7 CATCHMENT-WIDE TERRESTRIAL CONSERVATION ASSESSMENT

The management of the catchment of the Klein River and surrounding terrestrial areas will directly impact on the health and functioning of the estuary in terms of hydrology, water quality, erosion and sediment load etc. Critical to this is the land use and management of the catchment. The approach adopted therefore is to look at the catchment of the Kleinriviersvlei and the direct terrestrial linkages to protected areas and natural habitats and then to understand the terrestrial systems in the catchment of the Klein River (made up of its three sub-catchments) as a whole.

The review of existing conservation planning as well as GIS analysis on source datasets have enabled an analysis on the state, potential and priorities in the surrounding terrestrial ecosystems. Key conservation planning outputs available to the study identified by Job (2007) have included:

- National Spatial Biodiversity Assessment (Driver et al, 2005)
- Conservation Plan for the Agulhas Plain (Cole et al, 2000) (incorporated in Putting Biodiversity Plans to Work documents prepared for Overstrand municipality)
- Cape Lowlands Renosterveld Plan (Von Hase, 2003) (incorporated in Putting Biodiversity Plans to Work documents prepared for Overstrand municipality)
- CapeNature ecosystem status assessment based on an updated remnant layer for the Overberg DM developed by Don Kirkwood.

In addition, datasets listed in Section 12 have been used to generate this assessment.

7.1 Land capability and extent of cultivation

<table>
<thead>
<tr>
<th>Klein sub catchment</th>
<th>Arable land (ha) (% of catchment)</th>
<th>Grazing (ha) (% of catchment)</th>
<th>Wildlife (ha) (% of catchment)</th>
<th>Cultivated fields (ha) (% of catchment)</th>
<th>Total catchment area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G40L</td>
<td>18,566.69 (48.66%)</td>
<td>18,590.42 (48.72%)</td>
<td>997.49 (2.61%)</td>
<td>2,286.83 (5.94%)</td>
<td>38,511.96</td>
</tr>
<tr>
<td>G40K</td>
<td>24,904.70 (58.03%)</td>
<td>18,013.26 (41.97%)</td>
<td></td>
<td>30,014.99 (69.94%)</td>
<td>42,917.96</td>
</tr>
<tr>
<td>G40J</td>
<td>3,151.37 (18.70%)</td>
<td>13,699.55 (81.30%)</td>
<td></td>
<td>4,966.97 (29.48%)</td>
<td>16,850.92</td>
</tr>
<tr>
<td>Total in all catchments</td>
<td>46,622.76 (47.61%)</td>
<td>50,303.23 (51.37%)</td>
<td>997.49 (1.02%)</td>
<td>37,268.79 (1.92%)</td>
<td>98,280.84</td>
</tr>
</tbody>
</table>

In Table 7, the assessment of land capability within each catchment (based on three broad land capability classes) is shown together with the total and sub-catchment aerial extent of cultivation. The results show that there are potentially marginal lands being used for cultivation.

A Fine scale biodiversity plan for the Overberg Region will be undertaken in 2008.
Figure 11 Vegetation types and special habitats within the Klein River Catchment
7.2 Historic vegetation distribution and ecosystem status

An assessment of historic vegetation distribution and extent was undertaken using the Overberg remnant layer (D. Kirkwood) (refer Figure 11).

Table 8 presents the ecosystem status of each represented vegetation type within the sub catchments and

Table 9 presents a summary per sub catchment of areas that are classified within ecosystem status type

Table 8  Catchment ecosystem status and vegetation distribution

<table>
<thead>
<tr>
<th>Vegetation types</th>
<th>Ecosystem status</th>
<th>G40L Ha (% of catchment)</th>
<th>G40K Ha (% of catchment)</th>
<th>G40J Ha (% of catchment)</th>
<th>Total Ha (% of total area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agulhas limestone fynbos</td>
<td>LT</td>
<td>11,632.81 (30.27%)</td>
<td></td>
<td></td>
<td>11,632.81 (11.85%)</td>
</tr>
<tr>
<td>Cape coastal lagoons</td>
<td>LT</td>
<td>1,028.74 (2.68%)</td>
<td></td>
<td></td>
<td>1,028.74 (1.05%)</td>
</tr>
<tr>
<td>Cape lowlands freshwater wetlands</td>
<td>LT</td>
<td>250.86 (0.65%)</td>
<td></td>
<td>114.32 (0.68%)</td>
<td>365.18 (0.37%)</td>
</tr>
<tr>
<td>Cape seashore vegetation</td>
<td>LT</td>
<td>2.45 (0.01%)</td>
<td></td>
<td></td>
<td>2.45 (0.003%)</td>
</tr>
<tr>
<td>Elim ferricrete fynbos</td>
<td>CE</td>
<td>4,477.10 (11.65%)</td>
<td>310.52 (0.72%)</td>
<td>3,645.89 (21.64%)</td>
<td>8,433.51 (8.59%)</td>
</tr>
<tr>
<td>Greyton shale fynbos</td>
<td>E</td>
<td>1,488.76 (3.47%)</td>
<td></td>
<td></td>
<td>1,488.76 (1.52%)</td>
</tr>
<tr>
<td>Overberg dune strandveld</td>
<td>LT</td>
<td>10,467.05 (27.24%)</td>
<td></td>
<td></td>
<td>10,467.05 (10.66%)</td>
</tr>
<tr>
<td>Overberg sandstone fynbos</td>
<td>LT</td>
<td>9,420.08 (24.52%)</td>
<td>5,695.52 (13.27%)</td>
<td>9,130.97 (54.19%)</td>
<td>24,246.57 (24.69%)</td>
</tr>
<tr>
<td>Rûens silcrete renosterveld</td>
<td>CE</td>
<td></td>
<td>73.78 (0.17%)</td>
<td></td>
<td>73.78 (0.07%)</td>
</tr>
<tr>
<td>Southern coastal forest</td>
<td>LT</td>
<td>675.82 (17.76%)</td>
<td></td>
<td></td>
<td>675.82 (0.70%)</td>
</tr>
<tr>
<td>Western coastal shale band vegetation</td>
<td>LT</td>
<td>428.02 (1.11%)</td>
<td>366.29 (0.85%)</td>
<td>280.70 (1.67%)</td>
<td>1,075.00 (1.09%)</td>
</tr>
<tr>
<td>Western Rûens shale renosterveld</td>
<td>CE</td>
<td>41.64 (0.11%)</td>
<td>34,983.09 (81.51%)</td>
<td>3,679.05 (21.83%)</td>
<td>38,703.77 (39.42%)</td>
</tr>
</tbody>
</table>
Table 9  Summary of area of vegetation types assignment of ecosystem status per catchment area

<table>
<thead>
<tr>
<th>Ecosystem status</th>
<th>G40L (Ha (% of catchment))</th>
<th>G40K (Ha (% of catchment))</th>
<th>G40J (Ha (% of catchment))</th>
<th>Total Ha (% of total area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critically endangered</td>
<td>4,518.73 (11.76%)</td>
<td>35,367.39 (82.41%)</td>
<td>7,324.94 (43.47%)</td>
<td>47,211.06 (48.08%)</td>
</tr>
<tr>
<td>Endangered</td>
<td></td>
<td>1,488.75 (3.47%)</td>
<td></td>
<td>1,488.75 (1.52%)</td>
</tr>
<tr>
<td>Vulnerable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Least threatened</td>
<td>33,905.83 (88.24%)</td>
<td>6,061.81 (14.12%)</td>
<td>9,525.98 (56.53%)</td>
<td>49,493.62 (50.40%)</td>
</tr>
</tbody>
</table>

Ecosystem Status is determined on the basis of the remaining extent of historic distributions available to meet conservation targets.

- **CE** – Critically endangered: vegetation types for which the remaining extent is less than that required to meet the national targets
- **E** – Endangered: types with less remaining area that needed for the target plus an additional 15%
- **V** – Vulnerable: types with less than 60% of historic extent remaining
- **LT** – Least Threatened: types with more than 60% of historic extent remaining

From the analyses represented in Table 8 and Table 9, the results show that 49.60% (48,699.82 ha) of the Klein River Catchment is considered to represent habitats that are endangered or critically endangered. On the basis of this analysis, two vegetation types have different assigned status to that determined by the NSBA: Greyton Shale Fynbos moved from Vulnerable to Endangered, and Elim Ferricrete Fynbos moved from Endangered to Critically Endangered.

The implications are that further transformation of these identified habitats (Elim Ferricrete Fynbos, Greyton Shale Fynbos, Rüens Silcrete Renosterveld and Western Rüens Shale Renosterveld) should be prevented in line with the PSDF and adequate planning for their protection and rehabilitation should be initiated.

These issues will need to be addressed through the fine-scale planning process for the Overberg in 2008, and directly by the Overstrand and Theewaterskloof Municipalities in how they respond to development applications.

7.3 Extent of transformation of habitats

Table 10 shows the distributions of land cover categories developed by Kirkwood (2007) within each sub catchment and Table 11 shows the extent of remaining habitat, which inversely shows the extent of transformation of natural habitats.
### Table 10  Analysis of broad land cover per sub catchment

<table>
<thead>
<tr>
<th>Broad land cover types</th>
<th>G40L</th>
<th>G40K</th>
<th>G40J</th>
<th>Total</th>
<th>Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ha (of catchment)</td>
<td>Ha (of catchment)</td>
<td>Ha (of catchment)</td>
<td>Ha (of total area)</td>
<td></td>
</tr>
<tr>
<td>Natural</td>
<td>24,456.91 (63.65%)</td>
<td>6,879.28 (16.03%)</td>
<td>8,521.16 (20.57%)</td>
<td>39,857.35 (40.59%)</td>
<td></td>
</tr>
<tr>
<td>Near natural</td>
<td>5,215.97 (13.57%)</td>
<td>5,215.97 (13.57%)</td>
<td>5,215.97 (13.57%)</td>
<td>5,215.97 (13.57%)</td>
<td></td>
</tr>
<tr>
<td>Degraded</td>
<td>3,053.77 (7.95%)</td>
<td>2,809.36 (7.36%)</td>
<td>2,371.88 (5.92%)</td>
<td>8,235.01 (8.39%)</td>
<td></td>
</tr>
<tr>
<td>Uncertain – probably natural</td>
<td>313.32 (0.81%)</td>
<td>148.65 (0.39%)</td>
<td>170.87 (0.43%)</td>
<td>632.84 (0.64%)</td>
<td></td>
</tr>
<tr>
<td>Uncertain – probably transformed</td>
<td>0.25 (0.001%)</td>
<td>0.25 (0.001%)</td>
<td>0.25 (0.001%)</td>
<td>0.25 (0.001%)</td>
<td></td>
</tr>
<tr>
<td>Uncertain – probably degraded</td>
<td>4,471.30 (11.64%)</td>
<td>33,079.61 (77.08%)</td>
<td>5,786.67 (13.34%)</td>
<td>43,337.58 (44.13%)</td>
<td></td>
</tr>
<tr>
<td>Transformed</td>
<td>913.04 (2.38%)</td>
<td>1.06 (0.002%)</td>
<td>0.35 (0.002%)</td>
<td>914.45 (0.98%)</td>
<td></td>
</tr>
<tr>
<td>Water bodies</td>
<td>913.04 (2.38%)</td>
<td>1.06 (0.002%)</td>
<td>0.35 (0.002%)</td>
<td>914.45 (0.98%)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 11  Distribution of only natural areas (as defined by broad land cover described by Kirkwood) of each vegetation type

