enterprises does not explicitly reflect on the implications of lack of legitimacy on the sustainability of these enterprises. Nevertherless, it provides specific examples of the effects of delegitimated structures and how they have affected enterprise functioning. The impact on enterprise sustainability is therefore deduced from such examples.

A specific example of this situation is the Amadiba Adventures Management Committee that was established after the disbanding of both the RDP Committee and the Amadiba Natural Resources and Tourism Management Committee which succeeded it (Ntshona and Lahiff, 2005). Apart from being disgruntled with the leadership style of the chairperson, community members felt that they had no voice in the decisions taken by the committee, thus they would not respect its decisions. Eventually, it had to be dissolved and its dissolution and the formation of a new one meant an unnecessary increase in transaction costs which could have been avoided had the legitimacy of the committee been carefully managed.

The above example is just one example drawn from literature to illustrate the negative effect of delegimation of an enterprise related structure on the sustainability of a CBNRE. Other negative effects may arise as a result of too much focus on one particular type of legitimacy. For example in Dqae Qare preoccupation with achieving pragmatic appeal to the most marginalized members of the community led to the adoption of a selection criteria of non-participation in existing community structures (Van den Berg, 2001). This resulted in the formation of a farm management committee that comprised the most deprived members of the community. Consequently, it failed to perform its duties because of a severe lack of skills (ibid). While focus on pragmatic legitimacy might have been reasonable, too much focus on it led to the formation of the structure that was not desirable, proper and appropriate when evaluated against the consequential legitimacy score. As such, it had to be reconstituted, an indication of unnecessary transaction costs that could have been avoided.

Despite the fact that delegitimation impacts negatively on CBNREs through increased transaction costs; also, it impacts on property rights and on the enforcement of contracts used in the transfer of such rights. Community members would not respect agreement entered into by a structure they do not consider to be legimate. Furthermore, while the actions of a particular entity might be considered to be legitimate to its constituents, it might be considered illegitimate to other constituencies. Therefore, efforts to achieve CBNRE sustainability have to give due consideration to the reconciliation of legitimacy tensions between constituencies, more so in the context of enterprises that are founded on a common property resource.

8.5. Livelihood Support

CBNREs are commonly established to attend to the twin objectives of promoting conservation and economic development. And, the success of CBNREs is dependent on how well the resources upon which they are founded are managed. From this, it follows that provision of other livelihood options is essential to reducing the demands on the resource and the CBNRE at community level. In this regard, Murombedzi (2001 states that unless revenues generated from conservation programmes such as CAMPFIRE are at levels sufficient to offset the perceived loss from potential individual livelihood strategies, the programmes are likely to encounter opposition at those levels. Along this thread Emerton (2001) states that "it is not self evident that sharing wildlife revenue as development benefits will alone lead to a net economic gain for communities living in wildlife areas or encourage them to conserve wildlife." Bond (2001:242) has also emphasised the same point by stating that "it is only under a combination of exceptional circumstances that the financial incentives from wildlife alone are likely to be sufficient to promote institutional change. This implies that the diversification of CBNRM programmes into other natural resources which can realise both market and non-market incentives is essential to raise the incentives for institutional change." Implicit in all three quotations is the importance of ensuring support for

a variety of livelihood strategies to promote benefit-based approaches to conservation. It is suggested that, as observed with wildlife-based community enterprises, the success of other non-wildlife based enterprises is also determined by the prevalence of other supporting livelihood strategies for the locals. These would comprise a mix of market or non-.market related livelihood strategies (Ashley, 2000).

While the conservationists perspective of establishing CBNREs, as nature-based tourism businesses, has been sustainable use of natural resources - hence a way to enhance incentives for conservation, economists have often seen tourism CBNREs as a route to macro-economic growth and a means of generating foreign exchange (ibid). The private sector has seen CBNRE establishment as a tourism commercial activity conceming product development, competitiveness and commercial returns (ibid). The fundamental difficulty with these perspectives which have been a major driving force behind community types of tourism ventures such as CBNREs is that they have not placed the interests of the poor at the centre of CBNRE development and as such have failed to give due consideration to the livelihoods of rural people and ways of achieving the best fit between rural peoples livelihoods and CBNRE activities. In tum this has resulted in a lack of understanding and appreciation of the centrality of livelihoods as determinants of the behaviour of rural people. Therefore, it is not surprising that Ashley (2000:22) points out that "the common gloomy picture of tourism case studies around the world is of local people disempowered by alien tourism developments and disenfranchised from their resources." She adds that there are many of such examples in Namibia, where white tourism operators have simply established camps or lodges in communal areas, often near a key water resource (spring or river). Other authors have also made similar observations with tourism enterprises in Zimbabwe (Murombedzi, 2001), Kenya (Sindiga, 1999), and Belise (Belsky, 2000).

The main advantage of putting livelihoods at the centre of CBNRE development is that it allows careful consideration to be given to both the positive and negative impacts of enterprise development on local peoples' livelihoods (Ashley, 2000). In this sense it ignores the flawed assumption made by many NGOs that economic development would automatically bring positive impacts, but explores the potential negative impacts as well (ibid). As evidenced by the negotiations that occurred between the Lerato Company and Conservancy representatives and Advisors in Namibia, such an approach has allowed rural people to call for tourism development to be adapted to meet their livelihood priorities (Ashley, 2000). Furthermore those livelihoods impacted upon by development are identified so that support measures or substitutes for those could be provided (Ashley, 2000). In Namibia, govemment support, among others, has been to request private operators to seek local leaders' approval before granting govemment planning approval. This has assisted in ensuring that local people are involved in the development planning and influence tourism enterprise development to suit their livelihood priorities (Ashley, 2000).

"Livelihood strategies are the range and combination of activities and choices that people make or undertake in order to achieve their livelihood goals (George, Undated)."

Livelihoods are sustainable when they are: resilient in the face of external shocks and stresses; are dependent upon extemal support that is economically and institutionally sustainable; maintain the long-term productivity of natural resources; and do not undermine the livelihoods of, or compromise the livelihood options open to others (George, Undated)." Because livelihood strategies are in a continuous state of flux people adapt to: evolving threats and opportunities, changing livelihood objectives and also as their own capabilities alter during their lifetimes (George, Undated).

That the development impact of CBNREs is about jobs and income is an oversimplification, rural people have complex livelihood strategies, based on multiple land-use, and diversification of risk across several activities. "These are affected by tourism enterprise development in many different ways, positively and negatively, directly and indirectly. Secondly, different types of tourism ventures have different livelihood impacts. And thirdly, different people have different livelihood priorities." (Ashley, 2000)

Matching tourism enterprise development plans to local livelihoods requires a good understanding of people's livelihood strategies and needs. Local people understand these without the intervention of researchers and reports. For example, Ashley (2000) states that individual farmers in Torra and Khoadi!!

Hoas conservancies in Namibia make their decisions of ratio of goats to cattle based on account of asset value, liquidity, drought resistance, cultural value, risk diversification, estimated resource availability, and budget constraints – although not expressed in these terms.

Typical livelihood strategies of the rural poor include agricultural and livestock farming, collection of plant materials such as medicinal plants and fuel wood, harvesting of forest products, etc (Ntshona and Lahiff, 2003; Ashley, 2000). For coastal communities livelihood strategies also involve the harvesting of intertidal resources such as fish for sale and subsistence purposes (Ntshona and Lahiff, 2003;). Some rural dwellers augment their income through migrant remittances and pensions. Others do so through income generated from micro-scale spaza shops. Skilled and semi skilled people derive some or all of their income from full time waged employment, building, brick making and block making. Rural peoples' livelihood strategies involve a combination of these livelihood activities. And, the development of nature-based enterprises impact positively or negatively on the livelihood options of rural communities. Therefore, it is important to match CBNRE development plans with local livelihoods so that those impacted negatively are identified and supported through other means. This way, livelihood support would not only deter negative pressures on the resource base with potential to adversely affect the sustainability of CBNREs, but also ensures a wholistic support of livelihoods that contributes effectively to poverty alleviation and development in these areas.

8.5.1. Poverty alleviation and Development

There is overwhelming agreement among authors on nature-based enterprises that establishment of CBNREs contributes to the reduction of poverty in rural communal areas (Murphree, 2001; Van den Berg, 2001; Wood, 1998; Ashley, 2000; Gujadhur and Motshubi, 2001; Flyman, 2001). This is because, in the main, nature-based enterprises are established in remote rural areas with limited economic opportunities for the locals to lift themselves out of poverty. Therefore, nature-based enterprise development provides economic opportunities, and in most cases in areas where there is a general lack of access to market economy (Wood, 1998). These economic opportunities come in the form of full time and casual employment, opportunities for the sale of local arts and crafts, as well as income from cultural tourism activities conducted by the locals (Flyman, 2001).

CBNREs rarely generate permanent jobs for more than a small portion of rural households (1-5%) in prime areas (Ashley, 2000). Earnings for those with jobs help lift their households from insecure to secure socio-economic status (Ashley, 2000). The earnings are also partially recycled within the local economy creating a multiplier effect. Profits from ownership of enterprises by individual local entrepreneurs and other non-tourism related enterprises like spaza shops add to income generated through the presence of nature-based enterprises.

CBNREs also create casual earnings opportunities from selling grass, food, wood, crafts, etc. Grass-sellers, craft-makers, fisherfolk, casual labourers and others sell their products or labour to tourists and tourism enterprises, and to neighbours earning wages from tourism jobs. Although these earnings tend to be smaller relative to waged employment, these additional opportunities tend to benefit a higher percentage of local households than the full-time jobs and are most important for the poorer people who have few other options for earning cash (Ashley, 2000). Small amounts of casual income earned by many poor people provide a food security net as it enables them to make food purchases, particularly in dry years when they cannot grow their own crops. It is reported that most tourism earnings in Cuyabeno, Acuador were invested in education, health services, radios, outboard motors and clothing (Wood, 1998).

In most cases collective income earned by the community from equity ownership of the enterprise, which accrues to the community trust, provides a substantial boost to a community because there are few – if any – other sources of this type of income. This collective income is normally invested in community infrastructure, other facilities such as schools, or any other community projects. In KD1 for example, because of the remoteness of the area, community members have to travel far and incur extra costs to

obtain implements, building materials, clothing, and household items. Transportation to and from the market is often problematic. Therefore, it is planned to make use of this income to the trust to provide some of these goods in the community either as another profit making enterprise or simply as a non-profit service of the trust to its members (in the process creating a few jobs)(Flyman, 2001). If income to the trust is divided between households it is often not enough to change livelihood strategies but enough to cover, for example, school fees and a couple of bags of grain (Ashley, 2000). The value of this income in alleviating poverty among rural households depends on how it is spent, which in turn depends on the local institutions and processes for managing joint expenditure (Ashley, 2000).

Training and capacity building that occurs in the process of establishing and operating community nature-based enterprises have increased the capacity of local communities to take control over their lives and development in their areas – a reflection of a stronger social and human capital. Above this, it has increased the capacity of some communities to influence external organisations (Ashley, 2000; Gujadhur and Motshubi, 2001; Flyman, 2001). For example, in Namibia, rural residents, and the emerging conservancies are recognised by government as a significant player in tourism; this is a significant move considering that in the early nineties, the government did not give them such recognition (Ashley, 2000). This recognition has been translated into the government strategy for tourism planning which has included a considerable element of community consultation (Ashley, 2000).

The value of nature-based enterprises in bringing local development is a key issue to local communities, and it is for this reason that some communities have adopted community private sector partnership models based on the principle on Build-Operate-Maintain-Transfer. The hope is that the tourism infrastructure developed by the private sector partner would become the property of the community at the end of the agreed period (usually 15-25 years).

As stated earlier, there is general agreement that CBNREs do contribute to poverty alleviation and development in communal rural areas. This being so it is fundamental to ensure the sustainability of these enterprises beyond the subsidy (donor funding support) phase.

8.5.2. Subsidy

Subsidy is defined in the Concise Oxford Dictionary as a sum of money granted from public funds to help industry or business keep the price of a commodity or service low. It is also defined as a sum of money granted to support an undertaking held to be in the public interest. According to Moll (1984) subsidies enable consumers to obtain the products or services concerned at prices lower than they would have under the free operation of economic factors and can also be used as tools for income redistribution. In CBNREs, initial funding normally provided by donors and other funding agencies could be described as some kind of subsidy as it is provided to support an undertaking held to be in the public interest. While it may be argued that this kind of support is not subsidy but an investment in an enterprise that serves the public interest, the fact is that many enterprises, particularly those which adopt the community owned and operated business model fail to exhibit properties of sustainability beyond the donor support (subsidy) phase (Salafsky *et al*, 2001; Wood, 1998; Naguran, 1999). These enterprises only continue to function for as long as some donor funding (subsidy) is provided. Therefore, this observation, supported by Salafsky, at al. (2001) warrants a critical assessment of the role of continuous financial support (subsidy) towards achieving the sustainability of nature-based enterprises, particularly those owned and operated by communities.

It should be stated that literature makes very limited reference to the potential role of subsidy towards achieving the sustainability of CBNREs. Salafsky *et al* (2001) conducted a study to test the hypothesis that if people benefit financially from enterprises that depend on nearby natural resources they will take action to conserve and sustainably use them. As part of this study they established and monitored the performance of a number of community-based enterprises over a period of about three years. As stated earlier, Salafsky *et al* (2001:1593) concluded that "....it will at best take a number of

years for most community-based enterprises to become self-sufficient. In many cases, it may be hard for the enterprise ever to cover all its costs. In particular, it may be necessary to pay for good-quality management and monitoring activities. Thus, the most common scenario might be one in which an outside subsidy is perpetually required to pay for the true costs (especially for management and monitoring) of the enterprise".

The author posits that the issue of subsidy has not yet been sufficiently thought through in nature-based enterprise development. This is reflected by the dearth of reference to subsidy in the nature-based enterprise literature. The effect of this is that it is not dealt with explicitly when establishing community operated enterprises, and when subsidies are withdrawn these enterprises fail. As pointed out by Salafsky *et al* (2001) some enterprise would not survive without perpetual subsidy, and those that would survive need to be prepared well in advance for the withdrawal of donor funding (subsidy). Because this issue of subsidy is not treated explicitly those that would not survive are not identified and preparation for the withdrawal of subsidy is normally very poor. Nevertheless, subsidy has a role to play towards achieving the sustainability of CBNREs, and therefore has to be treated explicitly.

8.6. Sustainability

Generally, the sustainability of CBNREs is measured along four dimensions, that is, economic, political, ecological and social sustainability. However, examples of success in all four dimensions remains incomplete and patchy in many parts of the majority world where nature-based enterprises have been established (Kontogeorgopoulos, 2005). Often, achieving success in some of these dimensions has inevitably meant that some tradeoffs have to be made (Flyman, 2001). Nonetheless, there are a number of reported cases where the positive consequences of enterprise development have offset the potentially harmful compromises (Kontogeorgopoulos, 2005).

8.6.1. Economic sustainability

A CBNRE is considered to be economically sustainable if it is institutionally sound and maintains a consistent flow of income to cover all its operational costs, offers continual rewarding employment to members of the local community and provides other collective benefits to the community. An economically sustainable nature-based enterprise distributes benefits widely and equitably, and such benefits remain in the hands of the locals rather than outside individuals or corporations (Kontogeorgopoulos, 2005). Most enterprises which adopt the community owned and operated business model fail to achieve this situation after the funding phase (Naguran, 1999; Kontogeorgopoulos, 2005, Salafsky *et al*, 2001, De Beer and Ellifee, 1997). Hence, they are described as economically unsustainable. While this is the case, enterprises which adopt the community private sector partnership models often display most of these features; as such they are referred to as economically sustainable (De Beer and Elliffee, 1997; Bond, 2001).

8.6.2. Ecological sustainability

Because CBNREs are based on some goods and services supplied by the natural resource base on which they are founded, ensuring ecological sustainability is of great necessity. Therefore, CBNRE establishment goes hand in glove with the development and implementation of sound environmental management systems and tools. In most cases the number of visitors and the types of tourism activities that can take place are determined by the conservation goals set for the resource. CBNRE activities are

then closely monitored for early detection of any negative impacts on the ecological state of the resource or to ensure that activities do not detract from the set ecological goals for the resource base (Flyman, 2001). Because of incomplete knowledge and lack of agreement even among ecologists on the critical thresholds beyond which ecological sustainability becomes seriously threatened (Grima, *et al.*, 2003), setting ecological goals and monitoring resource use to ensure achievement of these goals appears to be the commonly applied approach (Flyman, 2001; Wood, 1998). However, effective implementation of environmental management systems requires a certain level of knowledge and skills and should be complemented by promotion of education and awareness on the importance of conservation and sustainable use of resources. Without NGO or Public sector support, rural communities lack the institutional capacity and skills to effectively implement environmental management (Naguran, 1999). Therefore, without support, community owned and operated enterprises have not sufficiently demonstrated the capacity to ensure sound environmental management (De Beer and Elliffe, 1997). On the other hand community private sector partnership enterprises have demonstrated sufficient capacity for environmental management (Wood, 1998). Kontogeorgopoulos (2005) reports a case where a private sector partner took upon himself to promote environmental education and awareness in his partner community. A CBNRE that is involved in activities that do not lead to steady or rapid degradation of the ecological base and in which the environment is being carefully managed is considered to be ecologically sustainable (Grima, *et al.*, 2003; Flyman, 2001; Kontogeorgopoulos, 2005).

8.6.3. Social sustainability

The fundamental objectives of CBNRE establishment include promoting local traditions values and norms, social cohesion, harmony and cooperation. These give rise to individual self reliance, pride and hope for the future (Kontogeorgopoulos, 2005). Furthermore, these attributes form the social resources upon which community members draw in pursuit of their livelihood and development goals (Ashley, 2000). CBNRE establishment and operation processes are aimed at strengthening or improving these social resources within a community. However, achieving the social sustainability demonstrated by improvement in these features appears to be determined by the business models applied. There appears to be agreement that community owned and operated enterprises are potentially the best performers when evaluated against the social sustainability criteria (Van den Berg, 2001; Naguran, 1999; De Beer, and Elliffe, 1997). When evaluated against the same criteria, the community private sector partnership enterprises have demonstrated mixed successes, for example, Sea canoe is reported to have fostered social status and social mobility among individuals at the expense of community cohesion and harmony (Kontogeorgopoulos, 2005). Furthermore, there are many cases that demonstrate limited successes with respect to promoting social sustainability where community private sector partnership enterprise models have been applied (Murombedzi, 2001; Sindiga, 1999; Belsky, 2000; Gujahdur and Motshubi, 2001). As indicated by the Sea canoe example, in the long run, lack of social sustainability poses serious threats to the sustainability of an enterprise.

8.6.4. Political sustainability

The political sustainability of CBNREs is measured against the extent to which they encourage autonomy, sovereignty, decision-making power, local participation and community control over initiation and direction of development projects (Kontogeorgopoulos, 2005). With this in mind, training and capacity building that occurs in the process of establishing and operating community nature-based enterprises is meant to increase the capacity of local communities to take control over their lives and development in their areas (Ashley, 2000). Because of the domineering attitude (Ashley, 2000) of some of the private sector operators, some communities have opted to manage and operate their enterprises without private sector involvement. An example of this case is the Dqae-qare game farm community which opted not to involve the private sector so as to promote effective participation in decision making by the locals and local control of the enterprise (Gujadhur and Motshubi, 2001). While community owned and operated

enterprises are supported in order to strengthen these political sustainability attributes, the community private sector partnership enterprises have recorded mixed successes with most of such enterprises performing poorly on this aspect (Murombedzi, 2001; Sindiga, 1999; Belsky, 2000; Gujahdur and Motshubi, 2001). It should be stated that lack of effective participation by the locals in decision-making and control of the enterprise leads to tensions that tend to undermine the other dimensions of CBNRE sustainability. Sea canoe is a classic example of an enterprise perceived to be controlled by foreigners in which locals have no effective participation in decision-making. Because of this, despite the fact that it does benefit some community members, disgruntled members of the community have embarked on activities that are undermining both ecological and social sustainability. Unfortunately, sea canoe is a quasie-case of a community private sector partnership arrangement.

What is apparent is that in terms of these four dimensions of sustainability very few CBNREs can claim successes in all four of them. Patchy and partial successes involving tradeoffs sums up the successes recorded on the subject of nature-based enterprise development. Notably, successes achieved on some dimensions of sustainability have been accompanied by compromises on others. This observation requires further investigation because it suggests that these dimensions of sustainability are not mutually reinforcing something that one would expect to see, especially because achieving the aims behind CBNRE establishment is dependent on successful accomplishment of the afore-described sustainability. It should be added that the extent to which successes and failures achieved on these dimensions sustainability feed back and direct change in enterprise establishment and support is a matter for further research.

8.7. Discussion and conclusion

It is evident that in the majority world global donor agencies have supported CBNRE establishment as the main economic incentive for promoting biodiversity conservation and "development". Also evident is that these CBNREs vary in sizes; have different perceived value to their beneficiaries, provide varying benefits of different value and form, and fall within two broad categories, that is, value adding commodity enterprises and service enterprises. It is notable that following on support funding for CBNREs, environmental practitioners and researchers alike have experimented with different approaches in an effort to find business models that are truly sustainable on all four criteria (economically, socially, ecologically and politically). It is because of such concerted efforts that Ecuador has attracted comments suggesting that it is a living laboratory of ecotourism development (Wood, 1998). However, as evidenced by this literature review, despite the amount of experimentation that is being carried out, CBNRE sustainability has been, so far, about compromises and tradeoffs.

Communities, favoured by a whole range of other factors, and who are willing to tradeoff : full control and participation in decision making; some level of social cohesion, and some of their established values and norms for secure and rewarding employment and secure benefits that accrue to the community level structure would engage in a partnership enterprise with the private sector. Those communities who either because of their unfavourable circumstances cannot attract private sector investors or choose to operate and manage enterprises on their own have to strive to achieve enterprise sustainability. Such communities have greater potential for strengthening shared values and norms, networks, and improving social cohesion and cooperation among community members. Effective local control, autonomy and full participation in decision-making improve the self-esteem of these communities thus enabling them to become champions of natural resource management and development in their areas. However, in the long run, such attributes are compromised by the inability to continually provide economic benefits. Therefore, a need still remains to find enterprise models that will demonstrate success on all four dimensions of sustainability described in this document.

In this document distinct differences that characterize different business models reviewed have been demonstrated. While focus has tended towards those characteristics that impact on economic performance, those impacting on the other dimensions of sustainability such as the political and social dimensions have not been dealt with to any greater detail. The main reason being that this research is aimed at contributing to improving the economic sustainability of CBNREs, particularly those that are owned and operated by local communities. However, aspects such as legitimacy, support for livehood activities that are either directly linked or not directly linked to CBNREs and subsidy are cross-cutting and have been dealt with.

This review has clearly demonstrated that legitimacy impacts on the sustainability of CBNREs, This is because of its impact on the functioning of institutions, negotiation of property rights, and on the enforcement of contracts through which rights are transferred. Because of this an understanding of the different types of legitimacies is important so that legitimation is managed more explicitly in enterprise establishment, management and operation.

Furthermore, in this document, the importance of adopting an holistic approach in dealing with rural livelihoods has been highlighted. Apart from the fact that CBNREs in themselves aim to create livelihood opportunities for the rural poor, often, their positive impact is not sufficiently great to offset negative impacts on current and future livelihood activities of the community. Therefore, attending to other livelihood support measures is a necessary complement to achieving CBNRE sustainability. As indicated, other authors have supported this view.

The role of subsidy in supporting CBNREs has not been sufficiently given the attention it deserves. This is indicated by limited reference to the concept in the literature. Nonetheless, it appears that subsidy has a role to play in supporting biodiversity conservation through supporting CBNREs operation and management. However, it is suggested that this is one particular issue that requires further research.

In conducting this literature review, a conceptual framework was developed to guide the review of literature. In this framework it was postulated that institutions, property rights, transaction costs and contracts determine the sustainability of CBNREs. Indeed what has emerged from this review is an indication of a strong relationship between these determinants and enterprise sustainability, particularly economic sustainability or lack thereof. It is therefore concluded that based on this review, there is a relationship between dimensions of institutional sustainability (including rules, property rights, transaction costs, and contracts) and economic sustainability of CBNREs. However, in the context of CBNREs, this relationship requires further empirical testing and analysis so that a compelling case is presented.

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10. ANNEXURE A – IDP DEVELOPMENT PHASES

PHASE 1: ANALYSIS

PLANNING ACTIVITY: ENVIRONMENTAL ANALYSIS

Purpose

To ensure that municipal development strategies and projects take existing environmental problems and threats into consideration as well as environmental assets which require protection or controlled management.

Minimum Requirements:

- A list of major existing environmental problems with a short description of each of the problems (location, people affected, magnitude of problem, causes).
- A list of major environmental threats and risks (including disaster risks) with a short description.

Hints for Structuring the Process

- Preparing an environmental analysis is a task which involves investigation and desk-work, rather than a topic for a workshop event. All *available* information on crucial environmental problems and threats within the municipal area should be considered as background information for the municipal-level workshop dealing with "Municipality-Level Analysis" (1/4).
- It is up to the IDP Representative Forum to decide (taking the information of the environmental analysis into account) whether or not a certain environmental issue will become a municipal Priority Issue.
- Most category B municipalities will not be in a position to do or initiate a comprehensive environmental study to obtain additional information as part of their IDP process. Should there be an urgent need for more information, local municipalities may join their efforts with the district municipality and initiate a district-wide analysis on crucial environmental issues.

Suggested Institutional Arrangements/Responsibilities

- One of the technical officers of the municipality can compile existing information on environmental problems and risks, based on available reports and consultation with environmental stakeholders and promotion agencies.
- Provision of new information should be done on a district-wide scale and be initiated by the district councils, unless a category B Municipality feels the need and has the capacities to carry out a specific study on a specific environmental issue in their own area.

Involve environmental stakeholders and specialists in the IDP Representative Forum.

Note:

Do ***not*** make environmental analysis a topic for a workshop or a work group session. There may, however, be workshops or work groups on certain specific burning environmental issues (such as air pollution or risk of floods or forest fires) if they are identified as municipal priorities. Work groups should focus on discussing such **crucial issues** rather than being used for providing information.

PHASE 2: STRATEGIES

PLANNING ACTIVITY: LOCALISED STRATEGIC ENVIRONMENTAL GUIDELINES

Purpose

To ensure that the principles of Chapter 1 of the National Environmental Management Act of 1998 are applied when strategies are designed and projects are planned.

Minimum Output Requirements:

A concise document that demonstrates the application of the NEMA principles and Local Agenda 21, which gives effect to the NEMA principles, and makes them specific to the municipality. This should be represented in 3 – 5 pages accompanied by a diagram/plan.

Legislation/Policy Documents

- Principles of Chapter 1 of the National Environmental Management Act.
- Local Agenda 21.
- National Environmental Management Plans.
- Provincial Environmental Implementation Plans.

Relevant Guidelines/Principles

Municipal strategies and projects have to comply with the principle of an **ecologically sustainable development process** meaning that any utilisation of natural resources should not negatively affect the possibility of present and future generations to satisfy their needs. This relates to the following aspects of the environment:

- avoiding pollution and degradation of the environment;
- avoiding waste, ensuring recycling or disposal in a responsible manner;
- minimising and remedying negative impacts on the environment and on people's environmental rights;
- considering the consequences of the exploitation of non-renewable natural
- resources;
- avoiding jeopardising renewable resources and ecosystems;
- paying specific attention to sensitive, vulnerable, highly dynamic or stressed
- ecosystems;
- minimising loss of biological diversity; and
- avoiding disturbance to cultural heritage sites.

Attempts to consider such principles in development planning need to be aware of the limits of cur rent knowledge about the consequences of decisions and actions.

The Nature of Localised Strategic Guidelines

Localised Strategic Guidelines have to indicate which of these general environmental principles are relevant to which types of resource utilisation and to which locations. Only by being sufficiently focused and specific in that regard environmental guidelines can adequately inform strategy decisions and project designs.

The guidelines may include:

- a list of especially endangered or degraded resources;
- a list of locations which may require restrictions for utilisation;

- a list of economic activities which needs special attention with regard to environmental impact; and
- risks of environmental disasters.

PHASE 3: PROJECTS

This section provides details on how to structure a project and is described as the nuts and bolts phase during which the municipality has to ensure that concrete and sufficiently specific project proposals are designed which can be used for implementation. Guidance is provided on issues such as:

- Integrated technical and financial project task teams
- Budget determinations and allocations
- Designing project proposals
- Participation
- Setting indicators
- Project targets and outputs

PHASE 4: INTEGRATION

PLANNING ACTIVITY: INTEGRATED ENVIRONMENTAL PROGRAMME

Purpose:

To contribute to a healthy environment by ensuring that:

- urgent environmental issues are adequately addressed; and
- envisaged projects have no negative impact on the natural environment.

Minimum Requirements:

A summary statement of 2 – 3 pages and a diagram/plan, that includes:

- a short reference to the results of the environmental issues identified in the Analysis Phase;
- Consideration of the Strategic Guidelines on the Environment (2/3);
- a statement of the projects and their activities that significantly affect the environment;
- description of the manner in which the municipality will ensure that its projects comply with the NEMA principles and the national environmental norms and standards; and
- identification of those projects that require an EIA.
- Consider the relevant information of the national and provincial departments' Environmental Management Plans and Environmental Implementation Plans.
- Refer to the Environmental Conservation Act of 1989 and the EIA Regulations of 1997 and guideline document, for the categories of activities that require an EIA and related application procedures.

Hints for Structuring the Process

- Check all project proposals, in relation to the outputs of the analysis and strategy guidelines:
    - Are the environmental issues of the analysis addressed?
    - Is there compliance with the strategic guidelines?
    - Are there approaches that identify, predict and evaluate the actual and potential impact on the environment, with a view to minimising negative impacts and maximising benefits?
    - Does the Integrated Environmental Programme adequately consider the provincial Environmental Implementation Plans?
- Give feed-back to Project Task Teams in case of non-compliance or insufficient consideration.
- Summarise all environmentally related measures, aspects and activities as part of one conclusive environmental programme.

- Present the programme, together with comments and recommendations, to the IDP Representative Forum.

Ensure that the recommendations of the IDP Representative Forum are incorporated in the final project proposals and in each of the Integrated Sector Programmes.

Suggested Institutional Arrangements/Responsibilities

- A senior municipal official in charge of environmental affairs should be given the responsibility for compilation of the Integrated Environmental Programme.
- Where a municipality does not have capacities in the field of environmental planning, a specialist resource person may be consulted to assist in drafting the Integrated Environmental Programme.

It should be ensured that the legitimate community and residents' representatives (or advocates) of the environment attend the workshops of the IDP Representative Forum in Phase 4.

Note:

* The Integrated Environmental Programme is not an additional programme besides the projects dealing with the priority issues. It is intended to capture the environmental contributions from all the IDP projects in context. Thus it is a tool for main-streaming, rather than being an add-on, for environmental issues.

11. ANNEXURE B - SUMMARY OF CAPACITY ASSESSMENT FOR SOME EASTERN CAPE COASTAL MUNICIPALITIES

	Environmental Attitude	*Institutional Structure*	*Physical Capacity*	*Applied Competency*	*Levels of Governance*	*Planning Tools*
Amatole District Municipality	Good	Environmental section falls within social development	Dedicated environmental manager, but more capacity needed	Limited experience	Limited	Completed: State of Environment Report Draft Coastal Zone Management Programme Draft Environmental Management Plan/System
Cacadu District Municipality	Various. Viewed as conflicting with development.	No dedicated environmental section Environmental falls within the PIMS	None	None	Limited	Were planning to do a State of Environment Report two years ago, but still not funded
OR Tambo District Municipality	Not known	No dedicated environmental section	None	Limited	Limited	About to embark on an SEA funded by DBSA to provide input into the SDF Other Wild Coast Initiatives will provide extremely valuable information for planning purposes
Buffalo City Local Municipality	Very good, but viewed as secondary function by some and obstructing progress	Integrated Environmental Management Unit sits directly der the City Manager's office	In addition to Environmental Manager, two new positions have been funded and appointments made	Good and increasing	Increasing	Completed State of Environment Report Coastal Zone Management Plan Draft State of Sanitation Report STEP being used and integrated well. SDF includes detailed environmental input including estuaries. Fine-scale conservation plan being developed.
Great Kei Local Municipality	Poor	No environmental department and environmental role.	Limited Technical manager undertaking planning,	Limited	Limited	SEA funded by DBSA completed and will inform the SDF, with emphasis on the coastal zone. STEP used in SDF

	Environmental Attitude	*Institutional Structure*	*Physical Capacity*	*Applied Competency*	*Levels of Governance*	*Planning Tools*
			engineering & environmental role.			
Kouga Local Municipality	Poor.	Planning and Development & Social and Economic Development and Human Resources Directorates exist (1 Environmental Officer).	Limited	Good to average, but certain skills require improvement (e.g. map reading)	Limited	STEP info is being used. Consultants are obliged to include STEP info in reports etc. SDF completed for 2 of 3 regions by consultants
Ndlambe Local Municipality	Not known	No dedicated environmental section Environmental sits with Planning	None	Limited	Limited	1st Draft of SDF available at end February 2005
Mbhashe Local Municipality	Not known	No dedicated environmental section	None	Limited	Limited	About to embark on an SEA funded by DBSA to provide input into the SDF, with emphasis on the coastal zone.
Ngqushwa Local Municipality	Not known	No dedicated environmental section	None	Limited	Limited	Recently initiated a DBSA funded SEA to inform the SDF, with emphasis on the coastal zone.

Introductory Course to Estuarine Management in South Africa

Training Course Manual

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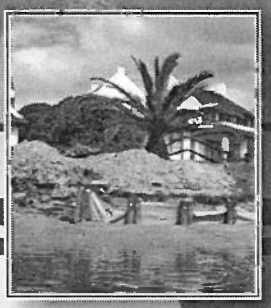

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Acronyms

CMA	Catchment Management Agency
CMS	Catchment Management Strategies
CWAC	Co-ordinated Waterbird Counts
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
ECA	Estuarine Conservation Area
EMP	Estuarine Management Plan
EPA	Estuarine Protected Area
IDP	Integrated Development Plan
LAC	Limits of Acceptable Change
LUM	Land Use Management
MPA	Marine Protected Area
MCM	Branch: Marine and Coastal Management, Department of Environmental Affairs and Tourism
NEMA	National Environmental Management Act (No. 107 of 1998)
NWA	National Water Act (No. 36 of 1998)
NWRS	National Water Resources Strategies
PSIR	Pressure-State-Impact-Response
RDM	Resource Directed Measures
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessments
SoE	State of the Environment
SWOT	Strengths-Weaknesses-Opportunities-Threats

1. INTRODUCTION

This introductory training course on Estuarine Management in South Africa forms part of Phase II of the Eastern Cape Estuaries Management Programme, which required the development of a capacity building programme focusing on local authorities and stakeholders.

The material included in this training course (Objective 3) is primarily based on issues highlighted by Objectives 1, 2 and 4 (of Phase II of the Eastern Cape Estuaries Research Programme), as part of the discussions with local authorities and stakeholders. Issues raised as part of the Eastern Cape Estuaries Programme: Phase I were also included by means of a review of the proceedings of various stakeholder workshops conducted during Phase I of this programme.

As part of this initiative the following activities were undertaken:

- An Assessment Workshop where important issues that may not have been highlighted in Objectives 1 and 2 were identified and where specific capacity requirements in the Eastern Cape in terms of information/knowledge/skills gaps were discussed;
- Draft training course materials, based on the outcome of the Assessment Workshop, were developed, focusing on training of municipal officials in estuary management and the incorporation of estuary management into the IDP process;
- A Training Workshop was held at which the draft training course material was used to train officials from Buffalo City Municipality and other authorities in the region;
- Thereafter, the final training course material was prepared, taking into consideration revisions and refinements as proposed at the Training Workshop (and Steering Committee Meetings);

The training course material includes the following:

- Short Training Course (PowerPoint Presentation) aimed at senior municipal officials (1-2 hours);
- Full Training Course (PowerPoint Presentation) aimed at officials involved in actual on-the-ground management of estuaries, which could also be used as an individual training tool (1-2 days);
- Training Course Manual that includes more detailed information on different aspects addressed in the Training Modules (MS Word document) ;
- Instructor's Notes (MS Word document) that give guidance to the presenter/s of the course; and
- A CD containing the Interactive PowerPoint Presentations, as well as the Training Course Manual and Instructor's Notes.

The course was developed in a modular fashion to allow for more flexibility. Modules on the following topics are included:

- The value of estuaries;
- Information on how estuaries work;

- Activities threatening estuaries;
- Legal mandate;
- Governance and management; and
- Introduction to management tools.

Although the CD provides a Directory containing the 'Full Course', presenters are recommended to select specific modules (or extracts thereof) to customize the training material according to their particular needs. A Directory containing a recommended 'Short Course' is also provided on the CD and includes extracts from the following modules:

- The value of estuaries;
- Legal mandate;
- Governance and management.

Useful environmental data and information sources considered relevant to Estuarine Management in South Africa are provided in Appendix A, while Appendix B contains a list of important infrastructural needs essential to the effective operational management of estuaries.

2. WHY DO WE VALUE OUR ESTUARIES?

Value is defined as "the quality of a thing according to which it is thought of as being more or less desirable, useful, estimable or important".

The great value of estuaries is reflected in the vast amount of goods and services that these sensitive ecosystems provide, which in turn generate value and contribute to human wellbeing. The concept of ecosystem goods and services stems from the perception of ecosystems as natural capital, which contribute to economic production. Ecosystem services are defined as the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life. Ecosystem goods, on the other hand, represent the material products that are obtained from natural systems for human use. Ecosystem goods and services occur on multiple scales, from climate regulation on a global scale, to water supply on local and regional scales. They also contribute direct or indirectly to human welfare, with those listed above being less directly connected, while food, raw materials, recreational opportunities, and aesthetic and cultural values being more directly connected. Table 1 lists some of the goods and services provided by estuaries (Van Niekerk and Taljaard, 2003, Costanza *et al.*, 1997; Mander *et al.*, 2001; Mander, 2001).

Turpie *et al.* (2006) state that part of the reason that estuaries are threatened is that the benefits of damaging activities are usually perceived to be greater than the benefits of conservation and sustainable use. Conservation is perceived by many to be costly, both in terms of management and the opportunity costs involved. Given these perceptions, and in some cases, realities, management and conservation planning will be toothless unless they take socio-economic realities into account. It is argued here that, while general perceptions may be true part of the time, there is likely to be a strong economic case for conservation and sustainable use in many instances, if the value of estuaries is taken into account.

Estuary valuation serves to (Turpie *et al.* 2006):

- highlight the degree to which estuaries contribute to human well-being and economic output;
- show that estuary degradation carries a cost;
- bring a more balanced perspective to planning and decision-making, by expressing conservation benefits in a currency compatible with conventional decision-making tools; and
- assist in devising more efficient incentive systems and financing tools for the management of estuaries.

2.1 Total economic value concept

Economic value is a measure of societal welfare or well-being, and is created through (Turpie *et al.* 2006):

- Generation of household income;
- Generation of employment;
- Contribution to household livelihoods (e.g. cash income, food, shelter); and
- Generation of utility or satisfaction.

Table 1. Summary of the goods and services provided by estuaries

Category	Goods and Services	Examples of opportunities & activities
Ecological	*Biological control*	*Maintaining the balance/diversity of plants/ animals*
	Refugia/Migratory corridors	*Fish and crustacean nurseries and roosts for migratory birds*
	Sediment supply	*Creation and maintenance of beaches, sand bars and sandbanks .*
	Erosion control	*Prevention of soil loss by estuary vegetation, and by capturing soil in reed-beds and mangroves.*
	Soil formation	*Accumulation of sediment and organic material on flood plains and in mangroves.*
	Nutrient supply and cycling	*Nutrient supply, nitrogen fixation and nutrient cycling through food chains.*
	Genetic resources	*Genes for mariculture, ornamental species and fibre.*
	Disturbance regulation	*Flood control, drought recovery and refuges from natural and human induced catastrophic events (e.g. oil spills).*
Subsistence	*Collection of living resources for food*	*Line fishing, inter-tidal collecting, beach and seine netting*
	Raw material for subsistence use (e.g. building material)	*Harvesting of craftwork and house-building materials.*
Recreational & Tourism	*Nature appreciation*	*Providing access to estuaries and associated wildlife for viewing and walking.*
	Scenic views	*Resort, residential houses, housing complexes and offices with scenic views, increasing turnover of properties with a sea-view*
	Culture	*Aesthetic, educational, research, spiritual, intrinsic and scientific values of estuary ecosystems.*
	Sports fishing	*Estuary flyfishing, estuary and inshore conventional fishing.*
	Water sports	*Water sports: swimming, sailing, canoeing, skiing and kayaking.*
Commercial and Industrial	*Waste treatment*	*Breaking down of waste and detoxifying pollution.*
	Water supply and regulation	*Water supply to marine environment and water for mariculture.*
	Mariculture (e.g. oysters, bait, etc.)	*Production (natural and cultivated) of fish, crustaceans and worms.*
	Commercial food production	*Fishing*
	Raw material for commercial use	*Diamond and titanium mining*
	Transport services	*Ports, harbours, marinas and ski-boat launching sites*

Different measures of value are relevant to different decision-makers. Individuals and firms make decisions on the basis of their own financial and/or utility gains. Governments make decisions on the basis of overall welfare gains (contribution to national income and employment). It is important to understand value from both an individual/firm perspective and a national perspective, since the former constitute the market forces of change, while the latter are required to make decisions that are in the overall interest of society.

A common indicator of societal well-being is income per capita. This is calculated by dividing a measure of national income - the Gross Domestic Product (GDP) - by the total population. Thus it is

highly relevant to estimate an estuary's contribution to GDP, and/or the way in which GDP would change given a change in estuary quality or size.

An estuary contributes to GDP through the expenditure generated by estuary-dependent activities. This expenditure contributes to the turnover in an industry. For example, expenditure by recreational anglers contributes to the turnover of businesses such as tackle-shops and hotels. Part of the turnover is spent on intermediate goods and services (e.g. on vegetables), the rest is direct value added to the national economy (i.e. ends up as income). The intermediate expenditure, in turn, contributes to the turnover of other businesses (e.g. greengrocers) in other sectors, some of which becomes value added. These contributions to value added together make up the indirect value added by estuaries. The total value added (contribution to GDP) is the sum of the direct and indirect value added. The relationship between these two reflects the multiplier effects of the direct value added. Note that the most difficult part is estimating the direct or indirect contribution of an estuary to different types of turnover, and how this turnover would change with a change in estuary quality.

Not all of the values generated by estuaries are reflected in measures of GDP. For example, the consumption of estuary resources may make an important contribution to peoples' livelihoods without generating direct, tangible income. Similarly, the aesthetic benefits of a view, and the scientific and educational benefits associated with estuaries would not be directly measurable in national accounting systems. Values such as this are often best expressed in terms of peoples' Willingness to Pay, rather than actual turnover, the latter constituting proven Willingness to Pay.