<table>
<thead>
<tr>
<th>Vegetation types</th>
<th>Ecosystem status</th>
<th>G40L (% of catchment)</th>
<th>G40K (% of catchment)</th>
<th>G40J (% of catchment)</th>
<th>Total (% of total area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agulhas limestone fynbos</td>
<td>LT</td>
<td>7,549.74 (64.90%)</td>
<td></td>
<td></td>
<td>7,549.74 (64.90%)</td>
</tr>
<tr>
<td>Cape coastal lagoons</td>
<td>LT</td>
<td>112.64 (10.05%)</td>
<td></td>
<td></td>
<td>112.64 (10.05%)</td>
</tr>
<tr>
<td>Cape lowlands freshwater wetlands</td>
<td>LT</td>
<td>168.76 (16.72%)</td>
<td></td>
<td>8.55 (0.78%)</td>
<td>177.31 (16.58%)</td>
</tr>
<tr>
<td>Cape seashore vegetation</td>
<td>LT</td>
<td>2.45 (100%)</td>
<td></td>
<td></td>
<td>2.45 (100%)</td>
</tr>
<tr>
<td>Elim ferricrete fynbos</td>
<td>CE</td>
<td>1,277.31 (28.53%)</td>
<td>55.07 (17.73%)</td>
<td>380.31 (10.43%)</td>
<td>1,712.69 (20.31%)</td>
</tr>
<tr>
<td>Greyton shale fynbos</td>
<td>E</td>
<td></td>
<td>157.66 (10.59%)</td>
<td></td>
<td>157.66 (10.59%)</td>
</tr>
<tr>
<td>Overberg dune strandveld</td>
<td>LT</td>
<td>7,401.28 (70.71%)</td>
<td></td>
<td></td>
<td>7,401.28 (70.71%)</td>
</tr>
<tr>
<td>Overberg sandstone fynbos</td>
<td>LT</td>
<td>7,009.69 (74.41%)</td>
<td>4,891.75 (85.89%)</td>
<td>7,564.48 (83.45%)</td>
<td>19,465.92 (80.28%)</td>
</tr>
<tr>
<td>Rûens silcrete renosterveld</td>
<td>CE</td>
<td></td>
<td>11.00 (14.91%)</td>
<td></td>
<td>11.00 (14.91%)</td>
</tr>
<tr>
<td>Southern coastal forest</td>
<td>LT</td>
<td>606.18 (89.70%)</td>
<td></td>
<td></td>
<td>606.18 (89.70%)</td>
</tr>
<tr>
<td>Western coastal shale band vegetation</td>
<td>LT</td>
<td>292.50 (68.34%)</td>
<td>336.49 (91.86%)</td>
<td>216.15 (77.00)</td>
<td>845.14 (78.62%)</td>
</tr>
<tr>
<td>Western Rûens shale renosterveld</td>
<td>CE</td>
<td>36.36 (87.32%)</td>
<td>1,427.30 (40.88%)</td>
<td>351.66 (9.56%)</td>
<td>1,815.32 (4.69%)</td>
</tr>
</tbody>
</table>

Note: % remaining is natural area/historic area
Table 10 and Table 11 underscores the need for an integrated approach to catchment and estuarine conservation and management that conserves remaining habitats within the Klein catchments that represent critically endangered and endangered types.

7.4 Level of protection within the Klein River Sub catchments

Protected areas within each quaternary catchment are as follows:

G40L (in which the estuary is located):
» Oude Bosch Private Nature Reserve
» Coppull Private Nature Reserve
» Walker Bay Provincial Nature Reserve
» Kleinrivier Private Nature Reserve
» Waterkop Private Nature Reserve
» Chaynouqa Private Nature Reserve
» Fairhill Private Nature Reserve
» Groothbos Private Nature Reserve
» Langverwagt Private Nature Reserve
» Maanschynkop Provincial Nature Reserve
» Fernkloof Local Authority Nature Reserve
» Vogelgat Private Nature Reserve
» Waterfall Private Nature Reserve

G40K: Drayton Siding National Heritage Site
G40J: Maanschynkop Provincial Nature Reserve

Table 12  Extent of the Klein River catchments under protection

<table>
<thead>
<tr>
<th></th>
<th>Provincial Nature Reserves (% of catchment)</th>
<th>National Heritage Sites (% of catchment)</th>
<th>Private Nature Reserves (% of catchment)</th>
<th>Local Authority Reserves (% of catchment)</th>
<th>Total area per catchment (% of each catchment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G40L</td>
<td>3,636.13 (9.46%)</td>
<td>601.72 (1.57%)</td>
<td>2,194.15 (5.71%)</td>
<td>86.38 (0.22%)</td>
<td>6,518.38 (16.96%)</td>
</tr>
<tr>
<td>G40K</td>
<td>0.27 (0.0006%)</td>
<td>160.14 (0.37%)</td>
<td>N/A</td>
<td>N/A</td>
<td>160.41 (0.37%)</td>
</tr>
<tr>
<td>G40J</td>
<td>488.03 (2.90%)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>488.03 (2.90%)</td>
</tr>
<tr>
<td>Total area per category (% of all 3 catchments combined)</td>
<td>4,124.43 (4.20%)</td>
<td>761.86 (0.78%)</td>
<td>2,194.15 (2.23%)</td>
<td>86.38 (0.09%)</td>
<td>7,166.82 (7.30%)</td>
</tr>
</tbody>
</table>

From the analysis in Table 12 it is apparent that a total area of 7.30% of the Klein River Catchment is under protection – less than the accepted minimum described by the IUCN.

Further, the combination of the significance of the estuary, the ecosystem and health status of the river, and that of the vegetation types, mean that sound land management practices and bold plans will need to be implemented for conservation and rehabilitation within the Klein Catchment as a matter of priority.
The EMP needs to support the achievement of conservation objectives by:

- recommending protected area linkages that can reinforce both the protection of terrestrial biodiversity and its positive influence on water resource management;
- enhancing the functioning of the Klein River Estuary and surrounding conservation areas as well as the riparian corridors as a coast-to-interior linkage and large-scale ecological corridor.

### 7.5 Determination of a terrestrial margin in which to focus EMP conservation and management interventions

Turpie and Clark (2007) refer to an estuary margin area but do not define its extent. For the purpose of initiating discussion through this assessment, an estuary margin area has been defined and a terrestrial margin has been set at a distance of 1 km from areas defined as estuarine habitats (not on the basis of a contour line).

The general recommendation made by Turpie and Clark is that half of the estuarine margin should remain undeveloped. On this basis and using the interim definition of estuary margin described above, an analysis was undertaken using the land cover categories defined by Kirkwood (2006) to ascertain the extent of transformation of natural habitat within the land area defined as the margin. The results show that 51.60% is natural; 17.93% is near natural; 9.37% is uncertain – probably natural; 1.21% is uncertain – probably transformed and 19.88% is transformed.

Figure 12 shows the extent of these areas overlaid with the interim margin area.

The analysis demonstrates that the remaining intact habitats amount to about half of the margin area.

- Further discussion will be required regarding the definition of the buffer area and the extent of transformation in terms of the Kirkwood categories.
Figure 12 Terrestrial margin and biodiversity informants
7.6 Limitations and gaps in data

The following gaps were identified:

- Land ownership information could assist in prioritising conservation action;
- Fine-scale mapping of vegetation according to new norms and standards integrating all ecosystem types;
- Land use alternatives together with costs and benefit analysis;
- Integration of geohydrological information, specifically contribution to water quantity and quality;
- Updated mapping of the extent of invasive aliens, clearing and follow-up programmes;
- Stewardship categories as applied to the different private nature reserves.

7.7 Areas needing priority attention

In general the following key issues need to be addressed in relation to terrestrial systems within the Klein River catchments (drawn from Job, 2007):

» Lack or discontinuation of scientific monitoring and management;
» Poor management of the estuary and catchment;
» Need for alien vegetation control;
» Expansion of the Vogelgat and Fernkloof nature areas (only Vogelgat is strictly within the receiving catchment).

A fire risk management assessment and planning with the FPA is also required.

The EMP should:

» Prioritise finer-scale vegetation and habitat mapping of the areas surrounding the estuary.
» Inform all land use decisions within the direct catchment influence on the estuary (focusing on G40L and G40K).
» Adopt an integrated conservation planning approach to link ecosystems, based on a discussion around the terrestrial buffer, its extent and linkages to other areas, as well as its status in law.
» Identify all relevant state owned land of endangered / critically endangered status and enable formal protection.
» Identify and prioritise privately owned land of the same status for stewardship arrangements.
» Contribute to the development of an invasive alien plant management strategy for the catchment.
8 LAND USE AND INFRASTRUCTURE

The assessment aims to identify the main issues relating to land use in the immediate environment and recreational use of the estuarine water body, as well as the infrastructure available to support both. It is primarily based on desktop research, guided but not driven by, issues raised by IAPs during interviews and meetings. Primary data sources are the IDPs and SDFs of Overberg and Overstrand, the report prepared for Cape Estuaries Programme by Nancy Job (2007), the municipalities’ websites. Much of the information that underpins the assessment is presented in Data Sheets that accompany this report:

» Overberg District Municipality IDP
» Overberg District Municipality SDF
» Overstrand IDP
» Overstrand Municipality SDF
» Municipal policy for agricultural land resources
» Municipal growth management Strategies
» Municipal policy on land use management in the proposed RDA
» Municipal sewerage disposal services
» Municipal water supply services
» Municipal solid waste management services
» Water Services Development Plan (WSDP)
» Structure Plan for the Kleinriviersvlei and Klein River Area (1993)
» Zoning scheme regulations
» Proclamation 357 issued in terms of the Nature Conservation Ordinance
» Proposed re-development of De Mond Caravan Park
» Developments under consideration
» Recreational carrying capacity

Whilst it is beyond the terms of reference of this study to develop comprehensive and holistic recommendations for land use and infrastructure in and around the estuary, it is considered by this team, based on our analysis of the policy and legal framework, to be within the scope of the EMP to consider impacts and opportunities as follows:

- Identify impacts of existing land use and infrastructure which are detrimental to the health of the estuary and, through the EMP Management Action Plans, identify remedial actions;
- Identify impacts of the natural systems on land use and infrastructure (e.g. flooding) and, through the EMP Management Action Plans, identify appropriate responses;
- Identify and spatially locate priority areas for conservation and develop guidelines for the management of those areas, which may include, for example, restrictions on changes in land use, partnership arrangements, incentives and tourism development, protected area designation;
- Identify and spatially locate priority areas for development and develop guidelines for the management of those areas, which may include, for example, preferred and non-preferred uses, impact assessment requirements, partnership arrangements, incentives and potential contribution to any rehabilitation measures relating to the estuary;
- Identify threats posed by current proposals and trends in land use and infrastructure development and identify measures for addressing these.
8.1 Current land use and recreational activity

A threats and opportunities analysis was used to assess the current status of land use and estuarine-based recreational activity in order to assess its potential as impact or opportunity for the purposes of the EMP.