Environmental and resource economics typically use a typology of values described in the Total Economic Value concept. The Total Economic Value of an ecosystem comprises Direct Use, Indirect, Option and Non-Use values.

- **Direct use** values may be generated through the consumptive or non-consumptive use of resources. In the case of South African estuaries, most, if not all, of this use is recreational, and includes both consumptive (fishing and bait collecting) and non-consumptive (e.g. boating, bird-watching) activities.
- **Indirect use values** are values generated by outputs from estuaries that form inputs into production by other sectors of the economy, or that contribute to net economic outputs elsewhere in the economy by saving on costs. These outputs are derived from ecosystem functioning such as water purification and nursery functions.
- **Non-use values** include the value of having the option to use the resources (e.g. genetic) of estuaries in the future, and the value of knowing that their biodiversity is protected. Although far less tangible than the above values, non-use values are reflected in society's willingness to pay to conserve these resources, sometimes expressed in the form of donations.

Turpie *et al.* (2006) illustrate the relationships between estuarine biodiversity and the ecological-economics and resource-economics concepts of different types of value in Figure 1.

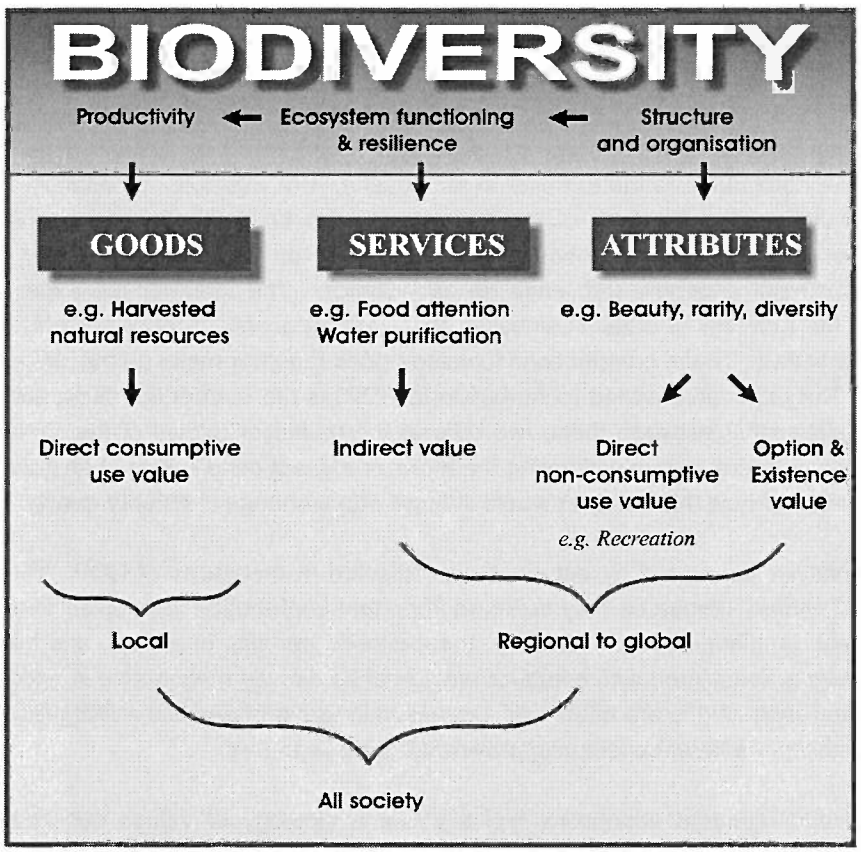


Figure 1. The relationships between biodiversity, the concept of 'ecosystem goods and services' and 'total economic value' typology of values (Turpie *et al.* 2006)

2.2 *Economic trade-offs in estuary conservation and development*

Turpie *et al.* (2006) explain that the different types of development might affect estuary values in a number of ways. With no development, an estuary would be expected to have little or no direct use value (e.g. perhaps a little derived by passing hikers), and the undisturbed estuary would have high indirect and non-use value, owing to its high level of biodiversity and healthy functioning. Sensitive development around the estuary might add significant value in terms of direct uses such as ecotourism, while having negligible impact on biodiversity and ecosystem functioning. Thus overall values would be raised. As development around an estuary progresses to that of a resort area, direct use value increases, but the valued attributes and ecosystem services are likely to become somewhat impacted. Thus the total value of ecosystem goods and services may initially be enhanced by increased use, but would decrease again beyond some level. The point at which value is maximised would depend on the nature and relative magnitude of the two curves described in Figure 2. In general, the values associated with conservation of estuaries would be the indirect and non-use values, plus the additional direct use value that would be secured by ensuring that use levels are sustainable. The latter would accrue mainly in the future.

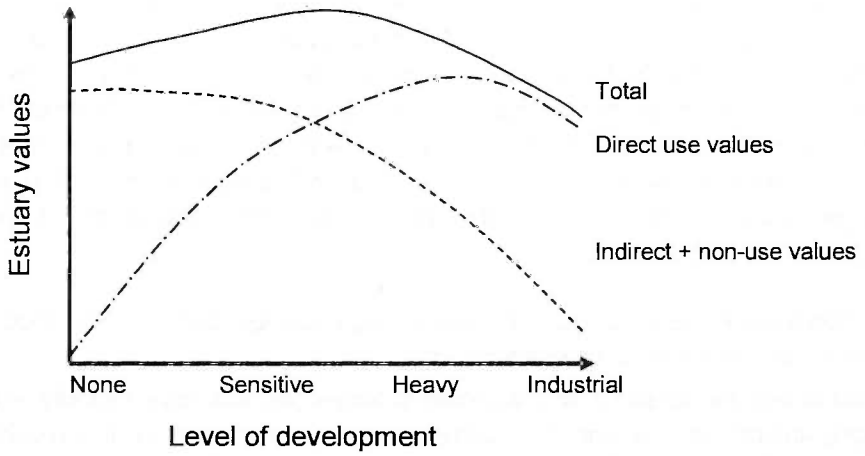


Figure 2. Hypothetical relationship between the level of estuary development and the magnitude of direct versus indirect and non-use values (Turpie *et al.* 2006)

The opportunity cost of estuary conservation depends on the level of protection applied to estuaries. This cost would include any use that is restricted in the present in order to secure a flow of value in the future, i.e. a cost that is borne mainly in the present. In some cases, complete protection may be required, in which case the opportunity costs would extend to any type of use. In other cases, conservation goals may be achievable with certain types of development that are deemed compatible. Thus the values of conservation might be maintained while there are also some developmental benefits. Whichever the case, the opportunity cost of conservation would be the benefits that would be obtained by the most valuable alternative use.

Property development is simultaneously of significant economic value and also one of the biggest threats to estuarine fauna and flora in terms of habitat loss, exploitation, disturbance and pollution. Properties adjacent to any type of wetland tend to be more expensive, which means that the opportunity costs of protecting estuaries in urban areas are likely to be high. This creates a significant challenge for conservation planners and decision makers.

The different types of planning are all increasingly being integrated in the sense of considering both environmental and socio-economic goals. Unfortunately, Integrated Development Plans (IDP) does not have a requirement to specifically link with conservation planning and is only poorly linked to water resource planning, despite the fact that water is a prerequisite for both development and conservation. Development and water resource planning embody the goals of economic efficiency, ecological sustainability and social equity, whereas conservation planning does not necessarily seek to achieve economic efficiency. Conservation planning provides the bottom line in terms of the constraints on other types of planning. Water allocation will provide one of the main constraints for development planning. To be truly effective, management plans should be guided by the objectives set by conservation and development planning processes.

Management decision-making involves trade-offs. This is especially the case for biodiversity conservation where the lack of understanding of ecosystem or biodiversity values can lead to distorted decision-making. Turpie *et al.* (2006) note that, while there are certain checks to meet minimum

biodiversity conservation requirements, any conservation beyond that is voluntary and will only occur if deemed economically sound. The optimum level of conservation for society needs to be determined, rather than the minimum level that is set out in most conservation planning exercises. This involves analysing the trade-offs between the benefits of additional conservation and the opportunity costs in terms of the most valuable alternative form of development. Local scale trade-offs are also made, such as where to locate conservation zones in an estuary. Valuation is necessary to inform these trade-offs, as well as to design effective incentive measures and financing mechanisms to achieve conservation goals.

Turpie *et al.* (2006) recommend that planning and management decisions should include the following goals to maximise the economic value of estuaries:

- At least 20% of the estuarine area within each biogeographical region should be conserved in a largely natural state, in order to maintain the valuable services that they provide such as nursery area function, as well as providing opportunities for wilderness experience, spiritual enrichment and research.
- Where development is seen as a use, property values would be enhanced if one side of the estuary remains undeveloped, preferably as a nature reserve. This is a highly successful model that exists in many South African estuaries, and can successfully combine development and conservation needs.
- The recreational value of estuaries is derived from various consumptive and non-consumptive uses. Zonation, which prevents one type of user's utility from impacting on another's is seen as a useful tool in maximising estuary value. It also provides the opportunity of achieving some conservation goals while not prohibiting consumptive use altogether. Zonation is also a far easier way of limiting consumptive use than bag or effort limits.

2.3 Economic valuation techniques

Turpie *et al.* (2006) divide economic valuation techniques into 'market value' approaches, 'surrogate market' or 'revealed preference' approaches, and 'simulated market' or 'stated preference' approaches (Table 2). The more intangible the type of value, the fewer the methods available for use.

Table 2. Different types of valuation methods and the types of value they are typically used to measure (Turpie *et al.* 2006)

Methods	Consumptive use values	Non-consumptive use values	Indirect use values	Option & non-use values
Market value methods				
Production function	*X*	*X*	*X*	
Replacement cost			*X*	
Surrogate market / revealed preference methods				
Travel cost method		*X*		
Hedonic pricing method		*X*		
Simulated market / stated preference methods				
Contingent valuation	*X*	*X*		*X*
Conjoint valuation	*X*	*X*		*X*

2.4 Additional Information

More information on the value of estuaries and techniques to determine value can be obtained from:

- Turpie J K, Sihlope, N, Carter, A, Maswime, T & Hosking, S 2006. Maximising the socio-economic benefits of estuaries through integrated planning and management: a rationale and protocol for incorporating and enhancing estuary values in planning and management. Eastern Cape Estuaries Management Programme: Phase II - Institute of Natural Resources, Pietermaritzburg

- Breen, C M, and McKenzie, M 2001. Managing estuaries in South Africa: An introduction - Institute of Natural Resources, Pietermaritzburg

3. HOW DOES AN ESTUARY WORK?

3.1 Definition of an Estuary

In the scientific international literature, an estuary is defined as 'a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land' (Cameron & Pritchard 1963; Pritchard 1967).

Recently promulgated legislation has addressed the deficiency in definition in earlier law, but the potential for different interpretations still exists. What is also confusing is the fact that, currently, different aspects of estuaries are being regulated by different authorities. This section draws our attention to some of the most pertinent definitions.

According to the National Water Act 36 of 1998 an estuary is defined as: 'a partially or fully enclosed water body that is open to the sea permanently or periodically, and within which the seawater can be diluted, to an extent that is measurable, with freshwater drained from land.'

The Seashore Act 21 of 1935 refers to an estuary as a tidal river or lagoon and defines it as follows: '"Tidal lagoon" means "any lagoon in which a rise and fall of the water-level takes place as a result of the action of the tides" and "tidal river" means "that part of any river in which a rise and fall of the water-level takes place as a result of the action of the tides" '.

The Marine Living Resources Act 18 of 1998 also refers to an estuary as a "tidal river" without explicitly stating the definition of "tidal river". The Regulations under the Marine Living Resources Act, however, refer to the definition as provided in the Seashore Act.

The White Paper on Sustainable Coastal Development in SA (2000) defines an estuary as: "A body of water that has a connection with the sea and where water, derived from land drainage, is mixed with seawater".

The primary criticism of the definitions of "tidal lagoon" and "tidal river" is that neither of these takes into account the situation where the body of water, as defined, is closed or otherwise cut off from the sea.

From the list of definitions provided above, that of the National Water Act is considered to be the most appropriate.

3.2 Geographical Boundaries

The methods for Resource Directed Measures for estuaries developed under the National Water Act (DWAF, 2004) provide the most appropriate administrative definition, but this is not legally binding in its present format as part of the guidelines. The definition states:

- Seaward boundary: Estuary mouth (however, there are systems where the 'estuary' often expands to the nearshore marine environment and where this boundary definition may need to be reconsidered in future).
- Upper boundary: Extent of tidal influence, i.e. the point up to which tidal variation in water levels can still be detected or the extent of saline intrusion, whichever is furthest upstream.
- Lateral boundaries along the banks: The 5.0 m above mean sea level (MSL) contour.

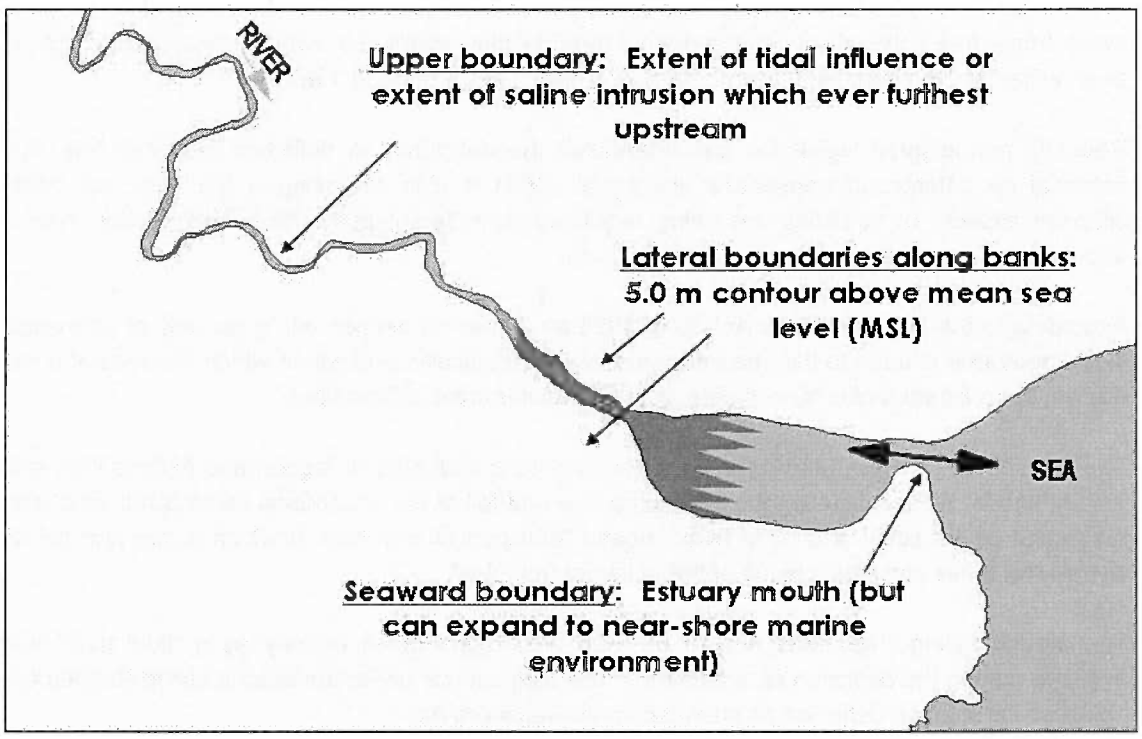


Figure 3. Geographical boundaries of estuaries

3.3 Special Ecological Features

Estuaries lie at the interfaces between terrestrial, freshwater and marine environments. They constitute a unique habitat type that supports fauna and flora found nowhere else. Ecologically they serve as vital nursery areas for a number of marine fish and shellfish. They are also important feeding and roosting areas for a number of bird species, both resident and migratory. In addition to their ecological function, estuaries fulfil important economic and cultural functions. Their contribution to the national economy in terms of fisheries alone is considered to be highly significant. The total value of estuarine and estuarine-dependent fisheries is estimated to be in the order of R950 million for 1997 (Lamberth & Turpie 2003).

Being areas where rivers meet the sea, estuaries are also affected by activities in the catchments of those rivers that drain into them, as well as in the adjacent marine environment and the immediate terrestrial environs.

Estuaries are complex and highly variable natural systems that provide unique environments that support some of the most biologically productive systems. South Africa's estuaries are relatively small in comparison with those of the northern hemisphere and South Africa's rivers mean annual run-off is more variable, which can lead to extreme environmental conditions.

The varying physical characteristics have lead to a number of different definitions for South African estuaries. Defining estuaries is also difficult from a legal and administrative perspective as their physical boundaries are dynamic and estuaries typically span the boundaries which have traditionally been used to define the extent of jurisdiction of national central, provincial and local government authorities. The historic development of law in South Africa reflects the tension between the need to define estuaries for ecological management and for legal and administrative purposes.

3.4 Estuarine Classification

According to Whitfield (1992), there are more than 250 estuaries in South Africa, which fall within three biogeographical zones in South Africa. A classification system has been developed for South African estuaries, based primarily on the broad physical features of estuaries (Whitfield, 1992). These include:

Estuarine bay: Water area exceeds 1 200 ha. Natural bays (Knysna) and artificially formed bays (Durban Bay) are permanently linked to the sea and the salinity within them reflects this. Hypersaline conditions are not common and water temperatures are strongly influenced by the sea. Marine and estuarine organisms dominate these systems and extensive wetland/mangrove swamps occur (Whitfield, 1992).

Permanently open estuaries: Vertical and horizontal salinity gradients are present and are modified by the river flow, tidal range and mouth condition. Wetlands (salt marshes), as well as submerged macrophyte beds, are common and the fauna is predominantly marine and estuarine. Hypersaline conditions in the upper reaches can occur during times of severe drought. Water temperatures in this estuary type are controlled by the sea during normal conditions and by river during flood conditions.

River mouths: Riverine influences dominate the physical processes in these estuaries. The mouth is generally permanently open but the tidal prism is small and strong riverine outflow prevents marine intrusion. During strong flood conditions, the outflow of these mouths can influence the sea salinity for many kilometres. Heavy silt loads are frequent in these estuaries, often resulting in shallow mouths (<2m). Water temperatures are strongly influenced by the river inflow although the sea can influence bottom waters.

Estuarine lakes: Water area exceeds 1 200 ha. These are usually drowned river valleys filled in by reworked sediments and separated from the sea by vegetated sand dune systems. The dune can result in complete separation of the lake from the sea that then results in a loss of estuarine characteristics and the system can be referred to as a coastal lake. Estuarine lakes can be either permanently or temporarily linked to the sea and salinity within them is highly variable. Freshwater input, evaporation and the magnitude of the marine connection are the main causes of this large salinity fluctuation. The tidal prism is small, and marine and river input have little influence on water temperatures, which are directly related to solar heating and radiation. Estuarine, marine and freshwater organisms all occur, depending on the salinity condition of the system.

Temporarily open estuaries: Sand bars often form in the mouths of these estuaries, blocking off connection with the sea. Sand bars form as a result of a combination of low river flow conditions and longshore sand movement on the adjacent coast. Flooding is frequently the cause of mouth opening, which also results in large amounts of sediment removal. However, infilling from marine and fluvial sediment can be rapid. Hypersaline conditions occur in these estuaries during times of drought. Tidal and riverine inputs control the water temperature in these systems when the mouth is open, but is independent of them when the mouth is closed. Marine, estuarine and freshwater life forms are all found in these systems, depending on the state of the mouth.

3.5 Key Biophysical components

3.5.1 *Physical (or driving) components*

Physical components refer to hydrodynamic (water movement patterns), sediment dynamic and water processes in estuaries. These components are the important driving forces (also referred to as stressors) for the changes observed in biological components, and also affect other beneficial uses. The driving components in estuaries are mainly influenced by two forces, i.e. river inflow and the ocean.

The river inflow is evaluated in terms of floods and seasonal base flows. Key aspects driven by floods include:

- Long-term sediment erosion/deposition cycles; and
- Sand/mud distribution patterns along the length of an estuary.

Key aspects driven by seasonal base flows include:

- State of mouth in temporarily open/closed estuaries (duration and frequency); and
- The extent of the salinity penetration in permanently open estuaries.

The interaction between the river inflow and the marine environment can be explained as follows (see Figure 4):

- During high tides, seawater pushes up into the estuary, introducing more saline water into the system and, at the same time, raising water levels in the estuary; and
- During low tides, water drains from the estuary, usually resulting in the water becoming fresher, while the water level in the estuary drops.

During periods of low flow (e.g. estuary during dry seasons or drought), the sea's influence becomes dominant, resulting in the estuary becoming increasingly saline. Under extreme conditions, the salinity in an estuary can even become higher than that of seawater due to evaporation (referred to as hypersalinity). Prolonged periods of these low flows could also cause premature closing of certain estuary mouths and/or lead to longer periods of mouth closure. During floods, most of the saline water in an estuary is flushed out to sea and the entire system usually becomes fresh.

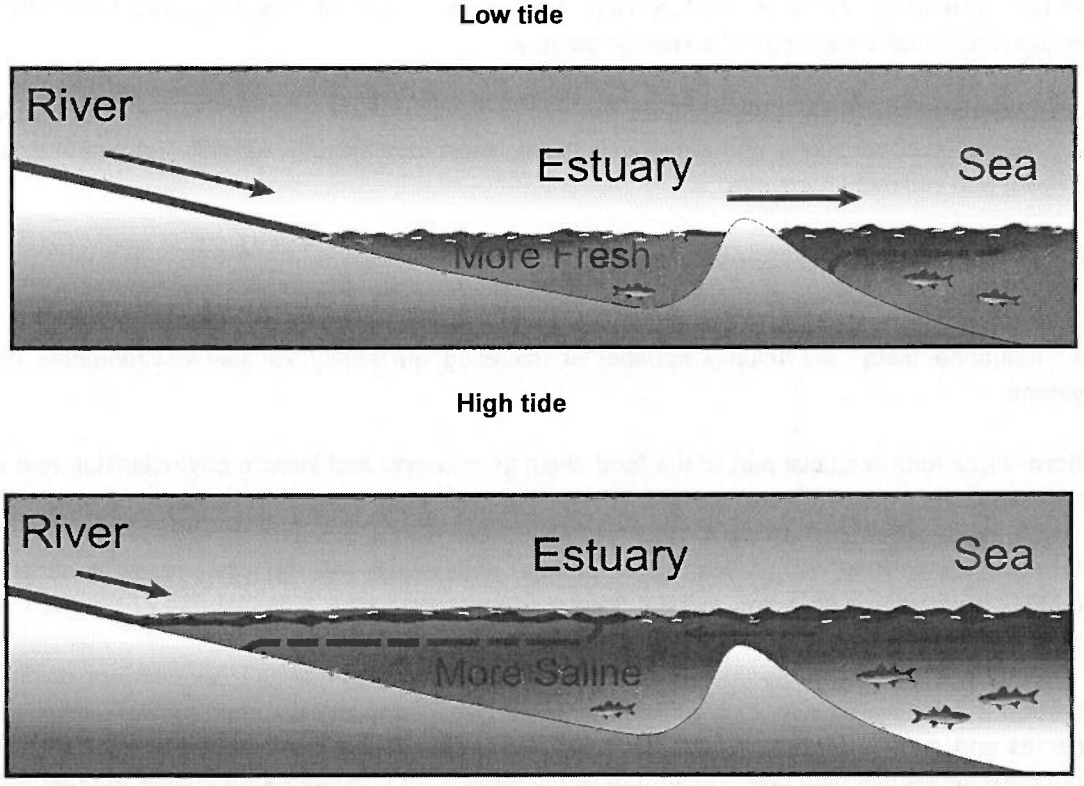


Figure 4. The difference in water levels and salinity penetration between low tide and high tide

Floods also influence the sediment dynamics of an estuary, which in turn influence the following estuarine parameters:

- Bathymetry (depth and shape) of an estuary;
- Distribution of sediment types (e.g. mud versus sand); and
- State of the mouth (in temporarily open/closed systems).

'Water quality' refers to concentrations and distribution patterns of:

- Salinity;
- Temperature;
- pH;
- Dissolved oxygen;
- Suspended solids and turbidity;
- Inorganic nutrients (e.g. nitrate and phosphate);
- Organic nutrients (e.g. organic carbon); and
- Toxic substances (e.g. trace metals and hydrocarbons).

The water quality characteristics of an estuary are largely dependent on the type of water in the estuary at any time, i.e. seawater, freshwater or a mixture thereof. The retention time of water in an estuary (i.e. how long it stays in the system) also influences the water quality characteristics. In

addition, processes within an estuary (e.g. plant growth, nutrient recycling) also contribute to the unique water quality character of a specific estuary.

All in all, the above imply that estuaries are highly variable environments in terms of hydrodynamics (e.g. water level variations and water velocities), water quality (e.g. salinity, temperature, pH and oxygen) and sediment dynamics.

3.5.2 Biological (or response) component

Biological components refer to estuarine vegetation, benthic invertebrates, fish and birds (See Figure 5). Estuarine biota are usually capable of tolerating the highly variable environments of these systems.

Micro-algae form a crucial part of the food chain in estuaries and include phytoplankton and benthic microalgae.

Macrophytes include mangroves, salt marshes, submerged macrophytes, reeds & sedges. The vegetation provides both a safe habitat from predators and forms a crucial part of the food chain in estuaries.

Benthic invertebrates refer to organisms such as crabs, sand prawns, mud prawns, various mussel species and surface feeders. Crabs, for example, forage during low tide on the material deposited during the preceding high tide. These organisms provide an important food source to other estuarine inhabitants such as fish and birds.

A variety of **fish** species are found in estuaries. There are, for example, fish (some estuarine mullet species) which are completely dependent on estuaries for their survival. On the other hand, there are species which use estuaries only as nursery grounds when, during spring and summer, juvenile fish enter the estuary to take advantage of its sheltered and food rich environment. A variety of fish species are found in estuaries, for example: mullets, grunter, king fish, shad, moonies.

Estuaries are very important **bird** habitats, particularly in terms of breeding, roosting and feeding. The intertidal and flood plain areas of these systems usually support a wide variety of birds, such as herons, gulls, waders, terns and cormorants. Birds prey on prawns, marsh crabs, pencil bait and fish. Estuaries also provide protected habitats for some of our endangered Red Data species, such as the black oystercatchers.

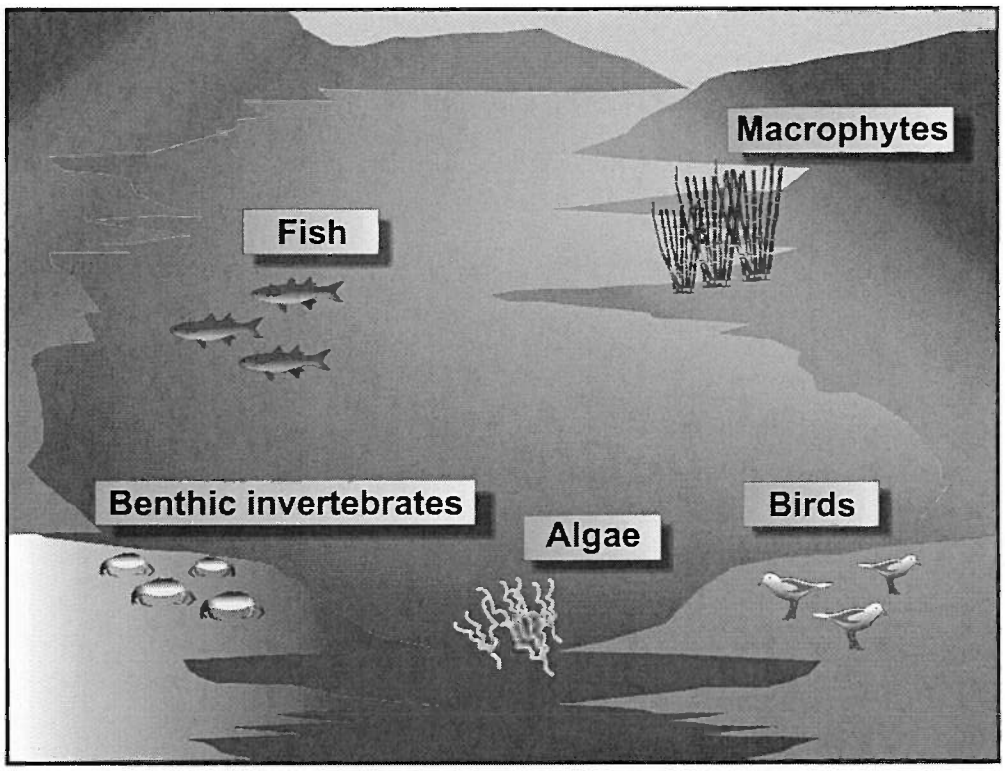


Figure 5. Illustration of the various estuarine biological components

3.6 Additional Information

More information on how estuaries function can be obtained from:

- Allanson, BR & Baird, D (eds) 1999. Estuaries of South Africa. Cambridge: Cambridge University Press - Available at most academic libraries
- Day, JH (ed) 1981. Estuarine Ecology. AA Balkema, Cape Town.
- Estuaries of the Cape. Part II Synopses of available information on individual systems. Stellenbosch – ('Green Reports' available from CSIR, Stellenbosch).
- Hay, D, Huizinga, P and Mitchell, S 2005. Managing Sedimentary Process in South African Estuaries: A Guide. WRC Report TT 241/04. ISBN 1-77005-272-0 - Water Research Commission, Pretoria.
- Whitfield, AK 1995. Available scientific information on individual South African Estuarine systems. Water Research Commission Report No 577/1/95 - www.wrc.org.za/
- Whitfield, AK 1998. Biology and Ecology of Fishes in Southern African Estuaries. Ichthyological Monographs of the J.L.B. Smith Institute of Ichthyology, No. 2 - SAIAB at www.jlbsmith.ru.ac.za

4. ACTIVITIES THREATENING ESTUARIES

Our use of the goods and services provided by estuaries often threatens the very things we value about estuaries. Estuaries will continue to be threatened by development, as they are attractive places for people to live. Land use, infrastructure and development, and water quality and quantity issues in the surrounding catchment also need to be managed to ensure that upstream water extraction or pollution does not threaten the estuary's ability to provide the goods and services downstream communities rely upon. The exploitation of living resources in estuaries needs to be closely managed as the pressure on these resources increases.

The threats to estuaries and the relevant legislation are categorised below under the headings:

- Land use, Infrastructure and Development;
- Water quality and Quantity; and
- Exploitation of Living Resources.

4.1 Land Use, Infrastructure and Development

The category *Land use, Infrastructure and Development* encompasses all developments and activities pertaining to, or in the proximity of, an estuary that influence the health of an estuary directly or indirectly.

Threat	Concern
♦ *Marina development* ♦ *Bridges* ♦ *Low-lying developments along banks* ♦ *Bank stabilization & destabilization* ♦ *Mouth stabilization* ♦ *Lack of maintenance of infrastructure (e.g. sewage plants)* ♦ *Cumulative impacts of development* ♦ *Dredging* ♦ *Mining (e.g. sand winning)* ♦ *Exceedance of carrying capacity resulting from boating, bathers etc.*	♦ *Destruction, fragmentation or modification of estuarine habitats and/or ecosystems* ♦ *Reduction in estuarine productivity* ♦ *Artificial Mouth Breaching*[1]
♦ *Poor agricultural practices*	♦ *Destruction of riparian area* ♦ *Soil erosion* ♦ *Pollution caused by agricultural return flow (see water quantity and quality concerns)*

[1] Artificial mouth breaching is a common practice in estuaries where coastal developments have occurred at too low levels next to temporarily open/closed estuaries. As a result, the mouth is breached artificially before natural breaching levels are reached to prevent flood damage to properties. Problems which are associated with artificial mouth breaching include breaching at the wrong time of year, breaching at too low water levels, breaching at the wrong position or digging a too shallow initial trench, resulting in increased sedimentation, no juvenile fish migration in spring or summer if closed, and salt-marsh vegetation die-off due to long inundation.

4.2 Water quality and quantity

Activities in the catchment may influence the quantity and quality of river water entering an estuary.

THREAT	CONCERN
Water Quantity issues	
♦ *Reduced run-off to estuaries due to* o *Construction of major dams* o *Direct abstraction by local farmers and industry* o *Cumulative impact of numerous small farm dams* o *Afforestation* o *Infestation by alien vegetation* o *Inter-basin transfers*	♦ *Altered turbidity and/or siltation* ♦ *Interference with natural migration patterns* ♦ *Early and extended mouth closure, due to loss of river inflow* ♦ *Increase in sedimentation due to decrease in major floods (less scouring)* ♦ *Decrease in sedimentation due to major dams sometimes acting as sediment traps*
♦ *Enhanced river flows* o *Inter-basin transfers* o *Waste water treatment works* o *Hardening of catchments*	♦ *Altered mouth closure regimes*
Water Quality issues	
♦ *Point source discharges* o *municipal waste (including sewage disposal)* o *industrial effluent(including cooling water) discharges* ♦ *Litter* ♦ *Mariculture waste products* ♦ *Pollution related to shipping activities in harbours*	♦ *Human health issues* ♦ *Ecosystem degradation*
♦ *Diffuse discharges* o *Septic and conservancy tank seepage Agricultural and pastoral run-off containing fertilisers, pesticides and herbicides* o *The inflow of contaminated storm-water or groundwater*	♦ *Non-natural salinity and temperature levels* ♦ *Nutrient enrichment* ♦ *Human health issues* ♦ *Ecosystem degradation*

4.3 Exploitation of living resources

Exploitation of living resources, include issues relating to over-exploitation, biodiversity protection, mariculture and general zonation for the harvesting of organism.

THREAT	CONCERN
♦ *Recreational fishing* ♦ *Commercial fishing (e.g. netfishing)* ♦ *Traditional fish traps* ♦ *Poaching* ♦ *Bait collection* ♦ *Aquarium fish collecting* ♦ *Inappropriate levels of recreational activities (e.g. fishing competitions)* ♦ *Mariculture* ♦ *Harvesting of mangroves* ♦ *Translocated and alien fauna and flora*	♦ *Loss of biodiversity (e.g. loss of fish and bait species)* ♦ *Loss of eco-system structure* ♦ *Destruction of habitat*

These threats to biodiversity can be linked to growing populations placing ever-increasing demands on natural resources and operating in an environment of inadequate planning, enforcement and compliance. Even within 'protected areas', protection of biodiversity is inadequate. In part, this reflects policy deficiencies in that desired levels of biodiversity protection have yet to be set and these are required before setting biodiversity conservation goals and strategies.

4.4 Legal and Institutional Structure

International experience indicates that the most fundamental pitfall in achieving biodiversity protection is the fragmentation of estuarine management amongst the different national, provincial and local government agencies. Threats include:

Threats	Concern
Lack of communication, coordination and cooperation between government departments	♦ *No communication between government departments* ♦ *Lack of co-ordination (Government)* ♦ *Lack of co-operation within national departments* ♦ *Duplication of work, lack of responsibility*
Lack of clearly defined, legislated responsibilities	♦ *Legislative mandate not clear* ♦ *Conflicting legislation* ♦ *Jurisdiction / Responsibility: don't know who is responsible* ♦ *Narrow jurisdiction e.g. control of bait collection only* ♦ *Lack of funds*
Lack of effective planning, implementation and management	♦ *Corrective Action - procedures and follow up!* ♦ *Need monitoring protocols* ♦ *No holistic management plan for each estuary* ♦ *Problems in implementing Integrated Catchment Management* ♦ *Difficulties in implementing solutions to problems (e.g. removing sedimentation)*
Socio-economic problems	♦ *Migration to coastal areas due to rising unemployment* ♦ *Poverty* ♦ *Need for community beneficiation*
Lack of enforcement of legislation and the capacity to do so	♦ *Lack of capacity & commitment* ♦ *Failure to implement environmental legislation & plans* ♦ *Lack of resources (human & financial) for enforcement*
Lack of internalisation of costs by developers	♦ *Lack of internalisation of costs* ♦ *Risk and responsibility should be carried by developers or municipality*
Stakeholders	♦ *Stakeholder fatigue* ♦ *Range of different interest groups with different needs (difficult to manage)*
Lack of data and knowledge on estuaries and poor distribution of existing information	♦ *No database for general access* ♦ *Lack of distribution of information - poor communication* ♦ *Lack of indicators of estuarine health* ♦ *Lack of environmental knowledge : engineers, town planners* ♦ *Lack of knowledge on socio-economic uses* ♦ *Lack of knowledge in communities living next to estuaries (i.e. understanding systems)* ♦ *Inventory of resource base lacking*

4.5 Why do we need to manage an estuary?

Although the value of estuaries is often reflected in the activities they support, inappropriate management and control can result in net loss of value to society as was discussed in the module relating to estuarine value.

Estuaries constitute the interface between land and sea. They therefore form a critical node in the overall planning process, which implies that conservation, development and water resources planning need to take cognisance of their needs to ensure a sustainable future for all that depend on their goods and services.

4.6 Additional Information

More information on threats to estuaries can be obtained from:

- Turpie J K, Sihlope, N, Carter, A, Maswime, T & Hosking, S 2006. Maximising the socio-economic benefits of estuaries through integrated planning and management: a rationale and protocol for incorporating and enhancing estuary values in planning and management. Eastern Cape Estuaries Management Programme: Phase II. Water Research Commission.
- McGwynne, L and McKenzie, M 2006. Objective 1: Profiling estuaries in IDP planning. Policies and procedures for incorporating information and knowledge on estuaries into the integrated development planning and related processes are established through collaboration between researchers and authorities at local, district and provincial levels. Water Research Commission
- Van Niekerk, L & Taljaard, S 2003. A framework for effective cooperative governance of South African estuaries. CSIR Report ENV-S-C 2003-077. Stellenbosch

5. LEGAL MANDATE

National Policy is a statement of intent by government on its vision, principles, goals and objectives as well as institutional arrangement to achieve desired outcomes for specific sectors. National Policy is usually captured in White Papers. Key policies (white papers) pertinent to estuaries include:

- White Paper for Sustainable Coastal Development in SA;
- White Paper on a National Water Policy for South Africa;
- White Paper on Marine Fisheries Policy for SA;
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity;
- White Paper on Environmental Management Policy; and
- White Paper on Spatial Planning and Land-use Management.

National Policy (white paper) is given legal status through National Legislation (Act). In South Africa, national legislation governing estuaries can be subdivided into acts related to (see Figure 6):

- The setting of overarching strategic resource objectives; and
- Management of key activities or developments threatening estuaries

The key activities or developments that are threatening estuaries can be subdivided into:

- Water quality and quantity;
- Land use and infrastructure development; and
- Exploitation of living resources.

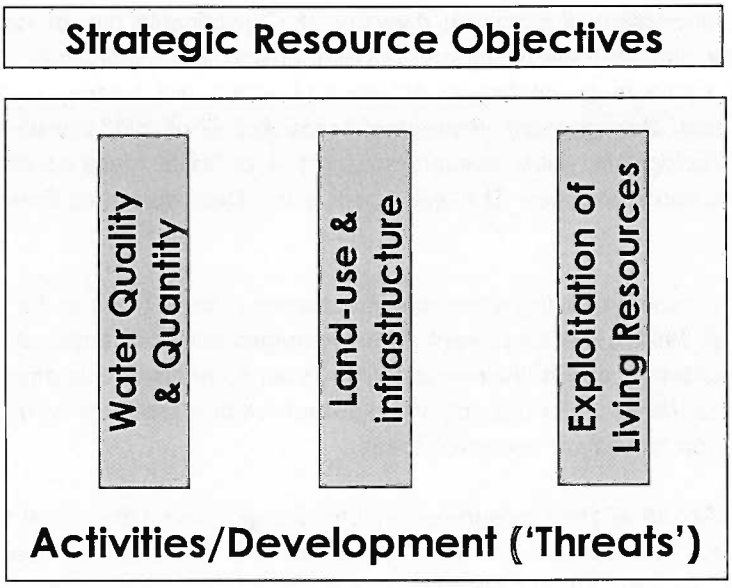


Figure 6. Illustration of the relationship between policy and legislation governing Strategic Resource Objectives and key activities and development that threaten estuaries

5.1 Strategic Resource Objectives

Strategic resource objectives are cross-cutting objectives that influence the management of a number of key sectors. They predetermine, to a large extent, the management objectives on a local level. For example, declaring an estuary a Marine Protected Area potentially limits the number of development options for that specific system or classifying (determining the health status) an estuary under the National Water Act may preclude the discharge of waste water by a local authority in the future. Strategic resource objectives are often determined by the national or provincial tier of government.

Key acts related to strategic resource objectives include:

- National Environmental Management Act 107 of 1998;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Environmental Management: Protected Areas 57 of 2003;
- Marine Living Resources Act 18 of 1998;
- National Water Act 36 of 1998; and
- National Environmental Management: Coastal Zone Bill.

The ***National Environmental Management Act 107 of 1998 (NEMA)*** provides for co-operative environmental governance, in general, through the establishment of national environmental management principles, and procedures for their incorporation into decisions affecting the environment. The act emphasizes co-operative governance and ensures that the environmental right and related rights in the Constitution are protected. NEMA requires the ***Department of Environmental Affairs and Tourism (DEAT)*** to be the lead agent in ensuring the effective custodianship of the environment (Smith and Cullinan 2000).

The ***National Environmental Management: Biodiversity Act 10 of 2004*** provides for the management and conservation of biological diversity, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from biodiversity. In addition, the act ratifies international agreements relating to biodiversity which are binding on the republic. The ***National Environmental Management: Protected Areas Act 57 of 2003*** provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. The lead agent is the ***Department of Environmental Affairs and Tourism***.

The management and control of living resources in estuaries primarily falls under the ***Marine Living Resources Act 18 of 1998***. The lead agent in the management and control of living resources in estuaries is the ***Department of Environmental Affairs and Tourism.*** *Estuaries may be declared* marine protected areas (MPA) under this act, which in turn requires that they be maintained in a good health status to fulfil their function as protected areas.

The ***National Water Act 36 of 1998*** recognises aquatic ecosystems as the actual resource base from which water is derived. The act calls for the **Classification** (i.e. predefined health status) and the setting of **Resource Quality Objectives** (i.e. overarching management objectives) of all water resources in South Africa. The lead agent is the Department of Water Affairs and Forestry.

The **White paper for Sustainable Coastal Development in South Africa** (April 2000) will ultimately be given legal status through the **National Environmental Management: Coastal Zone Bill** (to be

referred to as the Coastal Zone Bill). The lead agent is the Department of Environmental Affairs and Tourism (DEAT). Overarching strategic objectives are listed under a number of themes, namely:

- Theme A: Governance and Capacity Building;
- Theme B: Our National Asset;
- Theme C: Coastal Planning and Development;
- Theme D: Natural Resource Management; and
- Theme E: Pollution Control and Waste Management.

5.2 Land use and Infrastructure development

Key acts related to land use and infrastructure development include:

- National Environmental Management: Coastal Zone Bill;
- National Environmental Management Act 107 of 1998;
- Local Government: Municipals Systems Act 32 of 2000;
- Development Facilitation Act 67 of 1995;
- Local Government Transition Second Amendment Act 97 of 1996; and
- Mineral and Petroleum Resources Development Act 28 of 2002.