Information on the zoning of the majority of land parcels outside of the urban areas could not be accessed. For the purpose of the assessment it was assumed that riparian properties are zoned agriculture or indeterminate with the exception of the large “Municipal” (Local Authority) erf on the north-western area of the estuarine margin, a portion of which is occupied by the De Mond Caravan Park (Data Sheet No.5).

Land use - opportunities

- The density of development around the estuary is generally low, with the exception of the nodal urban areas of Hermanus and Stanford and some resorts.
- Existing development around the estuary is visually relatively unobtrusive from the vantage point of public roads in the area, including the R43 proposed scenic route.
- Existing land use zoning is (assumed to be) predominantly agriculture.
- 17% of the estuarine sub-catchment (G40L) is included in designated protected areas (public and private) (Figure 13).
- The uneven distribution of existing development extent and density, between the east and west banks of the river, support the potential for adopting a policy of restricting further development to one side of the estuary only.
- The estuary is a relatively untransformed natural attraction that could support low impact non-consumptive recreational and tourism activities, e.g. cycle paths, canoe trails, bed-and-breakfast accommodation and picnic sites, that would benefit local residents as well as the local eco-tourism industry.
- The property values of riparian owners located in zone 16F of the river are boosted by having sole rights to use engine-propelled craft to traverse this part of the river (Proclamation 357, 1972).

Land use - threats

- The nature of land use management in areas such as this, that lie outside of the urban edge, relies heavily on discretionary decision-making processes with regard to applications for change of use and subdivision and admits uncertainty for both residents and would-be developers. The risk of ‘developing’ the area’s natural assets could destroy the very quality that attracts residents and tourists in the first place.
- There are two intensive feed farming agricultural sites located within approximately 700 metres of the river on the east bank near Stanford. Intensive feed farming potentially generates negative environmental impacts and requires regular monitoring.
Recreational use zones (Figure 13)

16F: Only riparian land owners may use engine-propelled boats

16E: Bird sanctuary. Engine-propelled boats may only pass through. Max speed 10km/h

16D: Water sports allowed

16C: No water sports between 16h00 and 10h00. No fyke-nets nor bait trek-nets

16B: Angling zone no water sports. No fyke-nets nor bait trek-nets

16A: No boats nor any engine-propelled craft. No fyke-nets nor bait trek-nets

---

- In the event that riparian properties in zone 16F are subdivided, the rights established in terms of Proclamation 357, that permit riparian owners to use engine-propelled craft in this zone, would be conferred on a greater number of owners, possibly leading to an unsustainable level of use. The fact that the river is navigable in this zone increases its vulnerability to recreational use impacts.

- The Structure Plan identifies conflict between recreational users in relation to the different types of craft and recreational activities on the water surface, particularly at peak times, and makes proposals for the management of this aspect of estuarine use.

- Wind conditions limit the suitability of the estuary as a site for certain water sports and other recreational uses.

Unclassified

- The large surface area of the water body offers a high physical carrying capacity. Whilst this represents a strength, in terms of recreational and tourism development potential, it could result in the social and/or ecological carrying capacities being exceeded. Calculations of physical carrying capacity and a survey of recreational boating on the estuary is available in the Structure Plan for the area (DMP, 1993). Summarised information is available in Data Sheet No.13 and a discussion on carrying capacity is provided in Data Sheet No.33.

- Public access to the estuary is restricted by the presence of large privately owned (assumed to be) agricultural land parcels along the river. Limited public access to the estuary means that pressures relating to recreational activities are focused on a limited number of discrete points as opposed to being spread over a broad area.

- Other implications of private ownership – such as alien vegetation and potentially contaminating seepage and run-off have implications for estuarine management and are discussed in Section 6.5.

- Existing boat houses on the river edge represent an established precedent in the area for private use of coastal public property. This issue needs to be examined in greater detail in order to assess the implications.

- Likewise, existing boat launch sites (slipways) on the lagoon and river require detailed investigation to assess their status and locational suitability relative to public recreation facilities and estuarine zones.

- The implications of the high (90%) property rates rebate on agricultural land and the exemption on property rates for privately owned designated protected areas have implications for the Municipality’s income base. Offsets against such losses, such as environmental services and added tourism revenue, etcetera, need to be made explicit.

- The prevailing ethic of compliance with existing zones, both on land and on the water body, and the capacity for monitoring compliance, and enforcement, has not yet been ascertained.
Further information on the recreational use zones established through Proclamation 357 (PG, 1972) is provided in Data Sheet No.30

8.2 Basic services infrastructure

Infrastructure servicing the area is presented itself in three distinct areas: the urban areas of Hermanus and Stanford on the north and south sides of the river respectively, and the agricultural and undeveloped areas between. They are presented in this format in Table 13 (opportunities) and Table 14 (threats). The location of waste disposal sites (solid waste and waste water treatment) is provided in Figure 14.
<table>
<thead>
<tr>
<th></th>
<th>Western portion - Hermanus</th>
<th>Middle extent</th>
<th>Eastern portion - Stanford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>The estuarine environment is unimpeded by any major physical structures. The road transport link between the north and south sides of the Klein River is located well upstream at Stanford.</td>
<td>The R43 is proposed for development in the SDF as a Scenic Route. Current traffic load is not identified as a problem.</td>
<td>Performance of the bridge during November 2007 floods to be investigated.</td>
</tr>
<tr>
<td>Stormwater</td>
<td>Unknown</td>
<td>Unknown</td>
<td>‘Leiwater’ open channels are attractive. See weaknesses.</td>
</tr>
<tr>
<td>Water supply</td>
<td>Reticulated within the urban area, source unknown.</td>
<td>Unknown</td>
<td>Drawn from a spring and reticulated within the urban area.</td>
</tr>
<tr>
<td>Sewerage</td>
<td>A decision was made in the ‘90s not to locate a waste water treatment works in Voeëlklop, with a discharge into the Klein River estuary, but instead to pump the untreated sewerage westwards to an alternative treatment site. The estuary therefore carries none of the nutrient load associated with Hermanus’ urban discharges.</td>
<td>The absence of piped sewerage means that poorly located pipes and pump stations are not a contamination risk during flooding. See weaknesses.</td>
<td>The quality and location of effluent discharge from the waste water treatment works at Stanford is unknown. Further investigation is needed to assess its impact on estuarine health.</td>
</tr>
<tr>
<td>Solid waste disposal</td>
<td>Municipal collection service, large transfer station in Hermanus with recycling centre.</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
### Table 14  Assessment of threats i.r.o. basic services infrastructure

<table>
<thead>
<tr>
<th>Western portion – Hermanus / Wortelgat</th>
<th>Middle extent</th>
<th>Eastern portion - Stanford</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roads</strong></td>
<td>The R43 is a narrow road that cannot safely accommodate heavy traffic flows. It is vulnerable to flood risk and was closed to traffic during the November 2007 floods. It is the only direct road link between Stanford and Hermanus – the alternative involves a much greater travel distance. There are a very limited number of locations where public roads provide access to the estuary on both the north and south banks.</td>
<td>Bridge – flooding? Stanford is well served by a grided urban road network but, apart from the slipway, it is impossible for a visitor to find the river.</td>
</tr>
<tr>
<td>Stormwater</td>
<td>Unknown – further investigation required.</td>
<td>Unknown – further investigation required.</td>
</tr>
<tr>
<td>Water supply</td>
<td>Unknown.</td>
<td>Unknown – further investigation required.</td>
</tr>
<tr>
<td>Sewerage</td>
<td>Current waste water treatment works that serve Hermanus (not located in the core study area) is reaching its capacity. The Municipal erf on which De Mond Caravan Park is located is outside the urban edge – possibly unserviced. Requires further investigation.</td>
<td>Septic tanks are used. Capacity of on-site disposal systems to adequately deal with effluent is dependent on specific local conditions. Likewise with their location in relation to the river, except for the purpose of reducing the risk of direct damage and consequent contamination during flooding. Conservancy tanks and ‘honeysuckers’ have been introduced as an interim situation where development densities are considered too high for septic tanks but it is not considered to be a sustainable solution.</td>
</tr>
<tr>
<td>Solid waste disposal</td>
<td>Former landfill site for Hermanus located close to the estuary. Procedures for officially closing the site are not yet complete.</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
The following items are flagged for further investigation regarding their possible impact on estuarine health and/or flow:

- Quality and location of effluent discharge from the waste water treatment works at Stanford;
- Performance of the bridge during November 2007 floods to be investigated;
- Surface water management in the eastern part of Hermanus and on the developed portions of the riparian sites in the agricultural area, and any resorts;
- Liquid waste disposal at De Mond Caravan Park – mains or on site;
- Impacts of leiswater run-off into Klein River at Stanford;
- Abstraction of ground water for Stanford water supply and in the agricultural area, limits undetermined;
- Impact of the on site disposal of liquid waste in the area agricultural area, and any resorts;
- Water quality in the vicinity of the former Hermanus garden refuse site;
- Limited and/or low visibility public access routes to the river for recreation purposes.

8.3 Plans for future development

The Overstrand IDP (2007/08) records strong growth in the building industry over the past few years and outlines strategies for managing the spatial implications in the SDF (2006). Some relevant aspects of the Growth Management Strategies are recorded in Data Sheet No.23. Growth in the Hermanus area is to be directed to the west and into densification. Limited growth is provided for at Stanford and, in both instances, an urban edge has been introduced to define the limit of the area that is allocated for urban development. New nodes and settlement areas are to be prevented and Rural Development Areas (RDAs).

One such Rural Development Area is proposed for the estuarine area, to act as an intermediate zone between urban and core agricultural areas, accommodating an as yet unlimited range of land uses that are considered unsuitable for either urban or agricultural locations. Information on the proposed RDA is provided in Section 4.2 and Data Sheet No.24. The current absence of any strong statement of intent for the land use in the RDA means that it is open to influence from parallel initiatives, including the EMP.

The IDP identifies the need to satisfy a demand for affordable housing and the limited availability of land for such development. The feasibility of a site at Stanford is being investigated and adoption of the Overstrand SDF is pending the outcome of discussion with DEA&DP regarding the position of the urban edge.

The nature of developments under consideration in the core study area, including awarded and invited tenders, applications and proposals still in their early investigation stages, is summarised in Table 15 and illustrated in Figure 15. This is based on information recorded in Data Sheet No.6.
Figure 15 Developments under consideration
Table 15  Developments under consideration

<table>
<thead>
<tr>
<th>Proposed land use / infrastructure</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resorts (redevelopment)</td>
<td>1</td>
</tr>
<tr>
<td>Golf estate</td>
<td>1</td>
</tr>
<tr>
<td>Tourism / recreational facilities</td>
<td>5</td>
</tr>
<tr>
<td>Affordable housing</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
<tr>
<td>Petrol station</td>
<td>1</td>
</tr>
</tbody>
</table>

Infrastructure development proposals in the Overstrand SDF include the following:

- Upgrading of the R43 to the west of Hermanus;
- Investigation of desalination as an alternative source of water;
- Extension of the water-borne sewer system for currently unserviced areas at Hermanus;
- Investigation into upgrading the waste water treatment works at Hermanus because it is reaching its capacity limit;
- Investigation and determination of limits of ground water and other water resources;
- Identification of new sources of water for Stanford;
- Tender invitation for a consultant for an ‘Overstrand Groundwater Development and Management Programme’.