Policy dealing with the management and control of land use and infrastructure, as far as it pertains to estuaries, is primarily dealt with in the White paper for Sustainable Coastal Development in South Africa (April 2000), which will ultimately be given legal status through the National Environmental Management: Coastal Zone Bill (to be referred to as the Coastal Zone Bill). Theme C: Coastal Planning and Development of the white paper lists a number of important sub-goals that are expanded on in the proposed Coastal Zone Bill. The lead agent is the Department of Environmental Affairs and Tourism (DEAT).

New **Environmental Impact Assessment (EIA) regulations** were published in April 2006 under Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998). The regulations came into effect on 3rd July 2006. **Government Notice No. R.385** defines the process to be followed and the delegation of authority under NEMA (South Africa 2006a). Activities that require a Basic Assessment as defined in regulations 22 to 26 (South Africa 2006b), as well as the competent authorities, as identified in terms of section 24 of NEMA are listed in **Government Notice No. R.386.** These include activities such as dredging, excavation, infilling and removal of soil from an estuary. **Government Notice No. R.387** lists activities identified in terms of section 24 of NEMA that require scoping and environmental assessment (i.e. a "full EIA") in terms of regulations 27 to 36 (South Africa 2006c). These include, for example, development activities which exceed 20 hectares or more, and construction or earth moving activities in the sea or within 100m inland of the high-water mark. The regulations are especially pertinent to estuaries as the latter are rapidly expanding development nodes along the South African coast and are under tremendous pressure from human activities.

The legislative context for municipal planning is provided by the ***Local Government: Municipals Systems Act 32 of 2000.*** Chapter 5 of this act deals with Integrated Development Planning, which requires that each local authority adopt a single, inclusive plan for the development of that municipality. An Integrated Development Plan is intended to encompass and harmonise planning over a range of sectors such as water, transport, land use and environmental management. The ***Development Facilitation Act 67 of 1995*** requires the setting of Land Development Objectives and the principles of this act have also been incorporated into Chapter 5 (s 23 (l)) of the ***Municipal Systems Act.*** The ***Local Government Transition Second Amendment Act 97 of 1996*** also

requires that all municipalities, both Transitional Local Councils (TLCs) and District Councils, draw up Integrated Development Plans (IDPs) for the integrated development and management of their areas of jurisdiction. The requirements of this act have largely been incorporated in the ***Municipal Systems Act***, which is currently driving the establishment and implementation of IDPs. The lead agent for the above-mentioned acts is the Department of Provincial and Local Government.

Mineral and Petroleum Resources Development Act 28 of 2002 contains the statutory requirements regarding the enforcing of environmental protection and management of mining impacts, including sand and coastal mining. The Act requires Environmental Management Programmes (EMP) that identify a mine's impact on the environment and provide a clear programme on how these will be managed, based on an Environmental Impact Assessment (EIA). To ensure compliance with environmental issues, the act requires consultation with each department charged with administration of any law that relates to any matter affecting the environment before an EMP may be approved. The act is administered by the Department of Minerals and Energy.

5.3 Water quality and quantity

Key acts related to water quantity and quality include:

- National Water Act 36 of 1998;
- Water Services Act 108 of 1997;
- Prevention and Combating Pollution of the Sea by Oil Act 6 of 1981; and
- National Environmental Management: Coastal Zone Bill.

In estuaries, water quantity and quality related issues are mainly dealt with under the ***National Water Act 36 of 1998.*** The Department of Water Affairs and Forestry (DWAF), as the custodian of aquatic resources in South Africa, recognises aquatic ecosystems as the actual resource base from which water is derived and, through the Resources Directed Measures (RDM), focuses on the water resources as an ecosystem rather than just on water itself as a commodity. Water required to meet the Reserve is the only remaining right under the act. DWAF also has the responsibility of controlling and managing activities that would alter the beds and banks of an aquatic resource and that would ultimately have an impact on the in-stream and riparian habitat and the in-stream biota of a particular resource. Management and control of such activities are by way of general authorisation of water licences with various conditions attached to them (Ms L Hill, pers. comm., DWAF). The lead agent is the Department of Water Affairs and Forestry.

The ***Department of Environmental Affairs and Tourism*** also plays a significant role as there are additional acts that relate to the protection of water quality, e.g. ***Prevention and Combating Pollution of the Sea by Oil Act 6 of*** 1981 (which requires that contingency plans be in place to protect estuaries in the event of an oil spill at sea).

The ***Water Services Act 108 of 1997*** is not considered to be of major importance to the management and control of water quality and quantity in estuarine resources as its key focus is to develop a regulatory framework within which water services can be provided and to establish water service institutions and define their roles and responsibilities. Water quality impacts on a water resource, for example as a result of such services, are still regulated under the Water Act.

The White paper for Sustainable Coastal Development in South Africa (April 2000) will ultimately be given legal status through the National Environmental Management: Coastal Zone Bill (to be referred to as the Coastal Zone Bill). Theme E: Pollution Control and Waste Management of the white paper lists two sub-goals that are expanded in the proposed Coastal Zone Bill. The lead agent is the Department of Environmental Affairs and Tourism (DEAT).

5.4 Exploitation of living resources

Key acts related to exploitation of living resources include:

- Marine Living Resources Act 18 of 1998; and
- National Environmental Management: Coastal Bill.

Exploitation of living resources includes issues relating to over-exploitation, biodiversity protection, mariculture and general zonation for the harvesting of organisms.

The management and control of living resources in estuaries primarily falls under the ***Marine Living Resources Act 18 of 1998***. The lead agent in the management and control of living resources in estuaries is the ***Department of Environmental Affairs and Tourism.***

The primary purpose of the Marine Living Resources Act is to protect marine living resources, through establishing sustainable limits for the exploitation of resources, declaring fisheries management areas for the management of the species, and approving plans for conservation, management and development, prohibition and control of destructive fishing methods, and declaring marine protected areas (MPA).

The Marine Living Resources Act overrides all other conflicting legislation relating to marine living resources. This has resulted in some provincial and local legislation that provided effective protection for living resources being superseded before proper protection measures were put in place under the new Act.

The **White paper for Sustainable Coastal Development in South Africa** (April 2000) will ultimately be given legal status through the **National Environmental Management: Coastal Zone Bill**. Theme D: Natural Resource Management of the white paper lists a number of sub-goals that are expanded in the proposed Coastal Zone Bill. The lead agent is the Department of Environmental Affairs and Tourism (DEAT).

5.5 Additional Information

More information on legislation can be obtained from:

- Smith, N and Cullinan, C 2000. Review of South African Environmental Laws regulating Estuaries. In Boyd, A J, Barwell, L & Taljaard, S (eds.) Report on the National Estuaries Workshop. 3 – 5 May 2000, Port Elizabeth, South Africa. Report No. 2, Marine and Coastal Management Implantation Workshops. Cape Town: Chief Directorate Marine and Coastal Management
- Van Niekerk, L & Taljaard, S 2003. A framework for effective cooperative governance of South African estuaries. CSIR Report ENV-S-C 2003-077. Stellenbosch

6. GOVERNANCE AND MANAGEMENT

6.1 What is Governance?

Historically, "governance" used to be broadly understood as government - the elected officials and civil servants who make up governing institutions - which in turn referred to a political system or to those with the capacity to formulate and implement policies and with the authority to manage a country's economic and social resources. Due to their public administration and executive functions, government officials were believed to have the ultimate capacity to manage and influence the development of all economic and social resources.

More recently, this limited concept of governance has been broadened to account for the realities of how countries are run and managed, and recognises the limitations of governments. The broader definition of "governance" refers to the process by which society manages its economic, social and political resources and institutions for the well-being of its people.

A system of governance ideally includes all sectors of society:

- Government institutions;
- Non-government organizations;
- Community or civil society organizations (including private and commercial sectors); and
- Scientific community.

A system of effective governance reflects the following principles:

- Accountability;
- Participation;
- Consistency (Predictability); and
- Transparency.

6.2 Joint decision-making platforms

Governance on local level is best implemented through Joint decision-making platforms, such as Estuarine Forums or Estuarine Advisory Committees, which allow for community participation.

Key factors needed to successfully implement such a process include:

- Representation from all relevant sectors of society;
- Government representations. This is especially important as authorities hold the executive (legal) powers to implement a decision made by a forum or committee;
- Must commitment towards common goals;
- Dedicated champion to keep momentum going; and
- Communication!

Examples of who should be represented on such a joint decision-making platform include:

- National: DWAF, DEAT (MCM), DME;

- Provincial Department of Environmental Affairs and Planning;
- Catchment management authority;
- Nature Conservation & National Parks Board;
- National Port Authority;
- Tourism boards;
- Heritage associations;
- Water user associations;
- Ratepayers associations;
- Local developers and industries;
- Local angling or fishing groups;
- Non-governmental organisations & community based organisations;
- Scientific community (ecological, social and resource economic); and
- General public.

6.3 What is management?

"Management" refers to a continuous and dynamic process that unites all sectors of society in preparing and implementing an integrated plan for the protection and development of resources, in this case estuaries. The ultimate goal of management is sustainable development which takes into account the social, economic and environmental needs of the current and future generations.

General guidelines for effective management include:

- Management is complex;
- No substitute for good leadership and planning;
- Nothing is perfect;
- The more you know the better your decisions;
- Know the law, follow it and make it work for you;
- Management is a process of learning and doing;
- You cannot manage alone;
- Build relationships and trust;
- Communicate, communicate, communicate;
- Start small and be realistic;
- In empowering others you empower yourselves;
- Think ahead and predict what will happen; and
- Everything takes longer than you think.

A number of different management approaches (or frameworks) have been proposed for South African estuaries, including:

- Management procedures linked to Integrated Development Planning (McQwynne 2006);
- Strategic adaptive management approach (Hay 2005); and
- Framework proposed as part of National Estuarine Management Protocol (Van Niekerk & Taljaard 2003).

Each of these is discussed in more detail below

6.3.1 *Integrated Development Planning (IDP)*

The IDP is the tool for achieving development in an integrated manner between municipal sectors on the local government level. The IDP process and the details of each phase are described by McGwynne and McKenzie (2006). The IDP process is set out in the IDP Guide Pack (DPLG 2001). There are five phases (Figure 7):

- Phase 1 – Analysis
- Phase 2 – Strategies
- Phase 3 – Projects
- Phase 4 – Integration
- Phase 5 – Approval

A Preparation Phase (known as Phase 0) precedes these five phases and focuses on developing a Process Plan to guide the IDP. The IDP process must achieve acceptance from all relevant stakeholders and take place within the framework of co-operative governance. It is strategic in that it focuses on key issues, and is adaptive in that it is reviewed annually to refocus its priorities and budget allocations.

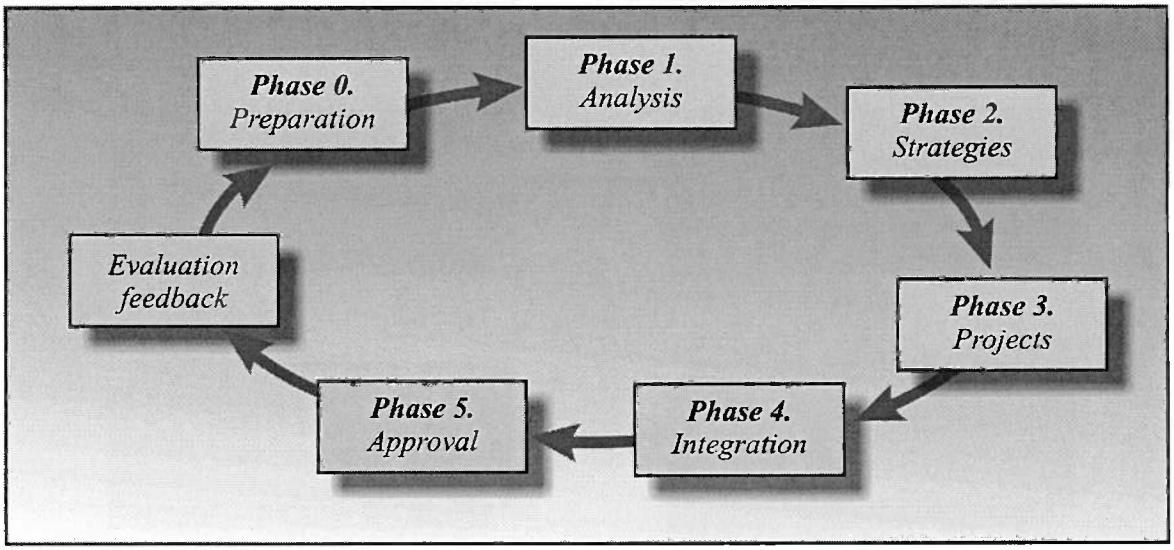


Figure 7. Phases in the IDP process (McGwynne and McKenzie 2006)

McGwynne and McKenzie (2006) state that the processes of IDP development and estuary management incorporate closely related principles. The five phases of IDP development are broadly similar to the steps of estuary management as indicated in Figure 8.

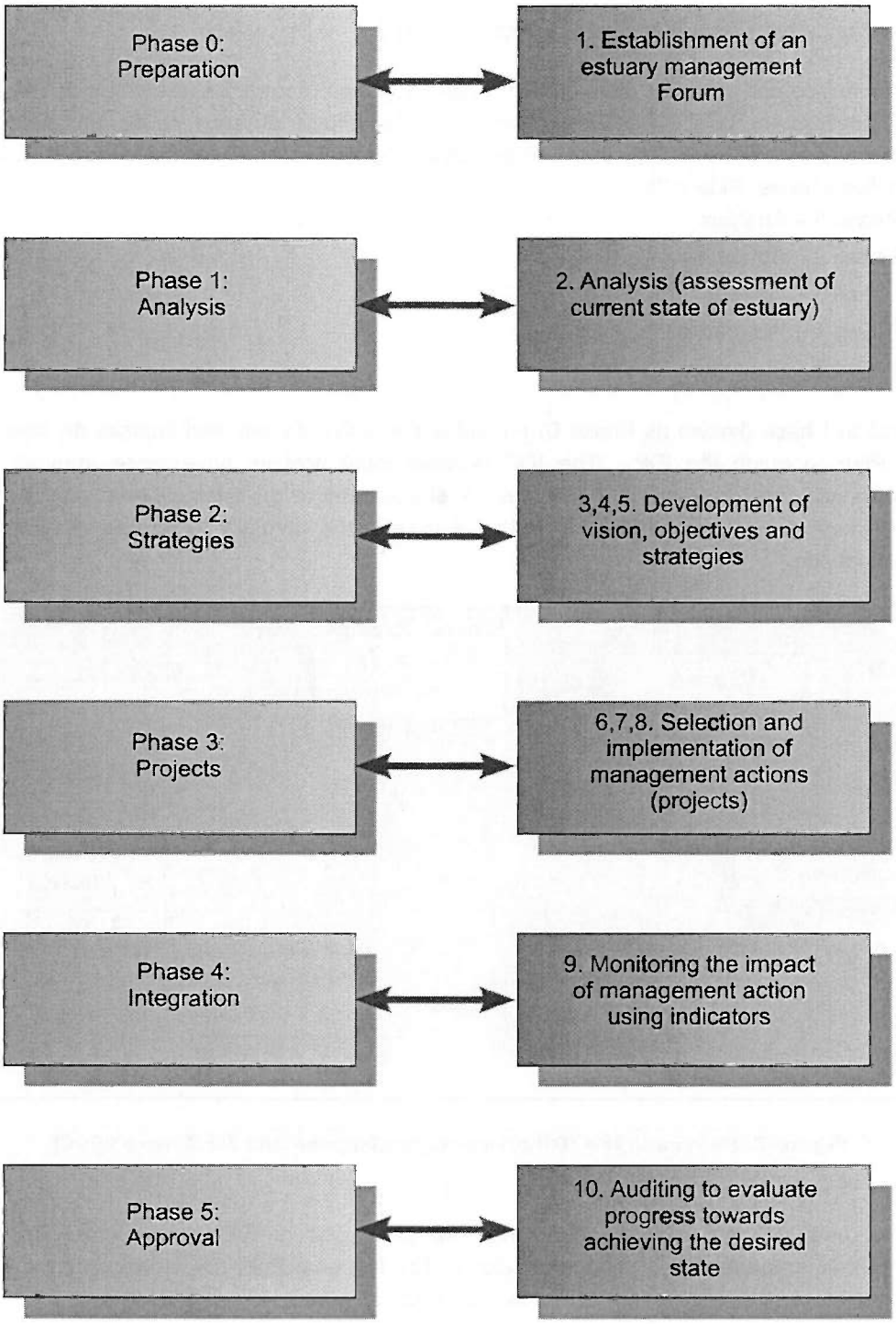


Figure 8. Comparison between the processes of IDP formulation and estuary management. (McGwynne and McKenzie 2006)

In the ideal situation, a formally constituted estuary management forum conducts an analysis of the estuary environment to identify problem areas and develop a vision for the estuary. The forum outlines and evaluates a range of possible actions to achieve the vision and presents these as clearly defined projects. Unfortunately, the implementation of projects by forums will be curtailed by limitations in manpower and funding. Linking the estuary management process with the municipal IDP process and shifting the responsibility for estuary protection to the local municipality, where it legitimately belongs, is essential to ensure that protection measures are put in place (McGwynne and McKenzie 2006).

Turpie *et al.* (2006) state that several types of planning affect the future of estuaries and determine the way in which they will be managed. These in turn determine ultimately the type and amount of goods and services that estuaries can deliver to society.

Planning sets the conservation and development objectives and goals of defined areas. Turpie *et al.* (2006) categorise the different types of planning into the following groups, all of which are completely interdependent:

- **Conservation planning**: the identification of important areas for biodiversity and the spatial delineation of protected area networks and their buffer areas;
- **Water resource planning**: the classification of water resources (rivers, wetlands, estuaries and groundwater) in terms of their future health status and allocation of water; and
- **Development planning**: the identification of development goals and directions for a defined period and in a defined area.

Land use planning is seen primarily as a spatial expression of conservation and development planning, though both of these are also related to water resource planning (Figure 9). Finally, management gives effect to these plans at the estuary level.

Land use planning in South Africa is becoming more strategic and forward thinking and is now an integral part of the development planning process. All municipalities are required to draw up Spatial Development Frameworks (SDFs) which are aligned with their Integrated Development Plans. These SDFs will provide indicative plans that show the preferred patterns of land use, directions of growth, urban edges, special development areas and conservation worthy areas. In drawing up these plans, municipalities will be obliged to consider sustainability issues and safeguarding the environment.

Thus, instead of following the *ad hoc* process of the past, it is envisaged that land use planning will ultimately encompass all areas of the country. Moreover, planning at the municipal level will be integrated with spatial and development planning conducted at broader scales, as municipalities will be obliged to align these plans with national and provincial strategies on socio-economic development, sustainable development and bio-regional planning. In addition, it may soon become a legal requirement for local level planning to take regional conservation planning initiatives into account.

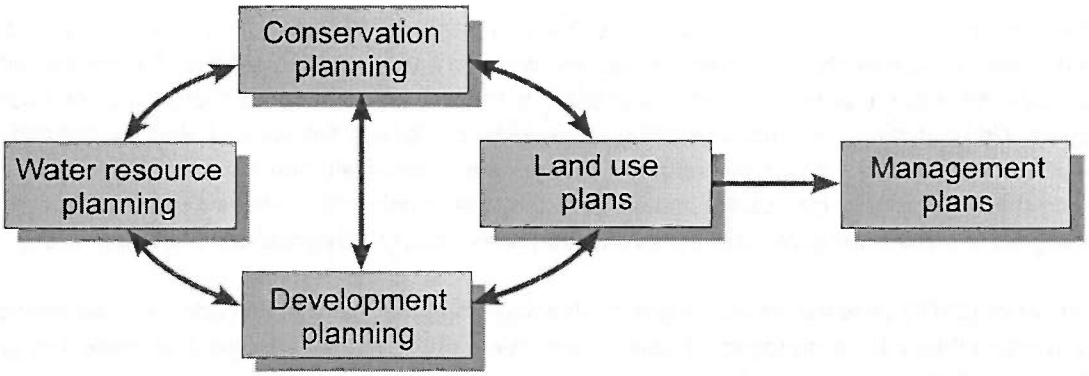


Figure 9. Links between different types of planning that affect estuaries (Turpie *et al.* 2006)

At a broader spatial level, development planning will have to take into account the effect on overall water demands in relation to supplies across the country. Decisions about water allocation will ultimately take into account the economic costs to aquatic ecosystems, including estuaries. Local level development initiatives will thus eventually need to take these broader scale constraints into consideration.

Apart from catchment level considerations, land-use planning also has important implications for land use within and adjacent to estuaries. Planning affects the extent to which estuaries can be developed. There is huge demand for the construction of marinas and housing developments which alter hydrological patterns and require the hardening of the estuary edge. The level of development around estuaries also affects the numbers and types of users that impact directly on estuarine biodiversity. Of paramount importance is the overall level of access to estuaries.

6.3.2 Strategic Adaptive Management Approach

In its simplest terms, ***adaptive management*** is a process of managing and learning in situations of uncertainty. The term *strategic* indicates that, in this process, one should look forward into the future so as to predict the consequences of management actions. This makes management more predictive and less responsive (Hay 2005).

The basic steps in SAM are (see Figure 10 below) (Hay 2005):

- **Visioning**. Understand, with stakeholders, the social, economic and ecological context of the system to be managed, and the principles/values that guide management. Develop a broadly acceptable vision of the future.
- **Translate vision into ecosystem goals**. Develop an objectives hierarchy that documents the sequential reasoning used in translating a broad societal values-based vision into science-based ecosystem outcomes.
- **Expect the unexpected**. Use a variety of tools (Scenario planning, systems thinking, models, historical records, etc.) to scope the range, and likely spatio-temporal limits, of unusual events and their implications for management towards the desired future conditions.
- **Scope the range of management options** to achieve the desired future conditions and predict (formally or informally) their likely outcomes under different scenarios.

- **Select and implement the best options.** In co-operation with stakeholders decide which management options provide the best potential learning opportunities, and social-ecological system outcomes.
- **Monitor and audit achievements**. Use a range of research projects, traditional monitoring, modelling and surveys to understand system response to natural flux and management intervention. Weigh this response against the desired outcomes.
- **Reflect at each step**. Is thinking and action congruent with principles, values and vision? What does knowledge gained tell us about (1) our understanding of the ecosystem, (2) its responses, (3) how realistic the desired outcomes are and (4) how useful the processes used to achieve them are.

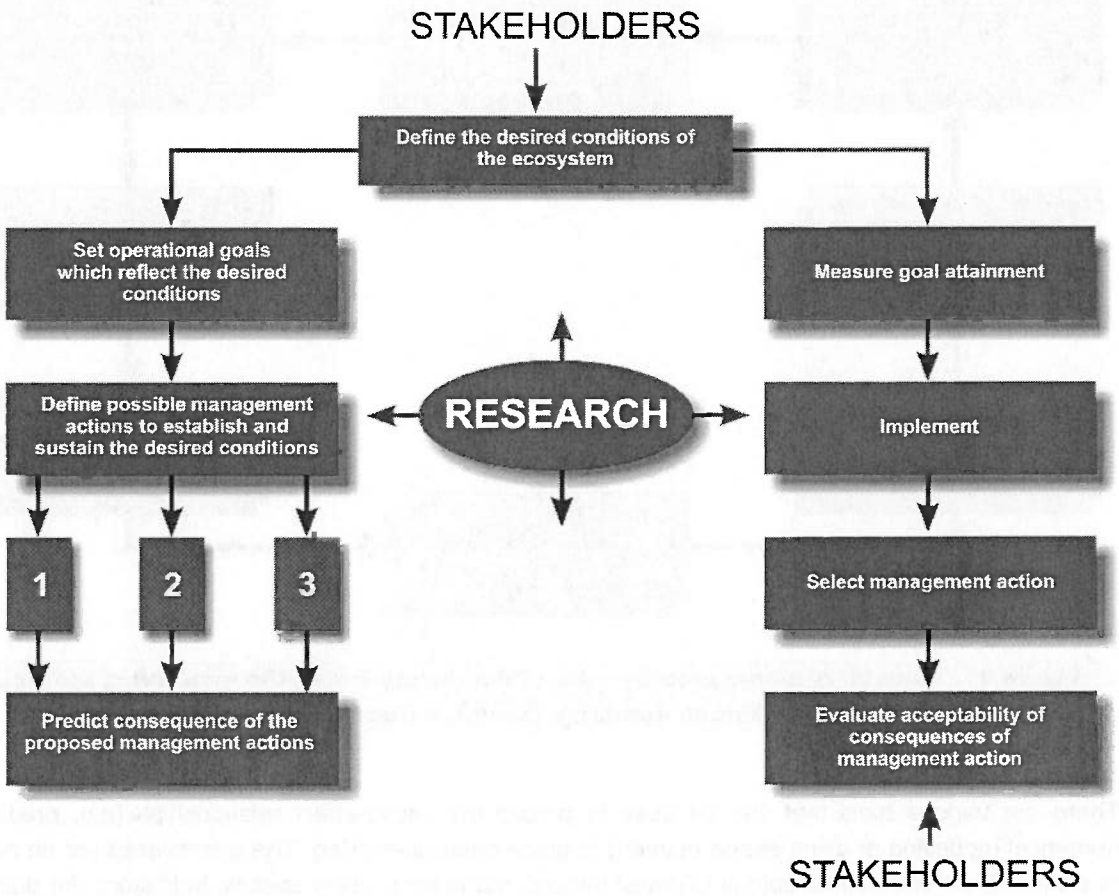


Figure 10: The adaptive decision making/problem solving cycle (Hay 2005)

McGwynne and Adams (2004) describe how strategic adaptive management can be applied to the process of estuary management (Figure 11). The procedure starts with the establishment of an estuary management forum. This is followed by an assessment of the current state of the estuary that leads to the determination of a vision or future "desired state". This state is ultimately described through the development of objectives that lead to a series of operational goals that define specific ecological, social and institutional end-points . Possible management actions to achieve these end-points are identified and evaluated by examining the potential consequences of each one. The procedure is cyclic and iterative by nature.

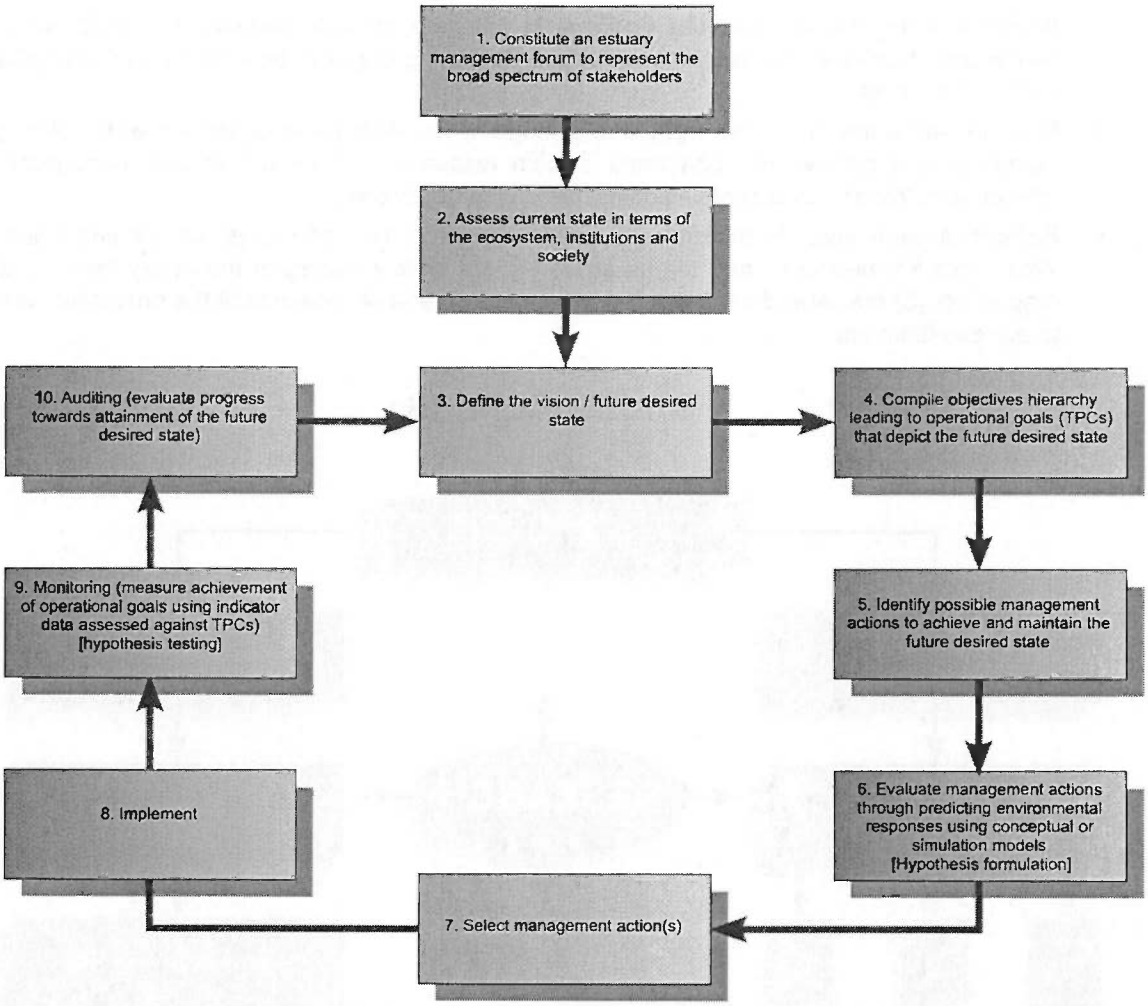


Figure 11. An estuary management protocol that incorporates the monitoring protocol proposed for South African estuaries (modified from Rogers and Biggs 1999)

There are various tools that can be used to predict the cause-effect relationships (e.g. predictive numerical modelling or using expert opinion) to guide decision-making. The effectiveness of an action in achieving an operational goal is followed through monitoring, using specific indicators. An auditing process evaluates progress towards the desired state and, if necessary, leads to an adjustment of the objectives and operational goals.

6.3.3 Framework under National Estuarine Management Protocol

This section describes the proposed National Estuarine Management Protocol (Figure 12), which is based on the principals of strategic adaptive management (Van Niekerk and Taljaard 2003, 2004). The Protocol views management as an iterative process and conforms closely to that for integrated development planning in that the thrust in both processes is strategic.

Scientific research input is used to guide the process where required and to analyse (audit) data collected during monitoring. This input essentially provides the basis upon which the process of adaptive management (as opposed to reactive) can proceed.

Documentation of the process and communication of the results are essential for building a legacy of knowledge and promoting the ideal of learning by experience, especially for long-term projects. Interaction between stakeholders, managers and research is thus critical during all stages of the Estuarine Management Protocol.

The different components of the management protocol follow a cyclic, adaptive management approach and are described in further detail below:

6.3.3.1 Vision and objectives

Strategic vision and objectives need to be set for both the biophysical and socio-economic environments. The objectives are set at two levels, namely:

Strategic vision and objectives

Strategic vision and objectives are set on a national and/or provincial/regional level. Estuaries do not operate in isolation, but are connected, albeit indirectly, to other estuarine systems in a region and even globally (e.g. fish and bird migration). As a result, certain objectives need to be set on a higher level to ensure overall sustainability (taking into account social equity, economic growth and ecological integrity).

Local vision and objectives

Local vision and objectives are site-specific and need to be set for individual estuaries. To ensure long-term sustainability of estuaries, a balance needs to be reached between ecological integrity, social equity and economic growth.

It is crucial that the vision and objectives of the lower tiers of government are aligned with those of national and regional government departments. However, this does not mean that local authorities and communities cannot take the initiative when appropriate, i.e. forcing national and provincial authorities to act in a "bottom-up" approach. In addition, the vision and objectives set for a particular estuary by the various management and control authorities should also be in alignment.

Aspects that must be taken into account when setting local ecological and socio-economic objectives include:

- Limits of acceptable change and carrying capacity
- Current/potential goods and services provided
- Current/potential activities posing threats
- Opportunities and constraints.

i. Limits of acceptable change and carrying capacity

Limits of acceptable change, for both the living and non-living ecological resources, must form the basis for the local vision or management objectives. Objectives based on resource limitations, will

ensure that expectations of use are aligned with the natural environment's ability to provide the necessary goods and services.

A new methodology called Limits of Acceptable Change has been developed for assessing the carrying capacity of protected areas and other sensitive sites. The effect of cumulative impacts must also be addressed using, for example, the Strategic Environmental Assessment methodology.

ii. Goods and Services

Resource Economics provide the tools that allocate economic values to the goods and services provided by an estuary. These values provide a common denominator in terms of financial value, to facilitate decisions around the optimal use of estuaries and for setting management objectives.

iii. Activities posing threats

Most activities that pose a risk to the provision of goods and services are goods and services in themselves. Explicitly listing activities and their associated impacts allows the direct and indirect impacts on other goods and services to be identified.

iv. Opportunities and Constraints

Quantification of the interactions between the various users and functions of the estuary can be achieved by a sequential cause-and-effect analysis using the Driver-Pressure-State-Impact-Response approach. The Strengths-Weaknesses-Opportunities-Threats (SWOT) technique can be applied to analyse the existing situation and make forecasts. To decide on the optimum combination of goods and services, within the limits or carrying capacity of the natural environment, multi-criteria analysis techniques can be used to discriminate between various options.

v. Setting local vision and objectives

Ultimately, a vision for a particular estuary with site-specific ecological and socio-economic objectives needs to be defined. For these objectives to be implemented effectively, they must be presented in a measurable format for both the biophysical and socio-economic environments, e.g. indicators with specific target values or ranges.

6.3.3.2 Management strategies

Management Strategies are defined at two levels, namely:

National/Regional management strategies

Management strategies and plans should be developed on national and regional/provincial levels to guide management on all levels to ultimately achieve the Strategic Vision and Objectives set for estuaries. National/regional management strategies need to be elaborate in order to provide the necessary guidelines for national, regional (provincial) and local initiatives.

Local management strategies

Detailed management strategies and plans must be developed on a local level to guide local managers to achieve site-specific ecological and socio-economic objectives set for a particular estuary, taking into account national/regional management strategies. Local management strategies, including an estuarine zoning scheme, should be incorporated into an Estuarine Management Plan which, in turn, must be incorporated into Integrated Development Plans (IDPs) or Municipal Coastal Management Programmes for the area.

6.3.3.3 Planning and Implementation

Planning and implementation primarily relate to the actions (categorized into **water quality and quantity**, **land use and infrastructure development** or **exploitation of marine living resources**) that need to be taken into consideration in the planning and operation of activities/developments in and around estuaries.

Planning and implementation typically include the following steps:

- Step 1: Pre-application consultation and Submission of application
- Step 2: Impacts Assessment
- Step 3: Setting of Critical Limits for Activity/Development
- Step 4: Design of or Operational Management Plans and Environmental Management Plans
- Step 5: Operations

Implementation refers to the phase in which a project has been commissioned or in which the construction of a development has been completed, i.e. when the operational management plans are implemented. Despite following the proper route in terms of, for example, impact assessment studies and the design of operational management plans, non-compliance with these plans during the operations can still result in detrimental impacts on the environment. Therefore, the effectiveness of the operational procedures also needs to be considered in the monitoring, assessment and evaluation phases.

6.3.3.4 Monitoring

Monitoring can be divided into:

Strategic monitoring

Stategic monitoring refers to monitoring programmes through which long-term data sets are collected to establish natural variability and trends as a result of human interference. Data collected from such monitoring programmes are usually those which are used for State of Environment Reporting.

Compliance monitoring

Compliance monitoring is related to specific activities or developments in and around estuaries. The primary aim of these monitoring programmes is to establish whether the operation of such activities and developments complies with pre-determined critical limits, and with the ecological and socio-economic objectives of the estuarine environment on which it may have an impact.

6.3.3.5 Assessment and evaluation

Assessment and evaluation is the feedback loop that ensures the ultimate success of the management process. Assessments and evaluations are performed at a strategic level, and also on specific activities/developments.

Strategic assessment and evaluation

Strategic assessment and evaluation (e.g. State of Environment Reporting and State of the Coast Reporting) are required to establish the degree of long-term natural variability, as well as the potential trajectory of change associated with human interference.

Assessment and evaluation of specific activities/developments

Assessment and evaluation of specific activities/developments, on the other hand, entail compliance testing against critical limits set for processes and actions associated with the activity/development, as well as against measurable ecological and socio-economic objectives set for a particular estuary.

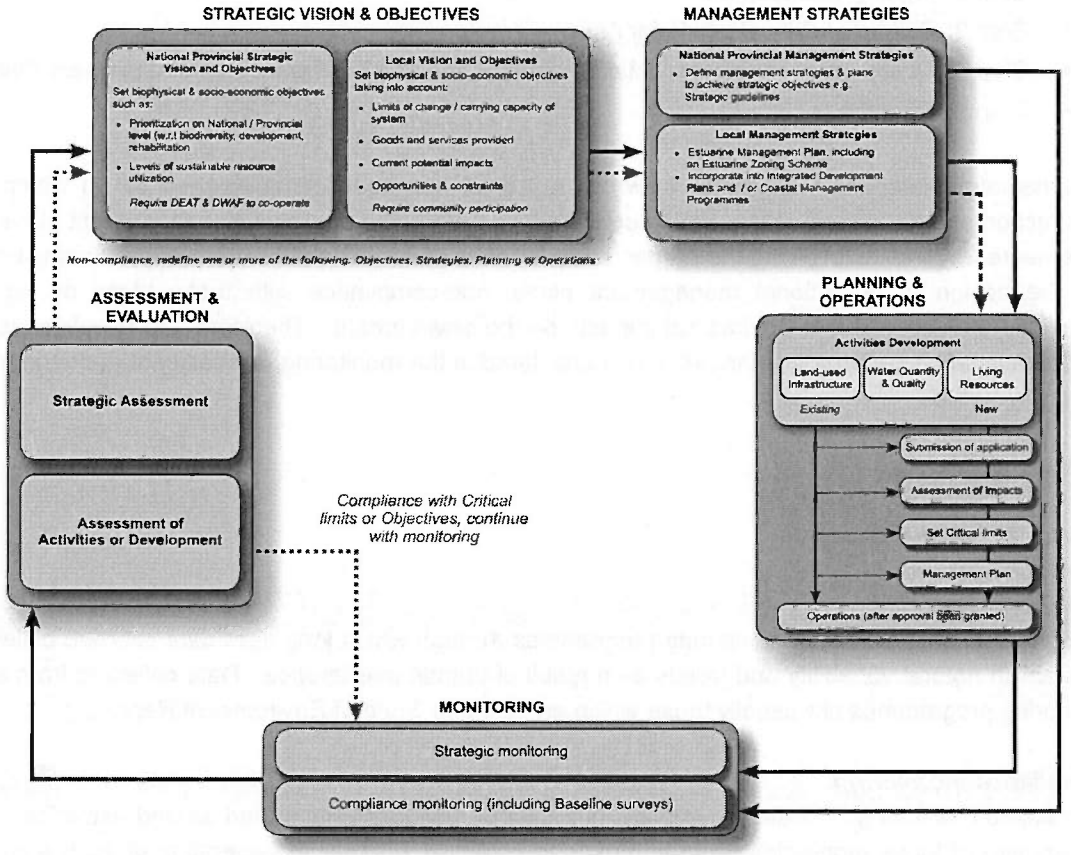


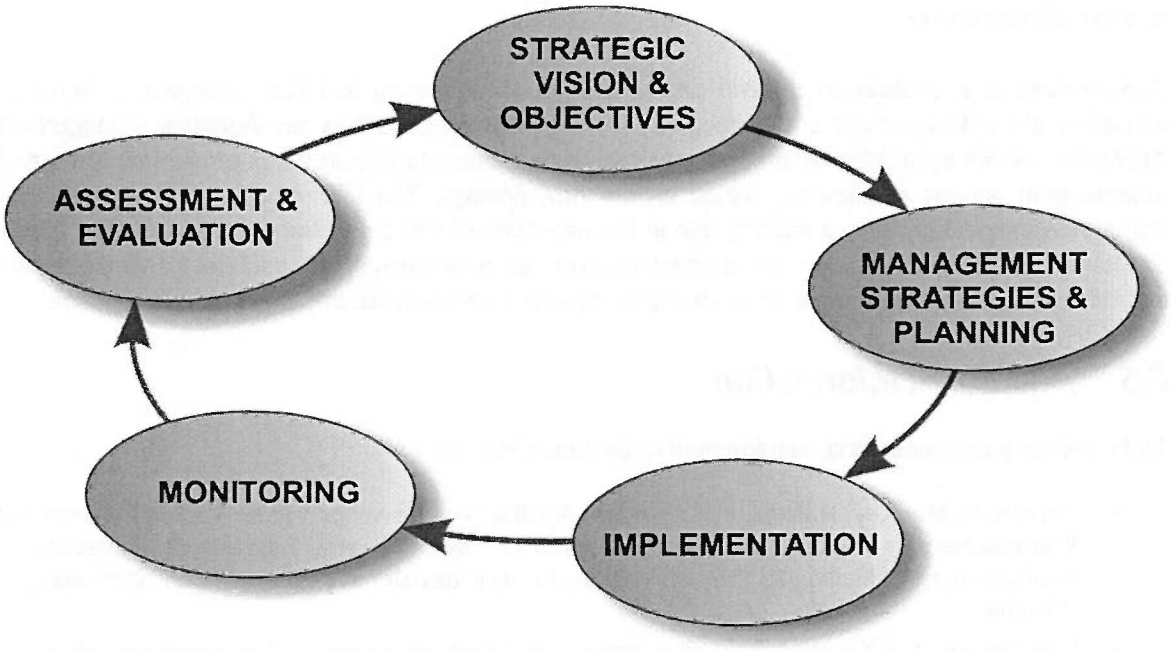
Figure 12. Proposed National Management Protocol for Estuaries

6.4 Generic management approach

As can been seen from the preceding discussions, estuarine management comprises a cyclic process consisting of the following generic elements or steps, namely:

- Setting of a vision and objectives;
- Devising **management strategies** to achieve the objectives;
- Incorporating the objectives and strategies into **planning and implementation;**
- **Monitoring** the effectiveness of strategies, plans and operations;
- **Assessing and evaluating** the monitoring results in terms of objectives, strategies and operations; and
- Re-visiting the vision and objectives.

The cyclic process involved is illustrated as follows:



Vision and objectives; Estuaries are connected within a region and even globally (e.g. fish and bird migration), therefore, certain objectives need to be set by higher tiers of [government – rather: authority] (e.g. international, national or regional). Vision and objectives for a particular estuary (set by local decision-making platforms) must be aligned with these higher level objectives. Local authorities and communities can take the initiative and force higher tiers of government to act by using a "bottom-up" approach. Although lead responsibility should lie with an organ of state (with executive powers), no interested party is precluded from the initiating process - 'get the ball rolling'.