8.4 Limitations and gaps in data

The following information was not available in this assessment:

- Existing land use zones
- Location of all boat launch sites / slipways and jetties
- Location of all public recreational facilities (e.g. parking areas, public ablutions, picnic areas, hiking trails, bird hides, cycle paths etc)
- Level of compliance, and monitoring of compliance / enforcement of existing estuarine zones (e.g. convictions)
- Location of stormwater outfalls and measures to prevent solid waste from entering the estuary along with stormwater discharges
- Sewerage disposal systems used at resorts and developed areas and recreational facilities in the unserviced area
- Solid waste collection services at Stanford and the agricultural and public recreation areas
- Source of water supplied to Hermanus
- Western Cape (Spatial) Coastal Zone Policy (2003)
- Availability of flood line data (Breede WMA competency).
8.5 Areas needing priority attention

Spatial data is inadequate or unavailable and the land use management system is currently not operational in the proposed RDA. The planning scheme has yet to be extended to cover this area.

There is a lack of clarity around permitted land uses in the proposed RDA which could include intensive feed farming with high negative environmental impacts.

Basic services infrastructure limits are being reached and technology is being enlisted to push the limits to accommodate more development.

In working with the Municipality to address these issues and develop the Rural Development Framework and zoning scheme, the EMP should:

- Provide guidelines for preferred and non-preferred land uses, based on estuarine health priorities, and identify existing activities that pose a high risk. It is possible that these are not located directly adjacent to the estuary (dependent on hydrology).
- Identify opportunities in the study area for acknowledging and respecting the limits that the environment imposes, and supporting those opportunities through the EMP. e.g. initiatives like the proposed cycle path.
- Identification of current impacts on water quality need to be verified by water quality data. The leiwater issue needs urgent investigation.
- The precautionary principle should be applied in assessing proposed developments – EMP can provide some guidelines.
- Public recreation areas need to be more visible. Appropriate location and form of these, relative to proposed estuary zoning and preferred / non-preferred land use, should be addressed in the EMP.
- Liaison with the Overberg District Municipality regarding Disaster Management Planning relating to floods is needed. Lessons learned in November 2007 should be captured while these are still fresh.
- The EMP should support the investigation and determination of limits of groundwater reserves.
- The EMP must identify a management approach to recreational carrying capacity that is linked to a monitoring system and can respond to early warning signals.
- The existing protected areas in the estuarine environment present potential for corridor linkages that should be investigated through a variety of protection mechanisms.
9 SOCIAL SYSTEMS

Sustainability is often represented by the "triple bottom line" which reflects the economic, social and environmental components of an activity, be it related to resource use, infrastructure development, carrying capacity or agriculture etc. Social sustainability addresses the human aspects of the activity and relates to the well-being or quality of life of people. Social sustainability includes social capital and human capital and therefore encompasses improvements to the human development index or provision of basic services, job creation, skills development, access to resources, recreation and the preservation of sense of place. It also concerns civil society and its cohesion, such as relationships, community based organisations and action groups, amongst others (DEAT, 2005; Director of Social Planning, 2005).

- The Overberg District IDP (2006/07) identifies the following social aspects as threats to environmental sustainability:
  - Urban sprawl along the Overberg coastline
  - Negative impact on underground water resources, especially along the coastal plains
  - A growing demand for water from Cape Town Metro
  - A growing demand, in the face of poverty and deprivation, to have access to natural resources, e.g. fynbos, wildlife, etc
  - Over-exploitation of marine resources.

In order to better understand the human interface in the Klein River estuarine environment, the consultant team endeavoured to identify interested and affected parties (IAPs). Anecdotal information was collected during communications with IAPs which assisted in developing a snapshot assessment of the estuary and its people. In a few instances information is documented, but the majority remains anecdotal.

9.1 Demography

Information about the demography of the Overstrand area was obtained from the ODM Annual Report (2006/7), the Overstrand IDP.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Census 1996</th>
<th>Census 2001</th>
<th>Growth</th>
<th>Projection 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overberg District</td>
<td>159,033</td>
<td>203,520</td>
<td>28.0</td>
<td>332,339</td>
</tr>
<tr>
<td>Overstrand</td>
<td>37,315</td>
<td>55,738</td>
<td>49.4</td>
<td>130,353</td>
</tr>
</tbody>
</table>

Since 2001, population growth rate in the Overstrand has been higher than the district average with a forecast population for 2010 of 130,353 (Table 16). This increase will add pressure to municipal resources that are already stretched, and the municipality's ability to deliver basic services. From a manpower perspective the ODM Annual Report: 2005/6 states that the Overstrand's “proportion of highly skilled individuals is by far better than in the other areas. The overall better-skilled workforce can also be attributed to the well-diversified economic base as opposed to, for example, Swellendam and Theewaterskloof, which are predominantly agrarian.”
From a socio-economic perspective it is interesting to note that almost half of jobs created in the Overberg District, between 2001 and 2006, were created in the Overstrand municipal area. However, in 2001 unemployment in Hermanus was considered to be 25% and that of Zwelihle 40%. A larger percentage of households in the Overstrand Municipality (almost 11%) earn no income. What is also alarming is the 160% increase in drug-related crime that is experienced in this area.

The town of Hermanus is considered to have high development potential (DEA&DP, 2005) due mainly to economic change, commercial services and regional vitality. Tourism and recreation are the economic base of the town. The report notes that other than the limiting availability of fresh water, growth is threatened by inadequate access roads and limited scope for the lateral expansion of the town.

9.2 Broader interest groups and stakeholders 
(regional, national, global)

Non-government and Community Based Organisations

There is a very wide range of interest groups whose mandates extend, or are solely related to, the Klein River estuary and environs. At a local level these groups include:

» Birdlife Overberg/Birdlife SA
» Birdlife Walker Bay
» Hermanus Lagoon Property Owners Association (HLPOA)
» Fernkloof Advisory Board
» Hermanus Bird Club
» Hermanus Ratepayers’ Association
» Klein River Property Owners Association
» Kleinrivier Forum
» Kleinrivier Planning and Environmental Steering Committee
» Stanford Conservation Trust
» Overstrand Conservation Foundation
» Overstrand Heritage and Aesthetics Committee
» Klein River Association of Boating
» Stanford Bird Club
» Stanford Ratepayers’ Association

Users and other interest groups

» African Queen
» Boathouse Owners on the Klein
» Botfriends
» Hermanus Cliff Path Management Group
» Hermanus Yacht Club
» Klein River Property Owners Association
» Platanna River Cruises
» See-Eike Trust
» Wortelgat Outreach Trust

Private Nature Reserves and Conservancies

» Kleinriviersberge Conservancy
» RM Family Trust
» Kleinriviersvlei Conservation Trust
» Mosaic Farm
» Vogelgat Private Nature Reserve
» Waterfalls PNR
The Klein River estuary's status in South Africa means that, although few of the above organisations operate at a national level, their local support is critical to the management of the estuary. The Wildlife and Environment Society of Southern Africa (WESSA) has close contact with many of these organisations, particularly the Kleinrivier Planning and Environmental Steering Committee.

**Government Organisations**

- **Local**: Overberg District Municipality, Overstrand Municipality including Ward 3
- **Provincial**: Department of Environmental Affairs and Development Planning (DEA&DP), Cape Nature, Department of Agriculture (WC) including Agulhas Biosphere Initiative and LandCare
- **National**: Department of Environmental Affairs and Tourism, particularly the directorate of Marine and Coastal Management (DEAT: MCM) and Agulhas National Park, Department of Water Affairs including Breede River Water Management Area (WMA), Department Agriculture, Department of Minerals and Energy.

**Global stakeholders**

The estuary's ranking as 5th most important estuary in the country, and its contribution, with the Bot River estuary, to 60% of the surface area of estuarine systems in the Western Cape province, places it at a level of global importance in terms of tourist attraction, bird habitat, and recreation (water sports) venue. Birdlife SA is considering an application for the registration of an Important Bird Area (IBA) with Birdlife International. The estuary's significance for commercial fisheries possibly renders it classifiable as a global food resource. No other global stakeholders have been identified at this stage, although the World Bank is funding the six pilot EMPs in the Cape Floristic Region.

**9.3 Subsistence users**

Information on subsistence users is based on hearsay and anecdotal input. Fishers from Stanford and Hermanus are active in the estuarine area as shore anglers and bait collectors. The number of fishers or households that rely on the estuary as a livelihood or for subsistence use is unknown. Formal public access to the river and the estuary is limited.

**9.4 Recreational users**

As with most of the province's estuaries, the Klein River is used extensively for recreational purposes, and has huge local, regional and even international value in this regard.

From 27 December 2007 to 4 January 2008 the Laser 4.7 World Championships is being held at the Hermanus Yacht Club.

The Western Province Canoe Union opens its season in March with a 16km race from the Hermanus Yacht Club to Stanford. In some years even dragon boats have participated.
This is an annual event and the finish in Stanford is marketed as a festival-type weekend for the town.

Activities in and around the estuary include:

- Hiking
- Horse riding
- Birding
- Swimming
- Fishing
- Canoeing
- Boating (motor and oars)
- Water-skiing
- Jetskiing (permit only)
- Kite surfing?
- Sailing
- Windsurfing

9.5 Commercial users

Commercial users within the defined estuarine area include only riverboat cruises that operate from Stanford. These include the privately operated Platanna River Cruises and the African Queen. They operate from Stanford within Zone 16F.

In the surrounding area commercial enterprises include those based on tourism, agriculture and agri-business. These include overnight accommodation (lodges, B&Bs and self-catering facilities), horse trails, vineyards and a large County Fair chicken farm.

9.6 Cultural users and undeclared heritage sites

The town of Stanford dates to the subdivision of the De Kleine River Valley Farm in 1857. The old village of Stanford was proclaimed a conservation area in 1995 in terms of the National Monuments Act. The Stanford Conservation Body (SCB) was granted a permit by Heritage Western Cape in 2006. This enables it to assess plans concerning any alterations to buildings, including farmhouses. The extent of the SCBs area of jurisdiction is not known.

In the Stanford river area the Zion Christian Church uses the river for baptism purposes.

Anecdotal reports of boathouses being in existence for almost 100 years may grant these structures heritage status, although this is unconfirmed at this time.

On Mosaic Farm, the original farmhouse known as the "Spookhuis" was built from locally quarried limestone block in 1892. It is now used as a guest house and conference venue.

There is apparently evidence of old wagon trails, although the whereabouts of these and their protection status is unknown. Protected milkwood trees are found at various localities around the estuary. Permits are required in terms of the National Forests Act (1998) for pruning or removal of these trees.
9.7 Unauthorised / illegal uses

In 2004 media attention was given to widespread poaching of marine organisms in the Overstrand area, in particular the use of illegal gill nets to trap fish in the Klein and Bot River Estuaries. Although the Overstrand IDP refers to the establishment of a law enforcement unit, and reports that this has improved the Municipality’s ability to enforce the relevant legislation, much anecdotal evidence points to the ongoing illegal exploitation of marine resources, general lack of compliance and an almost complete lack of law enforcement.

Illegal exploitation of resources includes lack of fishing or bait collection permits, exceeding of bag limits for fish and bait and illegal gill netting of fish.

Vandalism is reported to take place regularly, and is apparently carried out by poachers mainly at night. Boat houses are most often targets for vandalism.

Non-compliant activities include:

- The lack of permitting of watercraft (in terms of Overstrand Municipality By-Law Relating to the Control and Use of the Bot River and Klein River Estuaries). This constitutes loss of revenue for the municipality as fees are paid for annual permits.
- Motorboat users not adhering to promulgated use zones, speed regulations and regulated times of use.
- Dumping, leaching of sewage from inadequate, badly located or neglected septic tanks, littering, pollution through runoff (fertilisers, pesticides, swimming pool backwash).
- Occupation of boathouses for overnighting purposes.
- Erection of any structures below the 1:50 year floodline and/or the high water mark, in particular the erection of jetties by riparian landowners, without the necessary authorisation (in terms of GN 22960 of 21 December 2001 and NEMA EIA Regulations GN. R386 and R387 of 2006).

Boat launching sites within the coastal zone including estuaries are required to be registered (Government Gazette 22960 of 21 December 2001) and along rivers, all jetties and slipways must have permits with CapeNature (Nature Conservation Ordinance).

In 2003 the Overstrand MARINES (Management Action for Resources of the Inshore and Nearshore Environments) was established by the Overstrand Municipality, DEAT and WWF-SA. Although their target is to prevent abalone and rock lobster poaching they are also involved in "enforcement of conservation regulations, data gathering, animal rescue service, education and awareness raising". In addition, a second project, PALMIET (Poverty Alleviation through Long-term Management of Inshore Environments for Tourism) has appointed contractors to "manage and maintain access control points along the coast including slipways, picnic sites, Blue Flag beaches and tourist sites. Seventy-five percent of fees from these amenities are used to fund the staff of PALMIET."
9.8 Riparian access rights, land claims, other prescriptive claims

At this stage no land claims have been identified. Prescriptive claims have also not been identified but these may come to the fore once ICM Bill definitions of coastal areas are put into practice on adoption of the Bill. The designation of public access areas by the Overstrand Municipality will need to consider existing corridors of access either based on prescriptive use or on current patterns of access.

There is some debate over riparian rights. A number of properties on the river either extend across or to the midline of the Klein River in the Stanford area. (Land Survey Act No.8 of 1997, s33).

The town of Stanford is considered a riparian owner on the Klein River and as such, all residents have assumed rights over access to the river in the urban area. The slipway at Stanford is for the use of ratepayers. This appears to be the only access on the river or estuary where boats entering the river are checked for permits and pay a fee for access.

9.9 Interest groups focused around local estuarine issues

A well-organized and networked community provides valuable social capital for that community. This can be said of the interest groups that are focused on the estuary and its environs. Many have already been mentioned, and are listed again below:

» Birdlife Overberg
» Birdlife Walker Bay
» Boathouse Owners on the Klein
» Botfriends
» Hermanus Lagoon Property Owners Association (HLPOA)
» Fernkloof Advisory Board
» Hermanus Bird Club
» Hermanus Ratepayers’ Association
» Hermanus Yacht Club
» Klein River Property Owners Association
» Kleinriviersberg Conservancy
» Kleinrivier Forum
» Stanford Conservation Trust
» Kleinriviersberge Conservancy
» Kleinriversvlei Conservation Trust
» Overstrand Conservation Foundation
» Overstrand Heritage and Aesthetics Committee
» Klein River Association of Boating
» Stanford Bird Club
» Stanford Ratepayers’ Association
» Vogelgat Private Nature Reserve
» Waterfalls Private Nature Reserve

9.10 Articulation of issues and a vision for the EMP

During the IAP meeting of 13 November 2007 brief discussion was held regarding the strengths, weaknesses, threats and opportunities in the Klein River estuary and surrounds. Further
input has been requested from IAPs in follow up communication so that adequate detail can be obtained to better understand the issues presented.

At the same meeting participants collectively formulated a vision for the EMP in the form of an 'instruction' to the Technical Working Group. This set of draft objectives, which may be refined by the TWG, reads as follows:

The EMP for the Klein will:

» "ensure the integrity of the estuarine ecosystem and its natural environs;
» "promote the optimal long-term utilisation of the estuary in a sustainable way;
» "address all impacts on the built environment and natural, cultural, social and economic systems; and,
» "be integrated with the Klein Rural Development Framework as provided for in the Overstrand SDF."

9.11 Limitations and gaps in data

Much of the material presented here is anecdotal and/or based in hearsay. This is considered to be admissible for the assessment of social systems but it is noted that what has been presented is a ‘snapshot’: information may change as additional IAPs are consulted, or as issues are reported on in greater detail.

At this stage representative contact has not been made with a large sector of the local community in Stanford. Efforts are continuing.

9.12 Areas needing priority attention

Priority issues include:

- Setting up and assisting the TWG
- Obtaining further input on riparian rights and any prescriptive rights.
- Development of a heritage registry – including mapping of milkwood trees
- Obtaining broader representation
- Maintenance and permitting of slipways (litigation implications in case of accident)
10 EXTRACTIVE RESOURCE USE, GOODS AND SERVICES

Estuaries are some of the most productive economic ecosystems on the planet (Day, 1980 cited in Midgley et al, 2005). Because 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.

Table 17 shows the ecosystem goods, services and attributes of aquatic and water-dependent ecosystems (Turpie and Clark, 2007, adapted from Costanza et al, 1997) and their importance in temperate South African estuaries.

<table>
<thead>
<tr>
<th>Ecosystem Goods, Services &amp; Attributes</th>
<th>Description</th>
<th>Importance in estuaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Provision of water for subsistence use</td>
<td>N/A</td>
</tr>
<tr>
<td>Food, medicines</td>
<td>Production of fish and food plants; medicinal plants</td>
<td>High</td>
</tr>
<tr>
<td>Raw materials</td>
<td>Production of craftwork materials, construction materials and fodder</td>
<td>Medium</td>
</tr>
<tr>
<td>Gas regulation</td>
<td>Carbon sequestration, oxygen and ozone production</td>
<td>Low</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>Urban heat amelioration, wind generation</td>
<td>Low</td>
</tr>
<tr>
<td>Disturbance regulation</td>
<td>Flood control, drought recovery, refuges from pollution events</td>
<td>Negligible</td>
</tr>
<tr>
<td>Water regulation</td>
<td>Provision of dry season flows for agricultural, industrial and household use [spatially and temporally]</td>
<td>N/A</td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion control and sediment retention</td>
<td>Prevention of soil loss by vegetation cover, and capture of soil in wetlands, added agricultural (crop and grazing) output in wetlands/floodplains</td>
<td>Low</td>
</tr>
<tr>
<td>Waste treatment</td>
<td>Breaking down of waste, detoxifying pollution; dilution and transport of pollutants</td>
<td>Medium</td>
</tr>
<tr>
<td>Ecological regulation</td>
<td>Regulation of malaria, bilharzia, liver fluke, black fly, invasive plants, etc.</td>
<td>N/A</td>
</tr>
<tr>
<td>Refugia</td>
<td>Critical habitat for migratory fish and birds, important habitats for species</td>
<td>High</td>
</tr>
<tr>
<td>Nursery areas</td>
<td>Critical breeding habitat, Nurseries for marine fish</td>
<td>High</td>
</tr>
<tr>
<td>Export of materials and nutrients</td>
<td>Export of nutrients and sediments to marine ecosystems</td>
<td>High</td>
</tr>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genetic resources</td>
<td>Medicine, products for materials science, genes for resistance to plant pathogens and crop pests, ornamental species</td>
<td>Low</td>
</tr>
<tr>
<td>Structure and composition of biological communities</td>
<td>Species diversity and habitats providing opportunities for recreational and cultural activities</td>
<td>High</td>
</tr>
</tbody>
</table>
10.1 Value of goods and services

The contribution of estuaries to the national economy in terms of fisheries alone is considered to be highly significant. Lamberth and Turpie (2003, quoted in van Niekerk et al, 2005) estimated the total value of estuarine and estuarine dependent fisheries to be in the order of R950 million in 1997.

The key goods and services provided by the Klein River estuary are identified as follows:

- Limited provision for subsistence use such as fisheries and food (subsistence value estimated to be between R0.05 and R0.1 million per annum). Most of these uses are seen as unregulated and potentially high impact in terms of the estuary’s nursery function.

- Significant ecological services that are not valued appropriately. The nursery function value is estimated to be between R50- and R100 million per annum, in combination, the Bot/Kleinmond and Klein Estuaries provide 40 to 50% of the estuarine nursery habitat for fish associated and dependent on estuaries along 350 km of coast from Cape Point to the Breede River Mouth (Lamberth and Turpie, 2003 quoted in van Niekerk et al, 2005).

- Recreation and tourism provided by Klein River are estimated as being recreation: less than R100 million per annum (Turpie and Clark, 2007). This value however, may be undermined by the existing water quality problems that will exclude certain types of recreation and tourism, possible impacting negatively on the local economy during the tourism season.

Lamberth and Turpie have quantified the value of the Klein River Estuary system to the community, taking into account ecosystem functions, natural resource values and contribution to the local economy. Using methodology adapted from international models, they estimated the value of the estuary to be in the order of R 540 million (WCNCB, 2005).

Information on water abstraction (catchment wide), existence or not of targets, management agreements, user association, licenses etcetera was not available at the time of reporting.

“Poachers using illegal gill nets, known as ‘walls of death’ because of the destruction they wreak, are hauling in fish - worth about R128-million to the national economy - in estuaries near Hermanus. The value of the Bot River and Klein River estuaries to commercial fisheries in South Africa is about R160-million a year. Gill net poaching is wiping out about 80 percent of that a year”.

“Gill net poaching is affecting white steenbras, dusky cob, elf, mullet and leervis, the populations of some of which have reached biological collapse.”

10.2 Limitations and gaps in the data

The information gaps relating to water abstraction and water uses, as well as harvesting of marine living resources, are significant and will require further effort. The assistance of S.Lamberth (DEAT – MCM) and J.Roberts (DWAF – Breede WMA) will be sought in this regard.

10.3 Areas needing priority attention

The EMP needs to address:

» Further investigation of the estuary’s functioning as a nursery area for marine species, in particular the role of mouth management, water quality and quantity and the definition of a sufficiently large nursery area as a no-take zone;
» Tourism and recreation aspects and the potential impact of poor management in terms of shoreside facilities and water quality and quantity
» The need to develop a consolidated data set on current rates of surface and ground water abstraction and uses (including waste water discharge) for the estuary;
» Dealing with compliance and enforcement / permitting and poaching – harvesting of marine living resources;
» Taking into account both the impacts and value of the uses of the estuary, as well as the potential conflicts associated with use and value, using the framework developed by Turpie and Clark (2007).
11 LANDSCAPE VALUE

The assessment of landscape value is based on material presented in the Overstrand SDF, GIS analysis and personal observation during a site visit conducted in July 2007.