Management strategies and planning: These are national, regional and provincial strategies and plans that are primarily aimed at providing general protocols and procedures to guide local initiatives. At local level, detailed strategies and plans identify the site-specific management actions that will ensure compliance with the vision and objectives set for a specific system. Local management

strategies and plans need to be consolidated into an Estuarine Management Plan and subsequently into Integrated Development Plans (IDP), Catchment Management Plans (CMP) and Municipal Coastal Management Programmes (CMP).

Implementation refers to actions undertaken as part of operational management of activities and developments in and around estuaries. Ideally, local management strategies and plans should provide clear guidance to ensure that actions undertaken during the implementation phases are standardized, effective and environmentally sustainable.

Monitoring: The main purpose of monitoring is to enable continuous evaluation of the effectiveness of management strategies and plans, compliance with required implementation actions and long-term trends and status in ecosystem health and services. The design of a monitoring programme must take into account the above-mentioned desired outcomes and not just monitor for the sake of monitoring. To assist in management, monitoring procedures must be scientifically sound to be legally defensible in cases of non-compliance. Lastly, where monitoring responsibilities lie with different authorities/institutions/industries, efforts should be made to consolidate them for optimal use of human and financial resources.

Assessment and evaluation depend on the results of monitoring to inform progress in terms of achieving defined objectives and strategies. This process also requires an 'Adaptive Management Approach', i.e. as more information becomes available, managers should adapt strategies, plans and management actions accordingly, based on the new findings. The joint decision-making platforms (forums or committees) play a leading role in the assessment and evaluation phase. Although (legal) executive powers usually reside with authorities, joint decision-making platforms can be very effective in fulfilling the role of 'watchdogs' or 'custodians', as part of the assessment and evaluation phase.

6.5 Additional Information

Additional on governance and management of estuaries include:

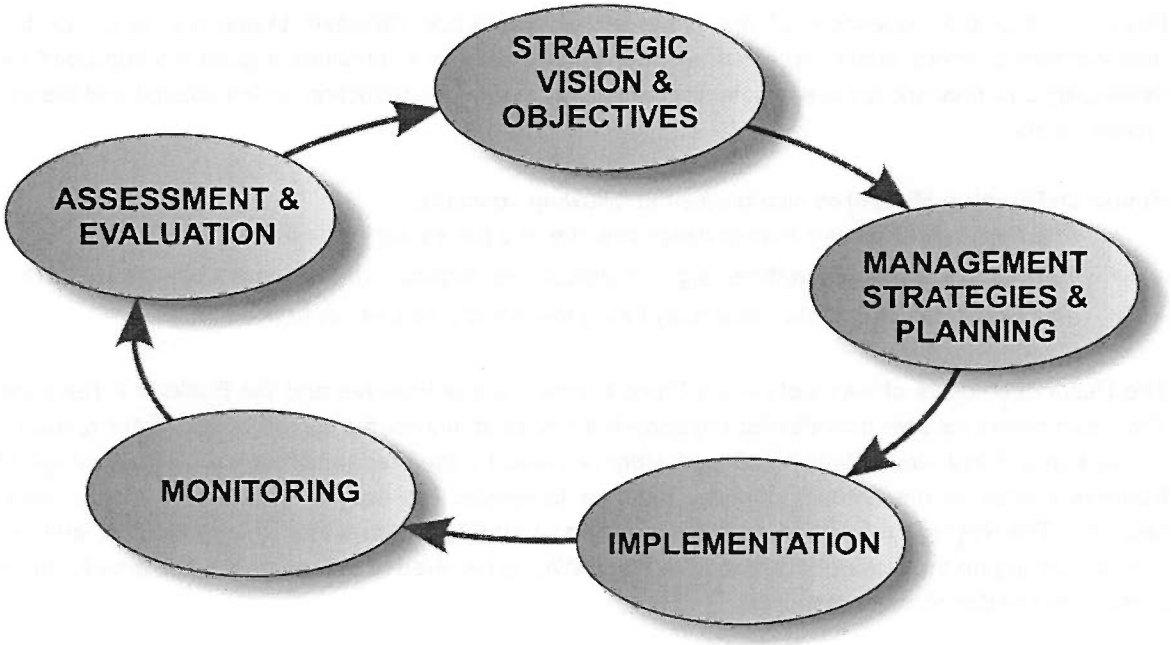
- Ashton, P, MacKay, H, Neal, M & Weaver, A 2002. The Development of Strategic Investment Frameworks for the Environmental Governance Systems and Biodiversity Protection & Environmental Functioning Thrusts. Draft for Discussion. Water Research Commission, Pretoria
- Van Niekerk, L & Taljaard, S 2003. A framework for effective cooperative governance of South African estuaries. CSIR Report ENV-S-C 2003-077. Stellenbosch
- McGwynne, L and McKenzie, M, 2006. Objective 1: Profiling estuaries in IDP planning. Policies and procedures for incorporating information and knowledge on estuaries into the integrated development planning and related processes are established through collaboration between researchers and authorities at local, district and provincial levels. Draft Water Research Commission.

7. SUPPORTING MANAGEMENT TOOLS

As can been seen from the preceding discussions estuarine management is a cyclic process consisting of the following generic elements or steps, namely:

- Setting of a vision and objectives;
- Devising **management strategies** to achieve the objectives;
- Incorporating the objectives and strategies into **planning and implementation;**
- **Monitoring** the effectiveness of strategies, plans and operations;
- **Assessing and evaluating** of monitoring results in terms of objectives, strategies and operations; and
- Re-visiting the vision and objectives.

The cyclic process involved is illustrated as follows:



Management tools refer to any available protocols, guidelines, methods and procedures that will assist in effective implementation of the estuarine management process

Management tools were sourced from:

- National and regional government documentation;
- Procedures and methods currently applied to South African estuaries; and
- Relevant tools currently applied internationally (where readily available).

Various tools available to estuarine managers in the execution of the generic steps are discussed below, organized in terms of the five generic management components identified above.

7.1 Vision and Objectives

7.1.1 Resource Directed Measures Methods

The National Water Act (Act 36 of 1998) calls for integrated management of water resources on an ecosystem basis. The Act prescribes a two-tier approach to the development of water resource management strategies, the **National Water Resources Strategy** (NWRS) and the **Catchment Management Strategy** (CMS). The NWRS sets out the macro-framework within which South African water resources must be managed. The preparation of a CMS, on the other hand, is the responsibility of a catchment management agency within its particular area of jurisdiction.

The National Water Act also provides for the integration of water resource management and co-operative governance via the NWRS. The latter sets a framework for water resource management, which includes the two-prong approach of **Resource Directed Measures** (e.g. for the management of rivers, wetlands, estuaries and groundwater) and **Source Directed Measures** (e.g. recycling, reduction in water use).

Following is a brief overview of the approach of **Resource Directed Measures** used for the management of rivers, wetlands, estuaries and groundwater as it provides a good starting point for developing a framework to assess potential impacts of freshwater reduction on the coastal and marine environments.

Resource Directed Measures incorporate the following concepts:

- The **Reserve** (the basic human needs reserve and the ecological reserve);
- **Resource Quality Objectives**, e.g. Ecological Specifications (management objectives); and
- The **Classification** of the water body being managed (condition or health status).

The Reserve consists of two parts – the Basic Human Needs Reserve and the Ecological Reserve. The basic needs reserve provides for the essential needs of individuals served by the water resource in question and includes potable water and water required for the preparation of food. The **Ecological Reserve** relates to the amount of water required to protect the aquatic ecosystems of the water resource. The Reserve refers both to the **quantity** and **quality of the water** in the resource, and will vary depending on the class of the resource. The DWAF is required to determine the Reserve for all or part of any significant water resource.

The Reserve, Resource Quality Objectives and the Ecological Classification can all be used as management tools as they apply to more than just the Water Quantity and Quality aspects of estuarine management. These tools can be used to set the overarching management objectives between different management authorities.

7.1.2 Sustainable use protocol

Increased levels of exploitation, illegal fishing activities and declining levels of estuary resource availability have highlighted the need for management to ensure long-term sustainable use of estuarine living resources (Wood, Cowley and Paterson 2004).

As part of the Eastern Cape Estuaries Management Programme, a procedure was developed that identifies environmental, socio-economic and institutional issues that affect the sustainable use of living resources in estuaries. In order to address these issues, management guidelines were proposed for environmental (resource and ecosystem level), socio-economic and institutional issues, to be used by local managers on a variety of estuary categories based on mouth state and user dynamics.

A total of 10 resource, 8 ecosystem, 13 socio-economic and 18 institutional related guidelines were formulated. A Rapid Assessment Matrix (RAM) was proposed to identify priority estuaries within municipal regions, based on a subjective assessment of certain key indicators. An Ecosystem Based Management (EBM) approach is suggested for the detailed assessment, through rating key environmental, social and institutional indicators, of the effective implementation of the proposed guidelines and the degree to which sustainable use has been achieved on a specific estuary.

7.1.3 Biodiversity protocol

Turpie (2004) emphasises that the estuarine biodiversity base that provides the numerous goods and services society depends on is under threat due to numerous factors, including increasing national demands for water, catchment degradation, and development, population growth and poverty in the coastal zone. Current protected area systems offer little protection for estuarine biodiversity, with almost no estuaries being protected from consumptive use. Despite this, the current health status of estuaries is fair overall, and suggests that many estuaries are quite robust. However, there are areas where considerable degradation has taken place, and it is concluded that the threats to estuaries are increasing exponentially and may soon have a serious impact, given the current status of protection. Thus, there is a need to develop a sound strategy for the protection of estuarine biodiversity.

The proposed goals for the protection of estuarine biodiversity are as follows (Turpie, 2004):

1. Maintain/restore the ecological **integrity** of estuaries, by ensuring that the ecological interactions among estuaries and those between estuaries, their catchments and other ecosystems are maintained.
2. Maintain/restore the **health** of estuaries in/to a good to excellent condition, ensuring that a representative set of estuaries is maintained in as close a state as possible to their pristine state. This includes (for all estuaries):

   maintenance of the natural magnitude, variability and frequency of **natural physical processes** within estuaries;

   maintenance of the natural characteristics and variability of estuarine **populations and communities** in terms of size, structure and functioning, through sustainable utilization; and

   maintenance of the natural **taxonomic diversity** of all estuaries, without loss of indigenous taxa from any estuary other than by natural processes, and without the introduction of alien species.

Considering these goals in the light of current and anticipated future threats to biodiversity, and drawing from international experience, five core components of a strategy were identified as follows.

Turpie (2004) proposed that three types of estuary management should be considered:

a. Estuarine Protected Areas (EPAs), in which part or all of the estuary is a sanctuary, providing protection from consumptive use. EPAs should be selected with both biodiversity representation and socio-economic considerations in mind.

b. Estuarine Conservation Areas (ECAs) - co-managed estuaries in which general regulation is augmented by estuary-specific regulation. These are particularly suited to estuaries used primarily for recreation.
c. Estuarine Management Areas (EMA), to which general regulation applies

In order to alleviate the threats to estuarine health, especially where regulatory mechanisms are weak, the following conditions and incentives that support conservation were proposed (Turpie 2004):

a. *Incentives for improving quality and quantity of freshwater inputs.* These include catchment level water demand management (pricing incentives), and supply management through incentives for improving quality and quantity of catchment run-off, e.g. tradable pollution permits.
b. *Sensitive planning.* Threats to estuaries need to be taken into consideration in regional-level development plans, as well as municipal plans.
c. *Property rights*, community participation and co-management. Open access to resources should be reduced. Commercial exploitation rights (e.g. bait collecting for sale) should be allocated to very few users per estuary. Community participation should be maximised, community management is not advised, and co-management must be applied with extreme care and only if certain conditions are met. It is argued that the conditions for successful co-management are generally unfavourable in the Eastern Cape.
d. *Poverty alleviation and alternative livelihoods.* No conservation strategy can succeed in the face of poverty, and poverty alleviation programmes are thus an essential part of the conservation of biodiversity. However, estuarine resources themselves cannot be seen as a route to poverty alleviation in highly populated areas. In this situation, creation of alternative livelihoods would be a better strategy.
e. *Communication, education and awareness raising.* General awareness and understanding is critical to the success of a conservation strategy.
f. *Institutional support.* No conservation strategy will succeed without strong institutional support.

7.1.4 Generic Co-management System

This primary goal of this study was to develop a generic co-management system for Eastern Cape Estuaries, with the potential for application to other South African estuaries (Sihlophe 2004). The structure is based on the premise that co-management occurs at two principal levels: at policy level through agreements that regulate the establishment and operation of an estuary management structure; and at resource management level through constituency agreements that regulate the performance of specific management functions. Processes to facilitate effective functioning of co-management structures are outlined.

In the course of this study, it was concluded that Integrated Development Planning (IDP) is key to the process as co-management occurs within the context of an IDP and the system comprises the structures, processes, principles and agreements. The proposed system can be used to align different activities with an integrated process that would help to build shared understanding, would facilitate devolution of responsibility with accountability, and would promote learning and adaptive management that are prerequisites for achieving sustainable use (Sihlophe 2004).

7.1.5 *Rehabilitation protocol*

Rehabilitation is about promoting the recovery of ecosystem functions and values in a degraded system in order to regain some of the value the system had to society. A key rehabilitation principle applicable to estuaries is to try and preserve what is still in good condition before trying to fix what is bad, i.e. prevention is better than cure. As such, the conservation of existing habitats is critical to the successful rehabilitation of estuarine habitats in general. Contrary to the common assumption that the estuary in the worst condition should be considered for priority attention when it comes to rehabilitation, it is it is far more efficient to preserve estuaries and sections of estuaries that are in good condition than to try and fix what is already degraded (Marneweck, Batchelor and Uys 2004).

A conceptual framework was developed for rehabilitation at an individual estuary level that encompasses a number of steps and actions that have feedback loops. While most of the steps in this process could be undertaken by an estuary manager, there are, however, elements that may require more specialised scientific and social skills. It is important to point out that this is the first step in the development of an estuarine rehabilitation process and, as such, provision should be made for the incremental development and improvement of the framework as experience is gained and management is adapted.

The steps and actions in the framework include (implicit in the approach is that changes to the estuary have or are likely to occur and that the changes have or could in the future impact on the value (ecological and socio-economic) of, and benefits derived from, the estuary) (Marneweck, Batchelor and Uys 2004):

- Establishing a vision for the rehabilitation of the estuary;
- Establishing the extent and nature of the changes that have occurred;
- Identifying the main assets of the estuary and the threats to these ;
- Identifying, screening and selecting candidate sites for rehabilitation, based on the perceived threats to the assets;
- Determining whether or not the sites are compatible with the vision;
- Setting priorities as to what should be done first;
- Identifying specific and measurable objectives for the rehabilitation intervention;
- Developing and determining the feasibility of strategies aimed at meeting the objectives;
- Designing projects to achieve the objectives;
- Establishing evaluation criteria and a monitoring programme;
- Implementing the project to specifications;
- Implementing the monitoring programme; and
- Assessing the outcome of the project and, where necessary, taking remedial actions if the performance standards were not satisfied.

7.1.6 *Biodiversity-based Enterprise Development*

Sihlophe (2006) in Turpie *et al.* (2006) states that biodiversity conservation promotes and applies a range of economic incentives in different parts of the world. Different combinations of incentives appear to be applicable and relevant in different contexts. For example, some incentives are suitable

for application in the major part of the world, while others tend to be more suitable for application in the developed world.

There are five main categories of economic incentives for biodiversity conservation. While in theory it is possible to apply any type of incentive measure to any group, activity or sector, in reality, different categories have particular relevance for different groups and activities. For example, bonds and deposits are particularly applicable to infrastructural, residential and industrial developments; and fiscal instruments function well in formal markets – hence such categories of incentive measures are most relevant in developed contexts. In rural areas, where communities live in areas of high biodiversity, with limited economic opportunities and infrastructural development and where there is high dependence on the harvesting of biological resources for income and subsistence – conditions found mostly in the major part of the world - livelihood support is the most commonly applied incentive measure for biodiversity conservation. Property rights, in particular, apply both to conditions in developed contexts and to those prevailing in the major part of the world as they provide an effective way of ensuring community participation in biodiversity conservation. Evidence pointing to the application of economic incentives for biodiversity conservation seems to indicate that a combination of economic incentives is being promoted and applied in the major part of the world. Prominent among these, particularly in Africa, is livelihood support.

Livelihood support aims at strengthening livelihoods, diversifying them and making them more secure, thereby decreasing reliance on biodiversity. It also aims to provide options that reduce vulnerability to perverse incentives that encourage people to engage in activities that degrade biodiversity. Livelihood support activities can be divided into two broad categories, that is, direct livelihood and indirect livelihood incentives. Direct livelihood incentives focus on increasing the efficiency and scope of biodiversity based activities while indirect livelihood incentives attempt to strengthen and diversify livelihoods in the hope that, as they become more secure, people will rely less on biodiversity. Establishment of local enterprises is one form of livelihood support incentives commonly applied to conserve biodiversity either as a direct or indirect livelihood incentive for conservation.

Various types of coastal and terrestrial resource biodiversity-based enterprise development exist. Sihlophe (2006) categorises them into linked and non-linked enterprises. Linked enterprises are those which directly utilise the goods and services supplied by the resource with a view that, as users realise benefits from goods and services supplied by the resource, they will manage use of the resource more effectively. Non-linked enterprises are those that are not directly dependent on the goods and services supplied by the resource, but the aim of which is to provide economic benefits to local owners of the resource, thereby reducing pressure on the resource.

Common types of linked service enterprises that have been established in estuaries and other coastal areas in various parts of the world include: ecotourism enterprises involving canoe trips to small islands in Thailand, horse and hiking trails in near pristine coastal environs that comprise spectacular estuaries, canoe trail enterprises, that is, canoe tours around the mangroves and tours of the estuary, tourism trail camps and camp-sites, and, in some cases, whale watching activity (Sihlophe 2006).

Enterprises based on goods supplied by the estuary and coastal resources include: non-consumptive fly-fishing operations, beekeeping enterprises, consumptive fishing where fishing quota are issued to subsistence and small-scale fishers who in turn may sell their fishing rights among themselves, and enterprises based on non-timber forest products and other medicinal plants found in adjoining forest. Although craft enterprises may not be directly associated with estuary resources, tourism activities that

take place in and around estuaries provide a market for craft produced by local community members. Other enterprise activities which also take place at estuaries include bird watching. It should be realised that low-impact ecotourism enterprises such as those found in estuaries have to diversify in order to establish income streams that ameliorate the variability of income flow. Therefore, it is common that a combination of ecotourism activities would take place at one estuary as it is intended at Mtentu estuary (Sihlophe 2006).

There appears to be growing concern among both practitioners and researchers about the sustainability of biodiversity-based enterprise development and therefore its potential to promote biodiversity conservation. While the intention is to support the establishment of viable and sustainable biodiversity-based enterprise development, which would continually yield benefits of conservation to the rural poor, evidence of this phenomenon appears to be limited.

7.1.7 Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) is a tool aimed at addressing the project specific shortfalls of the Environmental Impact Assessment tool. Essential SEA is a process aimed at understanding and addressing the potential impacts of a plan, policy or suite of proposed activities. There are different methodologies that can be employed in implementing an SEA. However, an SEA should have the following characteristics as identified by the CSIR (1996):

1. "Pro-active and informs development proposals
2. Assesses the effect of the environment on development needs and opportunities
3. Addresses areas, regions or sectors of development
4. Is a continuing process aimed at providing information at the right time
5. Assesses cumulative impacts and identifies implications and issues for sustainable development
6. Focuses on maintaining a chosen level of environmental quality
7. Wide perspective and a low level of detail to provide a vision and overall framework
8. Creates a framework against which impacts and benefits can be measured".

Estuaries are very susceptible to cumulative environmental impacts from a variety of activities (many of which take place at some distance from the estuary itself). SEA is a very useful tool for considering the impact of plans, policies and future developments on an estuary and can be used to flag unsustainable development and activities prior to application.

7.1.8 Multi-Criteria Analysis

Multi-Criteria Analysis refers to any analysis approach that has been designed to determine a preferred option where the preferred options need to be evaluated using more than one criterion. MCA approaches are essentially designed to address complex problems and there is not one defined approach to MCA (McKenzie 2006).

To decide on the optimum combination of goods and services, within the limits or carrying capacity of the natural environment, multi-criteria techniques can be used to discriminate between various options (UNEP/MAP/PAP, 1999). It is strongly recommended that one of the criteria included in such analyses be the economic value of the resource and the goods and services provided.

MCA is a useful tool for comparing competing options in estuary management where these options are trying to contribute to more than one estuary management objective (McKenzie 2005).

7.1.9 Limits of Acceptable Change

Limits of Acceptable Change (LAC) is a tool for defining how much change or degradation of a natural resource is acceptable before action should be taken. There are no set methodologies for establishing LACs. Setting LACs is also a partially subjective process that will reflect the value that is placed on the natural resource in question by the people setting the LACs. Importantly, LAC is a resource centred approach to dealing with cumulative impacts. Rather than considering if an individual activity is acceptable or not, LACs define when the resource will no longer be able sustain further activities (McKenzie 2005).

LAC is a useful mechanism for estuary managers that are concerned about cumulative impacts on an estuary. As LACs are defined for the natural resource itself, they constitute a useful tool for signaling a cut off point for various activities, without debating the merits of individual applications. In addition, LACs draw a clear line at which further activities can no longer be approved, which can be understood in advance by those interested in pursuing these activities (McKenzie 2005).

Limits of Acceptable Change involve a process whereby stakeholders identify the impacts they can accept and then develop "on the ground" standards for maximum acceptable impact. This implies a set of conditions that may not be exceeded and needs to be tested within the context of South African estuaries at both the public and statutory levels (Boyd *et al.* 2000).

7.1.10 Thresholds of Potential Concern

Thresholds of Potential Concern (TPCs) are a more flexible variation of a LAC. TPCs are tools for defining how much change can take place in a natural resource before management needs to be concerned about this change and consider taking action. As a result, TPCs are more flexible than LACs as they act as signals to management that the state of the natural resource should be investigated further, but they do not necessarily require action to be taken (McKenzie 2005).

Like LACs, TPCs are a useful mechanism for estuary managers that are concerned about cumulative impacts on an estuary and they are useful for signaling possible problems with regards to the state of the estuary. As TPCs are more flexible, they are useful when there is uncertainty or limited understanding of the functioning of the natural resource (McKenzie 2005).

7.1.11 Strengths-Weaknesses-Opportunities-Threats (SWOT)

Strengths-Weaknesses-Opportunities-Threats (SWOT) is an analysis tool that can be used in a variety of contexts, such as strategic planning and business assessment (McKenzie 2005). A SWOT analysis involves identifying the following elements:

- Strengths: The current strengths that can be identified
- Weaknesses: The current weaknesses that can be identified
- Opportunities: The future, existing or external opportunities that can be identified
- Threats: The future, existing or external threats that can be identified

SWOT is a useful tool for analysing a plan or understanding the current management approach for an estuary. To use SWOT successfully it is critical to clearly define what the SWOT analysis is being applied to.

7.1.12 Driver-Pressure-State-Impact-Response Approach

Quantification of the interactions between the various users and functions of the estuary can be achieved by a sequential cause-and-effect analysis using the Driver-Pressure-State-Impact-Response approach (UNEP/MAP/PAP, 1999). The Driver-Pressure-State-Impact-Response (DPSIR) approach is a tool for understanding why human impacts take place and how these impacts relate to the environment. It is commonly used in State of Environment Reporting. The elements of DPSIR are (McKenzie 2005):

- Driving forces of environmental change and pressure (e.g. manufacturing industry)
- Pressures on the environment (e.g. discharges of waste water into rivers)
- State of the environment (e.g. the water quality of rivers and estuaries)
- Impacts on people, the economy and ecosystems (e.g. water is unsuitable for human consumption, certain fish species unable to tolerate water quality)
- Response of people and government to the impacts (e.g. cleaner production laws, catchment management strategies)

DPSIR is a useful tool for helping estuary managers understand root causes of environment problems and for directing them towards possible responses to these environmental problems.

7.1.13 Stakeholder involvement

Lack of co-ordinated community participation is a concern. In some coastal areas, local communities are not as vigilant as they could be. This may be due to stakeholder fatigue and the perception that development will go ahead regardless of their concems. Furthermore, the lobbying of strong stakeholder groups, with vested interests, can often override the concems of weaker or less informed groups in community forums. Careful consideration and planning is therefore essential before commencing with stakeholder engagement or public participation.

The degree to which stakeholders influence decision-making differs widely. Therefore, different "levels" of public participation or engagement with stakeholders exists. The aim of stakeholder engagement or public participation should be:

- Raising awareness and increasing understanding between various stakeholders (two-way communication)
- Assisting in the identification of key issues of concem and reasonable development alternatives
- Identifying sources of information and the knowledge of local and other stakeholders
- Informing and improving decision-making
- Promoting democracy and ensuring greater credibility and legitimacy of the decision-making process
- Generating a sense of joint responsibility for the environment and establishing trust and cooperation
- Identifying creative solutions to problems

The International Association for Public Participation (IAP2) has described a spectrum of participation which represents increasing levels of the public's impact on decision-making (DEAT 2002). Elements of this spectrum range from protest and informing (one-way flow of information to the public); to consulting, involving, collaborating and empowering (information exchange). For more on this spectrum consult the following website: http://www.iap2.org/practitionertools/spectrum

7.2 Management strategies and Planning

To ensure the effective implementation of the local ecological and socio-economic objectives, it is crucial that these be translated into sound management strategies. It is envisaged that the basic tools for developing management strategies will consist of legislative requirements. Listed below are proposed and present management measures:

7.2.1 Estuarine Management Plans (EMP)

It is recommended that Estuarine Management Plans be developed specific to each individual estuary, which integrate both ecological and socio-economic aspects (Van Niekerk and Taljaard 2003, 2004).

In order to deal decisively and in a pro-active manner with activities/developments in and around estuaries, Estuarine Management Plans should be formally gazetted. Before an Estuarine Management Plan can be gazetted, it should be formally reviewed and approved by appropriate national and/or provincial authorities, to ensure alignment with national and provincial/regional objectives and strategies. Such a review is also important to resolve potential conflict between and within sectors of society (e.g. between government institutions). Furthermore, estuarine specialists (to provide the context for informed decision making regarding ecological objectives) and social and resource economic specialists (to provide the context for informed decision making concerning socio-economic objectives) should be included in the review process. This will ensure that the local strategies, as detailed by the Estuarine Management Plan, can achieve the overall objectives.

An Estuarine Management Plan should include (Van Niekerk and Taljaard 2003):

- Description of the area with spatial references (boundaries of the system may be taken further than the estuary itself for management purposes);
- Local vision and management objectives;
- Details on how national/regional objectives are to be achieved;
- Extent of existing and proposed infrastructure;
- Goods and services provided by the estuary;
- Type and intensity of use in areas zoned for specific purposes;
- Demarcation of dynamic or hazardous areas not to be developed;
- *Reserve* for water quantity and quality and *Resource Quality Objectives* if determined for an area (required under the National Water Act);
- Detailed compliance plan and the monitoring thereof;
- Detailed integrated monitoring plan (both compliance and baseline), including the allocation of responsibilities and an indication of monitoring frequency;
- Awareness and education programmes to be introduced;
- Details of the resource (both human and financial) implications of plan; and
- Record of process followed, including public participation process.

To ensure effective governance, Estuarine Management Plans should be incorporated in broader coastal management plans, such as the Municipal Coastal Management Programmes (as proposed under the Coastal Zone Bill) or as part of Integrated Development Plans (IDP) as required by the Municipal Systems Act.

7.2.2 Estuarine zoning scheme

Part of the Estuarine Management Plan should be an estuarine zoning scheme. Zones in estuaries may, for example, include one or more of the following (Van Niekerk and Taljaard 2003):

- Protected zones, as well as degree or class of protection needed (e.g. Estuarine Protected Areas, Estuarine Conservation Areas , Estuarine Management Areas (Turpie, 2004);
- Limited development zones, e.g. camping or caravan sites;
- High density development zones, e.g. residential and resort areas;
- Recreational zones, e.g. bathing areas;
- Boating zones, e.g. sailing or powerboat areas; and
- Mariculture areas.

At present, zonation in and around estuaries occurs on a fragmented or *ad hoc* basis, depending on provincial ordinances and local by-laws. However, it is likely that in future zoning plans for estuaries will become a legal requirement and form part of the more comprehensive Estuarine Management Plans.

7.2.3 Integrated Development Plan (IDP)

The legislative context for municipal planning is provided by the Local Govemment: Municipals Systems Act 32 of 2000. Chapter 5 of this act deals with Integrated Development Planning, which requires that each local authority adopt a single, inclusive plan for the development of that municipality. An Integrated Development Plan is intended to encompass and harmonise planning over a range of sectors, such as water, transport, land use and environmental management. The Development Facilitation Act 67 of 1995 requires the setting of Land Development Objectives and the principles of this act have also been incorporated into Chapter 5 (s 23 (I)) of the Municipal Systems Act. The Local Government Transition Second Amendment Act 97 of 1996 also requires that all municipalities, both Transitional Local Councils (TLCs) and District Councils, draw up Integrated Development Plans (IDPs) for the integrated development and management of their areas of jurisdiction. The requirements of this act have largely been incorporated in the Municipal Systems Act, which is currently driving the establishment and implementation of IDPs. The lead agent for the above-mentioned acts is the Department of Provincial and Local Government.

7.2.4 Spatial Development Framework (SDF) and Land Use Management System (LUMs)

Strategic land-use planning is an integral part of the development planning process and all municipalities are required to draw up Spatial Development Frameworks (SDFs) and Land Use Management Systems (LUMs) as part of the IDPs.

The SDFs will be plans that show, amongst other things, desired patterns of land use, special development areas and conservation areas. It is also required that these plans be aligned with national and provincial strategies on socio-economic development, sustainable development and bioregional planning.

The land use management system comprises schemes recording the land use and development rights and restrictions applicable to each erf in the municipality. The plan should be flexible enough to accommodate changing priorities, but the scheme has to conform to the plan. The plan (SDF) is a guide to development, and the scheme (LUMS) is binding. The land use management system, which sets out development rights applicable to each parcel of land, can range from simple to very complex, depending on the urban-rural nature of the municipality, and its complexity.

7.2.5 Catchment Management Strategies

The National Water Act calls for the establishment of Catchment Management Agencies to manage water resources on a catchment basis. Although very few Catchment Management Agencies (CMA) have been established as yet (2004), the intention is that regional offices of DWAF will establish them and then devolve authority to the agency as it builds the capacity to manage. Each CMA will be required to develop Catchment Management Strategies for the water resource under its jurisdiction, which will include the estuaries of that area.

7.3 Implementation

7.3.1 Environmental Impact Assessment EIA

"EIA aims to predict both positive and negative environmental impacts of a proposed project and find ways to reduce adverse impacts. This tool is designed to be project-specific and site-specific, and not to be focused on strategic issues." (DEAT, 2004a: 11) Depending on the scale of the activity or development and its related impacts (nature, extent, duration, intensity and probability), the responsible authorities may require a detailed impact assessment. It is recommended that, at all times, such assessment be done by acknowledged experts in estuarine processes (physical and biological) so that not only are direct impacts identified and evaluated, but also possible indirect impacts are highlighted and assessed.

7.3.2 Licence Authorisation Process for land-derived wastewater to the marine environment

The disposal of land-derived wastewater to the marine environment is currently governed under the National Water Act 36 of 1998. In the context of this operational policy, water use authorisation, under section 21 of the National Water Act, will be required for:

- New applications to dispose of land-derived wastewater to the marine environment
- Existing discharges of land-derived wastewater to the marine environment that are not classified as existing lawful water use in terms of Section 32 of the NWA
- Upgrading or extension of existing waste water treatment works or industries discharging to the marine environment that were not approved in terms of the original authorisation.

These activities would typically also be subject to the EIA process.

To assist applicants in the authorisation process, the DWAF has compiled a manual entitled *Water Use Authorisation Process for Individual Applications* (DWAF, 2000), which describes the administrative procedures and parties to be involved at different stages of the process. Also, to assist applicants with the preparation of the water quality management reports to support the licence application, the DWAF has compiled an Aide Mémoire. These documents provide a detailed listing of the types of data and information that need to be included in the reports for pre-assessment and detailed investigations. Note that this operational policy provides guidance on aspects related to the disposal of land-derived wastewater to the marine environment that are primarily addressed in *Final Waste Disposal Evaluation* of the water quality management report. Another important aspect that needs to be addressed in the water management report concerns the details on *Management Systems and Pollution Prevention Methods*, which judge the applicant's ability to effectively manage the proposed wastewater disposal facility.

7.3.3 Carrying Capacity Analysis (CCA)

Human activities in and around estuaries, particularly recreational activities, are a major concern as they result in increased anthropogenic pressures on the natural environment. Recreational facilities (launching sites, ski zones) are sought after at estuaries to accommodate the demand by local and international visitors. Although recreation plays a major role in tourism, and subsequently the economic benefit of any particular estuary, little research has been directed towards investigating and determining the *carrying capacity* of many South African estuaries.

The carrying capacity of an estuary can be loosely defined as "*the optimum utilisation of an estuary, taking into account seasonal and random changes, without degradation of the estuarine environment and without compromising the capability of future utilisation of the estuary*" (McKenzie 2005).

There are various kinds of carrying capacities that can be studied, such as physical, biological economic and social carrying capacities, which all have to be considered and addressed to ensure that every resource (such as an estuary) is optimally balanced. For example, the physical carrying capacity addresses the use of units that can be accommodated within a physical space (Sowman 1984).

7.3.4 Critical Limits for Activity/Development

Approval for a proposed development or activity may be granted under certain conditions. These conditions usually include critical limits which the activity may not exceed. Critical limits are typically laid down in the individual permit or licence conditions of an approved development or activity and should be measurable entities, for example:

Land use and Infrastructure	Water Quantity and Quality	Marine Living Resources
Extent of building line or garden into a flood plain	*Volume and flow rate of an effluent*	*Individual catch effort (bag limits)*
Quantification of recreation carrying capacity (e.g. number and types of boats).	*Restriction of direct abstraction during low flow periods*	*Levels of Exploitation*
Number and type of jetties allowed	*Nutrient limits in an effluent*	*Boat traffic (e.g. speed and type)*

per development		

7.4 Monitoring

Underpinning successful estuarine management are data and information, which can only be obtained through the design and implementation of monitoring programmes.

Monitoring programmes for activities or developments are often developed independently of different departmental and legislative requirements, despite potential overlap in their focus area. Furthermore, these can also overlap with baseline monitoring programmes undertaken, for example in the State of the Environment reporting. Therefore, to ensure efficient use of resources, both human and financial, and prevent duplication, monitoring initiatives within a particular estuary should be coordinated, taking into account aspects such as monitoring sites, monitoring frequency and monitoring parameters. Therefore, it is recommended that for a particular estuary:

- Monitoring initiatives be coordinated and that specific responsibilities be allocated to specific authorities or institutions.
- The appointed authority or institution have sufficient resources, both human and financial, to execute such monitoring or provide a strategy to obtain such resources.
- That scientifically defensible data and information on the functioning of estuarine ecosystems be collected so that the links between major threats and associated impacts can be established.

7.4.1 Resource Monitoring Procedures for Estuaries (Resource Directed Measures)

The CSIR was commissioned by the Water Research Commission to develop Resource Monitoring procedures for estuaries for application in the Ecological Reserve determination and implementation process. The aim of the project was to define guidelines and procedures for designing resource monitoring programmes for estuaries as part of the Ecological Reserve Determination process for estuaries, including baseline studies and long-term monitoring programmes (Taljaard *et al.* 2003).

Because each estuary is somewhat unique in its characteristics, the project provides generic sampling procedures (including recommended spatial and temporal scales) for each abiotic and biotic component, to be applied when a component is selected for inclusion in either baseline studies or the long-term monitoring programme of a particular estuary.

Abiotic components that need to be addressed in the Ecological Reserve Determination for estuaries are:

- Hydrology;
- Sediment dynamics;
- Hydrodynamics; and
- Water Quality.

Biotic components that need to be addressed are:

- Microalgae;
- Macrophytes;
- Invertebrates (including zooplankton, benthic invertebrates and macrocrustaceans);

- Fish (ichthyofauna); and
- Birds (avifauna).

For each of the abiotic and biotic components the following is specified in the procedures:

- Sampling procedures;
- Recommended spatial scales, i.e. selection of sampling stations; and
- Recommended temporal scales, i.e. frequency of sampling.

7.4.2 Monitoring Protocol (Eastern Cape Estuaries Management Programme)

In the Eastern Cape Estuaries Management Programme, a monitoring protocol is proposed to track long-term change in key physical, chemical, biological and socio-economic factors that govern the health of South African estuaries (McGwynne and Adams 2004).

The protocol presents a rational and practical procedure to measure progress towards sustainability, a concept we have interpreted as being the outcome of maintained ecological, societal and institutional integrity. Based on the dominant issues that threaten each of these domains, the protocol uses an objectives hierarchy to outline a pathway for reaching a future desired state defined in terms of operational goals.

To monitor the achievement of these goals, a suite of indicators was developed through a series of workshops with scientists and managers and tested in co-operation with stakeholders associated with the Swartkops and Tyolomnqa estuaries in the Eastern Cape.

The indicators are presented in 10 categories: (1) hydrodynamic and sedimentary processes (2) water quality (3) biodiversity (4) human population growth (5) control of human activities (6) planning and development (7) law enforcement (8) co-operative governance and co-management (9) effective management (10) and satisfaction of basic human needs.

Managers working together with, or as part of, co-management forums are the target user group and, to accommodate limits in their resources, the indicators are presented in three levels of increasing skill requirements, time and cost. In addition, the set can be customised to meet management objectives that are bound to differ between estuaries. Each indicator is embedded in an interpretive framework where defined end-points signify thresholds of potential concern.

7.4.3 CWAC Method

The objective of Coordinated Waterbird Counts (CWAC) is to monitor South Africa's waterbird populations and the conditions of the wetlands which are important for waterbirds. This is being done by means of a programme of regular midsummer and midwinter censuses at a large number of South African wetlands and estuaries, at regular six-monthly intervals. CWAC currently monitors over 350 wetlands around the country.

This project was initiated by the then Ramsar Working Group of the Department of Environmental Affairs and Tourism in part-fulfilment of South Africa's commitment to the Ramsar Convention. CWAC also contributes its data to the African Waterbird Census, a programme coordinated by Wetlands International and based at the African headquarters of Wetlands International in Senegal.

Methods of counting are standardised for a particular site in terms of area covered and manner in which counters are deployed. This is not possible between sites, for at some sites censuses are done by observers on foot, while others are done by boat or motorcar. Counters are provided with information sheets, which advise how to count efficiently and avoid double-counting and misidentification. Counts are submitted on a standard form, which also requests details on weather and threats currently having an impact on the wetland and birds. This information is then directly entered into the computer. Feedback on each seasonal count is provided by means of a newsletter, which is distributed shortly before the next count, together with a computer printout of the previous count and a blank form.

7.4.4 National Linefish Survey Method

The first National Linefish Survey evaluating participation in, and management of, the South African linefishery was a three-year project completed in 1996. It provided invaluable information on catch, effort and the socio-economics of the fishers involved. It also highlighted the importance of the linefishery, which has an estimated value of R 2.2 billion per annum.

A five-day workshop was convened in 2002 at which linefish researchers, managers and fishers throughout South Africa gave input on the design of the next National Linefish Survey, so that survey methods, questionnaires and data analysis could be standardised. The workshop recommended that the National Linefish Survey be repeated every 5 years. It was also decided that the next survey should entail two years of sampling. The survey is due to start in 2007 (Mr S. Lamberth, MCM, pers. comm.).

At the third Southern African Marine Linefish Symposium held at Arniston, 28 April – 1 May 1999, the lack of estuarine linefish data was highlighted as a major gap in the knowledge base. The National Linefish Survey will therefore explicitly include the collection of data on catch, effort, participation and socio-economics of estuarine fisheries. Monthly aerial surveys, for the two-year period, will cover the entire coastline, including all estuaries, while a minimum of 50 estuaries will be surveyed by ground personnel to monitor exploitation of estuarine and estuarine dependent fish and invertebrate species. These personnel will also be responsible for interviewing recreational, commercial and subsistence fishers. The estuaries to be surveyed include the top 50 on the priority list but the final selection still needs to be decided on a regional basis.

7.5 Evaluation

7.5.1 State of the Environment Reporting

Strategic assessment and evaluation is required to establish long-term natural variability, as well as the potential trajectory of change associated with human interference. State of the Environment (SoE) Reporting is an example of a strategic type of assessment. The Coastal Zone Bill proposes that State of the Coast Reporting be done regularly on both provincial and national levels (Section 138).

SoE reporting consists of compiling information on environmental and sustainable development issues from all available sources, and analysing this to discover whether conditions are improving or

deteriorating. If the environment is deteriorating, action needs to be taken to protect society's health and well-being.

SoE reporting provides a mechanism through which resource management and environmental issues can be analysed and reported using, for example, a DPSIR approach.

SoE can be done at different levels, for example:

- National;
- Provincial;
- Metropolitan;
- Local (local municipal area); and
- Sectoral (catchments, rivers or estuaries).

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ANNEXURE A: USEFUL ENVIRONMENTAL DATA AND INFORMATION SOURCES

There is an urgent need for a good information base to support the management of estuaries (i.e. monitoring system). The current lack of information leads to little, or no, understanding of the functioning of estuaries and/or the consequences of bad management practices. There are many estuarine datasets held by various institutions, consultants and individuals around the country. Although most cover short time periods or specific studies only, they provide valuable information for estuarine management.

The following datasets are noteworthy:

- CSIR Estuarine Data-Base (Water quality and bathymetric data)
- UCT Percy FitzPatrick Institute of African Ornithology, UVU (Coordinated Waterbird Counts (CWAC))
- Nelson Mandela Metropolitan University (UPE), Botany and Zoology Departments (Botanical Importance Rating)

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ANNEXURE B: IMPORTANT INFRASTRUCTURAL NEEDS

As local estuarine management requires hands-on involvement in the day-to-day activities that impact on estuarine health, the following infrastructure and resources are needed:

- Vehicle with towbar
- Skiboat/rubberduck with outboard engine
- Qualified skipper and/or crew
- Fuel for vehicle and boat
- All-weather gear (e.g. oilskins, wetsuit)
- Personal computer
- Internet access
- Cellular phone (ensure safety and security on water)
- Digital camera (to record evidence or interesting phenomena)
- Reference books

In addition, it is strongly recommended that the staff members of the lead agent for local estuarine management also do a *law enforcement course* (e.g. MCM), in order to enforce the relevant legislation and collect evidence in the correct manner. The ability to swim is also seen as an important aspect, as estuarine work is often conducted during bad weather conditions.

In regions where limited funding prevents the acquisition of the above-mentioned resources, it is recommended that local residents be approached for providing assistance where possible (e.g. skipper and boat).