The Overstrand SDF identifies the heritage value of the landscape in terms of its features including *inter alia* the R43 as a potential designated scenic route, the groves of milkwood trees and the combination of rocky shore, lagoon and beach, a sense of containment between mountain and sea and the linkage role of the Mossel River and Klein River systems. The Municipality is planning to commission a Heritage Resource Survey to initiate the realisation of its heritage strategies and will develop a series of overlay zones as a means of integrating heritage proposals into its planning scheme and land use management system (Data Sheet No.15).

The topography of the valley corridor is a particularly strong feature in the estuarine environment’s sense of place (Figure 16). This, in combination with the prevalence of conservation areas and special habitats, is what creates the conditions to support the designation of the R43 as a Scenic Route. An intervention of this sort requires that visual impacts are managed *inter alia* through the protection of views and development control. Figure 17 shows the extent of area that is covered by views generated from the vantage point of the R43. The section of the route between the estuary and the Kleinriviersberge could be much improved by the introduction of a ‘gateway’ experience at the point where the road intersects the urban edge of Hermanus and likewise on the Stanford end. There is a strong sense of having reached the ‘end of the road’ when departing Hermanus via the southern end of Voëëëklip. The location here of the former garden refuse site and sewerage pump station serve to highlight that this clearly was the case in former times. There is also a need to consider the links between the route and the estuary – visual and access routes. At the moment these are limited due to alien vegetation (wind breaks), poor signage and/or the absence of public access routes in predominantly privately owned riparian areas.

The Structure plan (DMP, 1993) provides much insight and attention to landscape issues. The proposals include a no-go cut-off for development at the 120m contour line and the limiting of development to one side only.

In a valuation of the environmental goods and services provided by the estuary, non-use values or existence values of the Klein are seen to be “medium” in relation to other temperate estuaries (Lamberth and Turpie, 2003 cited in van Niekerk et al, 2005). Landscape value in relatively untransformed landscapes nevertheless has significant implications for tourism and recreation. Visual impacts should therefore be considered not only from the vantage point of the proposed scenic route and urban areas but also from the point of view of people who recreate on or alongside the water body. This is readily achieved at this low elevation by maintaining a margin of untransformed vegetation on all riparian frontages.

The EMP will:

» Take into account the visual impact of any proposals, for example relating to any shoreside recreational facilities, relative to landscape value and

» Endeavour through its interventions to strengthen the landscape heritage aspect of the proposed Scenic Route.

» Support the Municipality’s proposals by identifying measures that will satisfy ecological sustainability and landscape considerations.
Figure 16  Landscape with overlaid heritage considerations
Figure 17  Viewsheds generated from the route of the R43 road
12 DATA ASSESSMENT

In an assessment of this nature, it is the assembling of the data, rather than the review and application of the data itself, that invariably consumes the bulk of the effort. It is also inevitable that there will be data that is known to exist but cannot be sourced, and that there will be data that is not revealed in any form. The situation is exacerbated by the constraint of time frames and the need, at a certain point, to cease pursuing data, ‘bank’ what is available and proceed with the assessment.

This experience is evidently widespread. The following statement is supported by this team:

“An estuaries database should be established in which all relevant existing scientific and management information for individual systems can be stored, and more importantly, accessed easily as required.”

(Buffalo City Municipality: Estuarine Management Component of Coastal Zone Management Plan, 2005)

Towards this end, we have included a (in incomplete) database of material pertaining specifically to the Klein, as well as the GIS datasets that were used in the course of this assessment, or are still awaited.

The inclusion of this database in the Draft Report presents the opportunity for reviewers to contribute to its expansion.
<table>
<thead>
<tr>
<th>Short name / description</th>
<th>Theme</th>
<th>Reference if available</th>
<th>Availability</th>
<th>(Possible) Source</th>
<th>Comments</th>
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<tr>
<td>Recreational facilities performance study / audit</td>
<td>Land use &amp; Infrastructure Development</td>
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<td>Availability</td>
<td>(Possible) Source</td>
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<td>Land use and Infrastructure</td>
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<td>Kleinviersvlies Structure Plan</td>
<td>Recreational carrying capacity</td>
<td>Dennis Moss Partnership</td>
<td>Available</td>
<td>Overstrand Municipality Town Planning Dept</td>
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<td>Fish population data</td>
<td>Resource value</td>
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<td>Unknown</td>
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<td>Availability</td>
<td>(Possible) Source</td>
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</tr>
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<td>Anecdotal references to a flow meter on the river</td>
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<td>Limit of saline intrusion</td>
<td>Water Quality and Quantity</td>
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<td>Required for spatial definition of the estuary</td>
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<td>Bird counts</td>
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<td>Available</td>
<td>Hermanus Bird Club UCT ADU</td>
<td>Bird counts undertaken since 2001</td>
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## GIS DATA AND MAPS

<table>
<thead>
<tr>
<th>Category</th>
<th>Datasets</th>
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</table>
| **Study area**            | • Three quaternary catchments of the Klein River  
• 1km buffer area around estuary (developed by buffering outer extent of estuary as defined in layers provided by T. Bornman, 2007)  
• Stanford bridge                                      |
| **Biodiversity (pattern and process)** | • SANBI Vegetation Map  
• Vegetation ecosystem status (critically endangered, endangered etc) based on SANBI vegetation map and integrated land-cover layer from D. Kirkwood and using latest SANBI guidelines for determining ecosystem status.  
• Agulhas plain original (historic) vegetation layer. Only extends over part of the immediate estuarine catchment area.  
• River conservation status, source NSBA (all major rivers within our catchments are critically endangered).  
• Overstrand special habitats from SANBI Putting Plans to Work project. Mapped features within our area include wetlands and milkwood patches.  
• Theewaterskloof priority clusters from SANBI Putting Plans to Work project. Essentially shows critical renosterveld patches with a 500m buffer.  
• Theewateskloof special habitats from SANBI Putting Plans to Work project. Features in our area are all wetlands.  
• Red Data and Orange list plants (point locations from CREW) with locational precision of 500m or better. Still awaiting official okay to use the data.  
• Red Data Protea species (point locations), source = Protea Atlas  
• Overberg-Agulhas Plain Coast to Interior Corridors, specifically the Bredasdorp mountains to Stanford/Hermanus/Gansbaai component.  
• Sand movement corridor along Walker bay coast (based on dune pioneer BHUs from CAPE) |
| **Estuarine habitats**    | Estuarine habitat map produced by Tommy Bornman (NMMU) for the C.A.P.E. Estuaries Programme’s regional estuaries conservation assessment and plan (Turpie & Clark, 2007). Extends from coast to Stanford bridge and maps the following systems within the estuary:  
• Open water  
• Phragmites  
• Reeds and sedges  
• Rocky banks  
• Supratidal saltmarsh  
• Submerged vegetation  
• Sand banks  
• Salt pan  
• Salicornia and Sarcocornia |
| **Conservation**          | • Protected area boundaries (including provincial reserves, local authority reserves, private nature reserves, national heritage sites)  
• Conservancy boundaries |
| **Hydrology**             | • 1:50 000 rivers (for some have river health status provided by D. Kirkwood)  
• 1:500 000 rivers  
• Catchment and sub-catchment boundaries  
• River geomorphic provinces |
| **Topography**            | • Digital elevation model  
• Slope |
<table>
<thead>
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<th>Datasets</th>
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<tr>
<td></td>
<td>· Aspect</td>
</tr>
<tr>
<td></td>
<td>· Contours can be generated if required, but only at intervals &gt;= 20m if accuracy is required</td>
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<td>Land-cover</td>
<td>Integrated broad land-cover developed by D. Kirkwood (e.g., natural, near-natural, degraded, transformed etc). Following land-cover datasets integrated:</td>
</tr>
<tr>
<td></td>
<td>· National Land-Cover 2000</td>
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<td></td>
<td>· Agulhas Plain land-cover</td>
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<tr>
<td></td>
<td>· Lowlands land-cover</td>
</tr>
<tr>
<td></td>
<td>· Cultivated field mapping</td>
</tr>
<tr>
<td></td>
<td>· National land-cover 2000 dataset</td>
</tr>
<tr>
<td></td>
<td>· Stanford urban area mapped off Spot 5 imagery (developed to produce viewshed from Stanford)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>· Soil potential (Elsenburg)</td>
</tr>
<tr>
<td></td>
<td>· Land capability (ARC)</td>
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<tr>
<td></td>
<td>· mapped cultivated fields (Elsenburg)</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>· Roads (doesn’t include roads within settlements, e.g., Hermanus)</td>
</tr>
<tr>
<td></td>
<td>· R43 Scenic route (viewshed generated from this line)</td>
</tr>
<tr>
<td></td>
<td>· Railway lines (one line runs through the north of the catchment)</td>
</tr>
<tr>
<td></td>
<td>· Waste facilities (gives type of facility and whether open or closed). Four features in the catchment</td>
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<tr>
<td>Population</td>
<td>· 2001 census dataset</td>
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<tr>
<td>Context</td>
<td>· Place names</td>
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<tr>
<td></td>
<td>· Municipal boundaries</td>
</tr>
<tr>
<td></td>
<td>· 1:50 000 topographic maps</td>
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<tr>
<td>Imagery</td>
<td>· Spot 5 colour imagery for all three quaternary catchments</td>
</tr>
<tr>
<td>Hardcopy maps</td>
<td>· 1:10 000 orthophotos for estuarine area (dated 1989)</td>
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<td></td>
<td>· Kleinriviersvlei and Klein River Structure Plan – Bathymetry survey, vegetation</td>
</tr>
<tr>
<td>Overberg SDF</td>
<td>· Cadastre</td>
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<tr>
<td></td>
<td>· Spatial Planning Categories</td>
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<td>· Urban edge</td>
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<td></td>
<td>· Rural Development Area boundaries</td>
</tr>
<tr>
<td></td>
<td>· Intensive Agricultural Resource Areas</td>
</tr>
<tr>
<td>Various datasets to be sourced from Umvoto Africa</td>
<td>· Geology</td>
</tr>
<tr>
<td></td>
<td>· Borehole locations</td>
</tr>
<tr>
<td></td>
<td>· Water use monitoring</td>
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<tr>
<td></td>
<td>· Aquifer water level</td>
</tr>
<tr>
<td></td>
<td>· Aquifer recharge calculations</td>
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13 INTEGRATED ASSESSMENT

For the purpose of an integrated assessment, discussion will be grouped in five themes proposed in the Generic Estuarine Management Plan of the C.A.P.E. Estuaries Programme (van Niekerk and Taljaard, 2007). The five themes are:

» Conservation
» Social and cultural issues
» Land use and infrastructure
» Water quantity and quality
» Exploitation of living resources

In each theme, key indicators of issues requiring attention will be brought forward from each of the assessments in the document (sections 5 to 11), along with the implications arising from the earlier sections (fundamental concepts, policy, legislation and planning frameworks). These will be presented as priority areas for attention in the EMP in the form of recommendations for the strategy frameworks that will guide the development of the Klein River Estuarine Management Plan. The recommendations will include reference to recognisable management tools where appropriate. Spatial references will be provided where such recommendations are supported by data availability.

The discussion will be ordered according to the questions:

Why is it important?
What are the implications and what are the mechanisms that can be brought to bear?
How will it be achieved and what tools can be enlisted to support the process?

13.1 Conservation

Why is it important and what are the implications?

Estuaries are highly productive economic ecosystems due to their location at the interface between terrestrial, freshwater and marine environments. Amongst other things, they serve as nursery areas for a number of fish and shellfish that are vital to the persistence of South Africa’s fisheries. On the stretch of coast between Cape Point and the Breede River, the Bot and Klein River estuaries account for 40-50% of the nursery habitats required to support these fisheries. The value of the Klein River Estuary system has been estimated to be in the order of R 540 million per annum (Lamberth and Turpie, 2003, cited in WCNCB, 2005).

Turpie and Clark (2007) rated the Klein River estuary as a highly important site – fifth most important of all temperate estuaries in South Africa – due to its potential to contribute cost-efficiently to meeting the biodiversity conservation targets that have been set for the habitats that are found at the Klein River estuary. One of the contributing factors to the rating was the high valuation that was awarded to the Klein River estuary’s tourism value and the approach that was used, whereby the potential for the estuary to be conserved as a sanctuary was counted as 50% of the area with the remainder being assumed to be unavailable for conservation purposes within the economic parameters that were applied.
In order to achieve the share of the biodiversity conservation target awarded to the Klein, 50% of the estuary's terrestrial margin should remain untransformed or be rehabilitated. Our assessment examined a 1km margin around the estuary and found that approximately half of this area is currently mapped as intact (natural) habitats (Figure 12). The implication is that the targets could be achieved by restricting development in the area to the existing footprints of transformed land cover areas.

The estuarine sub-catchment G40L includes a high proportion (17%) of designated terrestrial protected areas. The functionality of all ecosystems in the area – terrestrial, estuarine and marine – could be reinforced through the protection of corridors, in which the Klein River and the estuary could play a major role as a connecting device between the coastal margin and the interior.

The Overstrand Municipality has adopted spatial development strategies that support conservation through an interlinked web of natural spaces, which includes the Klein River corridor, and the protection of important and sensitive habitats. The Municipality plans to limit eco-tourism development within designated nodes and clusters, avoiding linear development along rivers, for example. The potential for a Scenic Route on the R43 (which runs parallel to the estuary) has been identified, in terms of which landscape heritage is to be conserved. The route will enhance the Overstrand’s status as a desirable tourism destination and residential / business location.

What are the mechanisms that can be brought to bear?

Historically, estuaries appear to have fallen through the gap between terrestrial parks and marine protected areas and there is no straightforward answer to the question.

The discussion that follows aims to identify the appropriate vehicle(s) for protecting the value of the Klein River estuary as an ecological, cultural and revenue-generating resource on the basis of the values described in the preceding discussion.

The NEM: Integrated Coastal Management Bill (2007) does not introduce any mechanisms for protection as such, of estuaries or marine areas, but provides the framework for cooperative management towards a conservation goal. The Coastal Protection Zone is a terrestrial management zone which may include protected areas as defined in the Protected Areas Act (2003) and which enables land use to be managed, regulated or restricted for various purposes, including the protection of ecological integrity, inter alia (refer Data Sheet 11 for the full list).

National parks and nature reserves were traditionally viewed as terrestrial conservation mechanisms and were frequently defined in terms of riverine boundaries, which meant that protected status ended at the river’s edge. Many of the nature reserves that abut estuaries were originally established as forest reserves to protect coastal dune vegetation and were proclaimed as nature reserves in the 1970s. Establishment and management of nature reserves, as well as national parks and other protected areas, is enabled through the NEM:

“Currently there is no mechanism for conserving the biodiversity of South African estuaries, particularly those that exist outside protected areas (the majority)” (Hay, 2003: 4)

Preliminary findings of the National Spatial Biodiversity Assessment of estuaries confirmed that only 39 of the total 258 estuaries along South Africa’s coast enjoyed any form of protection (Turpie, 2004).
The legislation does not provide a definition for ‘marine’, as in Marine Protected Area (MPA)
In terms of the Protected Areas Act and its amendment, privately owned land can be designated as a protected area provided that the owners have agreed to this. The management is assigned ‘to a suitable person, organisation or organ of state’ by the Minister or MEC, “provided that the owner and lawful occupier have requested or consented to such assignment” (Protected Areas Act s.38(1)(b)). These clauses make it possible for protected areas to be privately owned and managed. Assignment arrangements also provide the basis for some protected areas to be managed by the Environment Services Units of local municipalities.

The Protected Areas Act also makes provision for protection of privately owned land through establishment of a ‘Protected Environment’. This mechanism allows owners to continue to dwell on the land and pursue activities that are supported by the land use zoning and the objectives of the protected environment. It is the channel through which conservancies are established.

C.A.P.E.’s Conservation Stewardship programme aims to protect habitats and establish biodiversity corridors within productive landscapes in the CFR through arrangements with private land owners. Incentives are available through a municipal property rates exemption enabled through the Property Rates Act (2004). Three stewardship options are available and are described in further detail in Data Sheet No.31.

- Conservation sites;
- Co-operation agreements;
- Contract nature reserves.

A number of mechanisms provide vehicles for defining areas that require activities or processes to be regulated through the EIA authorisation process:

- The Biodiversity Act (2004) makes provision for this in areas that have been identified as threatened or protected ecosystems.
- The EIA Regulations (2006) identify the area within 100 metres of the high-water mark of the sea (not estuaries) as an area where authorisation is required for a range of activities that may disturb the coastal environment.
- Similarly the EIA Regulations (2006) identify the area within the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, as an area where authorisation is required for the construction of facilities or infrastructure, excluding purposes associated with existing residential use.
- The Coastal Protection Zone to be established through the ICM Bill holds potential for such provisions to apply in this zone which extends *inter alia* across riparian properties zoned for agriculture (refer Data Sheet No.11).
The National Water Act (1998) provides a basis for protection of water quality and flow through enforcement of a ‘polluter pays’ policy and the determination of an ecological reserve.

**How will it be achieved and what tools can be enlisted to support the process?**

The analysis above suggests that there is no single mechanism that can adequately achieve the target of conserving 50% of the estuarine water body and 50% of the terrestrial margin in an untransformed state (not necessary as a designated protected area).

The EMP would therefore need to base its conservation strategy on a multi-pronged approach, employing as many of the mechanisms as are suitable and necessary to achieve the objective. These would need to be held together in a co-operative management framework which could be referred to spatially as an ‘Estuarine Management Area’. Reyers and Ginsburg (2005) applied this concept in the preparation of a Conservation Assessment for the Wild Coast, based on a system of categorising estuaries into three types developed by Turpie under the auspices of the NBSAP. In the course of preparing the SDF for the Wild Coast (DMS, 2005), the assistance of Hay was enlisted to provide a set of recreational use guidelines to match the categories. In terms of this, an EMA involves regulation through a basic set of regulations with the intention of imposing limits on

- consumptive activities and pollution
- disturbance of sensitive habitats
- development of the estuarine margin
- stabilisation interventions and
- mouth management interventions.

In addition to the conservation of habitats, the EMP will need to address issues relating to water quality and quantity in order to support the sustainability of biodiversity persistence. This is addressed in a following discussion.

**13.2 Social and cultural issues**

**Why is it important and what are the implications?**

A participatory planning, co-operative governance and co-management based approach is essential for estuarine management due to the diverse range of IAPs involved. In most instances, including the Klein River, these range from national government departments such as DEAT’s MCM sub-directorate, due *inter alia* to the significant role of the estuary to South Africa’s fisheries, to local residents of the Overstrand Municipality who have an indirect interest in the estuary through the benefits that economic growth of the region provides in the way of livelihoods, and the riparian residents who have strong heritage attachments to the estuarine environment.

The municipal Council of the Overstrand in particular has a significant role in the EMP, not least due to their locational advantage in respect to any policing or permitting associated with the management of the estuary, and their obligations in terms of policy and the law. The eradication of poverty is high on this agenda and the municipality faces a backlog of housing and basic services needs which must be financed to
some degree from its income base. In addressing a conservation agenda, the EMP must also acknowledge and find strategies for supporting the municipality in its development agenda through mechanisms for offsetting any revenue losses with equivalent benefits. Losses to the rates base resulting from the conversion of land zoned for agriculture to land managed as a protected area, and thereby exempt from rates, would be minimal because agricultural properties in the Overstrand enjoy a 90% reduction in property rates.

Other significant issues that will need to be addressed in the EMP relate to private ownership of estuarine margins and mechanisms for mobilising these resources in meeting the EMP objectives, as well as illegal exploitation of marine living resources, vandalism of facilities associated with estuarine recreation, limitations on public access to the estuary, and conflict around recreational use of the water body.

What are the mechanisms that can be brought to bear?

There is overwhelming support from the Estuarine Forum, who drafted an instruction to the TWG for the preparation of an EMP for the Klein River that will –

- ensure the integrity of the estuarine ecosystem and its natural environs;
- promote the optimal long-term utilisation of the estuary in a sustainable way;
- address all impacts on the built environment and natural, cultural, social and economic systems; and,
- be integrated with the Klein Rural Development Framework as provided for in the Overstrand SDF.

The social and political will of the Estuarine Forum is potentially the most effective mechanism for resolving the social and cultural issues that need to be addressed through the EMP. This needs to be harnessed through the introduction of a co-management structure that enables people who are directly affected to work co-operatively with people who have the requisite technical, scientific and social skills towards a shared vision.

How will it be achieved and what tools can be enlisted to support the process?

The foundation for a co-management structure was laid at a public meeting held in Hermanus on 13 November 2007 where it was resolved that an Estuarine Forum be launched. This was proposed, and accepted, as a long-term, inclusive forum representative of a wide range of interest groups and affected parties, including all relevant government agencies, NGOs and community-based organisations. The Estuarine Forum is being formalised through registration of IAPs, and supplemented by 'head hunting’ where there are representation gaps. It serves as a communications network of interest groups and provides an opportunity for civil society and government to come together. Meetings will be held when necessary, perhaps quarterly, on an ongoing basis continuing into the implementation stage of the EMP.
In addition, the meeting agreed to the establishment of a Technical Working Group (TWG) which will have a finite life, working with the consultant team in the preparation phase of the EMP. This reference group is made up of experts in the five theme areas as well as sector representatives from government and certain other attributes. The meeting was invited to nominate candidates in these categories, and bearing in mind that people representing government sectors should ideally be decision-makers (or their representatives) in the mandated government agencies that have a role in Estuarine Management, members of the TWG should have time available to participate, during working hours, either on a voluntary basis or in fulfilment of their regular employment. One of the first tasks of the TWG will be to comment on the draft Assessment Report.

Nominations were received in the following categories:

- Experts in Conservation : Social and Cultural : Land use and infrastructure : Water Quality and Quantity : Resource use


- Other desirable attributes: Local knowledge : Conflict resolution : Estuarine ecologist : Chairing : Legal.

The Project Team will facilitate the inaugural meeting of the TWG but it is the intention that the TWG will operate independently of external support.

13.3 Land use and infrastructure

**Why is it important and what are the implications?**

The biggest potential threat to the estuarine system at present, within this theme, is the uncertain status of the proposed RDA. The SDF provides inadequate clarity on the intentions of this planning tool, the area of which coincides approximately with the estuarine terrestrial margin. This makes it vulnerable to inadequately regulated and discretionary decision-making processes that could impact negatively on the potential for the EMP to give effect to the instructions of the Estuarine Forum.

A number of potential point sources of discharges that pose a contamination or other pollution threat to the estuary have been identified for further investigation, including the leiwater channels in Stanford which are reportedly used for discharging chlorinated swimming pool water into the Klein River. Unmonitored groundwater abstraction, potentially leading to collapse of aquifers and reduced water available for ecological processes, is also an issue that requires attention in the EMP.

The large surface area of the water body has a high physical carrying capacity but ecological carrying capacity is an unknown factor and requires precautionary measures. The existing zoning plan and by-laws offer some measure of protection but should be reviewed in terms of the EMP’s conservation strategies. Recreation use needs to be linked to
public access and shoreside facilities which improve on currently poor levels of accessibility. The legal status of public boat launch sites is not altogether clear, and the management of boat houses, jetties and slipways, generally, requires a strategy.

What are the mechanisms that can be brought to bear?

The introduction of an Estuarine Management Area and 50% transformation limit in the estuarine margin, as discussed in the Conservation section of this assessment, provides a useful foundation for Land Use Management in the estuarine area that should be explored further on the basis that –

- Development should be limited to the current footprint of transformed land cover;
- Any new development or alterations should be assessed for impact on the estuarine environment and on the landscape value associated with the proposed scenic route and view corridors;
- State-owned land in the area should be designated as protected areas and rehabilitated if it is not in a natural state, with the exception of areas required for development that supports public recreation and tourism activities in appropriate locations based on the reviewed Estuarine Zoning Plan;
- Mechanisms for realising offsets from loss of revenue would need to be investigated and could possibly include a land swap – of rehabilitated land for untransformed land where particular circumstances support it – with the objective that the 50% target for conservation areas is managed as a ‘Reserve’ of untransformed or fully rehabilitated land and provided that any replacement portions of land contribute to the required ecosystem linkages.

How will it be achieved and what tools can be enlisted to support the process?

Apart from the areas that are formally designated and regulated in terms of the Protected Areas Act, there are a number of mechanisms that could provide vehicles for managing development and recreational activities in the Estuarine Management Area, which were introduced in the discussion of Conservation mechanisms. They include identification of threatened or protected ecosystems, EIA regulated activities within the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, the Coastal Protection Zone to be established through the ICM Bill, and the promulgation of a municipal by-law in support of the general regulating measures applicable to an EMA. The various overlay zones could potentially be reflected in the zoning scheme and in an Environmental Management Framework.
13.4 Water quantity and quality

Why is it important and what are the implications?

Both quantity and quality are essential to the healthy functioning of an estuarine system for the purpose of supporting nursery and conservation habitats as well as tourism and recreational uses such as swimming, boating, angling and birdwatching.

Mouth management is a critical factor in this regard. The mouth is the link between estuarine and marine systems, permitting – when open – the passage of the animals that use the estuary as periodic habitats at specific stages of their life cycles, linked to specific seasons. In addition, water flowing out at ebb tide transports with it nutrients and sediments that are also essential to the marine zone. It is clear that the timing of mouth openings is linked to seasonal weather patterns which, barring the influence of climate change, would coincide with fish breeding cycles. This issue requires careful consideration of the respective costs and benefits associated with artificial manipulation of mouth opening compared with a rehabilitation programme that takes into account the projected impact of climate change on low-lying coastal development.

Levels of abstraction in the river catchment need to be balanced against the ecological Reserve that is required to maintain healthy estuarine processes. The threat of potential point sources of pollution, discussed in the Land Use and Infrastructure theme, justifies the introduction of a monitoring programme if this is not already being done.

Alien vegetation control in the riverine system requires further investigation as it is unclear at this stage whether it is contributing to, or preventing, siltation in the lagoon.

What are the mechanisms that can be brought to bear?

There is an existing policy on mouth management for the Klein River, prepared in 1998. There are a diverse range of opinions on management alternatives, and there are almost as many examples of similar situations along the South African coast as there are temporarily closed estuaries. There are lessons learnt from these experiences that should be documented and cross-referenced against scientific studies to arrive at a national policy on mouth management with associated guidelines as part of the National Estuarine Protocol. The guidelines could be used to determine a local policy associated with each EMP.

Abstraction of water is managed through water user licensing, a system which is already operational and which will make it possible to ascertain the level of abstraction on the Klein River. The system is enforced through the National Water Act (1998) which makes provision also for preventing pollution through a ‘polluter pays’ principle, thereby addressing the issue of water quality. The control of alien vegetation is regulated in terms of CARA (1983) and supported by DWAF’s Working-for-Water programme and the Department of Agriculture’s LandCare programme, both of which are active in the Overberg District.
How will it be achieved and what tools can be enlisted to support the process?

The determination of an ecological Reserve is a component of DWAF’s toolkit of Resource Directed Measures (RDM), which includes a Reserve determination for basic needs as well as Resource Quality Objectives which set targets for water quality. The data requirements for both an intermediate level and a comprehensive reserve determination are reviewed in this report and indicate that there is inadequate data available in the short-term for even an intermediate level determination. It is proposed, in line with a strategic adaptive management approach, that the monitoring required to assemble the data is initiated but that interventions should not be delayed. A desired end-state should be described and intuitively derived interventions designed and adapted as information on impacts becomes available. This requires a well-designed monitoring and evaluation programme as a fundamental component of the EMP. The selection of indicators should also be strategic, using keystone indicators that are more economical to measure where possible. Avoid “DRIP Syndrome” – data rich, information poor (Olive Project Planning Handbook).

The EMP should include a strategy for managing alien vegetation and other catchment generated impacts, including siltation, and flood attenuation and response measures in collaboration with the District Municipality.

Finally, the issue of mouth management requires priority attention on a national scale, with a long-term view and the co-operation of experts and implementers from all coastal regions.

13.5 Exploitation of living resources

Why is it important and what are the implications?

At the local level, exploitation of living resources in the Klein River estuarine environment appears to be comparatively negligible, based on reports to date. The estuary does not support a community of subsistence fishers, or reed harvesters, as do many others in the eastern regions for example. However, the location of the Klein River relative to South Africa’s most productive fisheries, and the research that indicates its niche on this part of the coast along with the Bot estuary, as a nursery for marine species which are possibly critically endangered, means that even small losses to the system are significant. The impact of illegal harvesting therefore demands priority attention even if it is occurring on a small-scale. The combined value of the Klein and the Bot Rivers’ contribution to South Africa’s commercial fisheries is estimated at between R50-100 million per annum (Lamberth and Turpie, 2003, cited in van Niekerk, 2005).

What are the mechanisms that can be brought to bear?

The regulation of marine resources extraction has become highly politicised in South Africa with the issue of abalone being the most recent of these debates. It is regulated in terms of the Marine Living Resources Act (1998) and managed and enforced by the Department of Environmental Affairs’ Marine and Coastal Management Sub-directorate. The policing of South Africa’s 3,000 km coastline is a
challenging task which the Department is under pressure to resolve. In the Overstrand area, there is a local initiative called the ‘MARINES’ (Management Action for Resources of the Inshore and Nearshore Environments), co-ordinated by the Municipality.

How will it be achieved and what tools can be enlisted to support the process?

The EMP needs to provide the channels for co-operation between MCM, the local municipality and communities, and other stakeholders to engage with this issue and, at a local level, contribute to the resolution of the wider-scale problem.
14 CONCLUSION

In planning for an EMP that meets the draft objectives articulated by the Estuarine Forum, that the EMP for the Klein River will –

A Ensure the integrity of the estuarine ecosystem and its natural environs;
B Promote the optimal long-term utilisation of the estuary in a sustainable way;
C Address all impacts on the built environment and natural, cultural, social and economic systems;
D Be integrated with the Klein Rural Development Framework as provided for in the Overstrand SDF

The summarised outcomes of the assessment are linked to the objectives as follows, in order to test their integrity (Table 19):

Table 19 Evaluation of strategy options relative to the Estuarine Forum’s draft objectives for the Klein River EMP

<table>
<thead>
<tr>
<th>THEME</th>
<th>DRAFT STRATEGY OPTION</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSERVATION</td>
<td>Establish an Estuarine Management Area as a spatial framework that assembles a range of mechanisms for achieving biodiversity conservation targets for the estuary and its terrestrial margin</td>
<td>⭐</td>
<td>⭐</td>
<td>⭐</td>
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</tr>
<tr>
<td>SOCIAL AND CULTURAL ISSUES</td>
<td>Support the establishment and ongoing operation of a broadly representative and enduring Estuarine Forum, as well as a Technical Working Group, that will work on a co-operative management basis to harness social and political will for the purpose of achieving their common vision as represented by the Estuarine Forum’s objectives</td>
<td></td>
<td></td>
<td>⭐</td>
<td></td>
</tr>
<tr>
<td>LAND USE AND INFRA-STRUCTURE</td>
<td>Support the establishment and sustainability of an Estuarine Management Area through the application of relevant regulations and the introduction of municipal by-laws and enforcement capacity</td>
<td>⭐</td>
<td>⭐</td>
<td>⭐</td>
<td></td>
</tr>
<tr>
<td>WATER QUANTITY AND QUALITY</td>
<td>Initiate a well-designed system for monitoring water quantity and quality with a view to the introduction of Resource Directed Measures. Apply the principles of adaptive management in order that short-term results can be used to inform adaptations to intervention strategies aimed at improving water quantity and quality</td>
<td>⭐</td>
<td>⭐</td>
<td>⭐</td>
<td></td>
</tr>
<tr>
<td>EXPLOITATION OF LIVING RESOURCES</td>
<td>Engage with DEAT-MCM, the local municipality and communities, and other stakeholders to address the issue of illegal harvesting of marine living resources at the local level.</td>
<td>⭐</td>
<td>⭐</td>
<td>⭐</td>
<td></td>
</tr>
<tr>
<td>LEARNING</td>
<td>Support the development of the National Estuarine Management Protocol through the documentation of lessons learnt.</td>
<td></td>
<td></td>
<td>⭐</td>
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</tr>
</tbody>
</table>

It is impossible to assess the strategy options in relation to draft objective “D” because there is no clear statement of intent, or objectives, for the proposed RDA. It is suggested that the wording of this objective be revisited. The addition of the theme ‘Learning’ is considered appropriate to the programmatic context of this as a ‘pilot’ EMP in the C.A.P.E. Programme which has an ethos of learning from doing, and that it needs to be made explicit in order to be properly monitored and reported on.
15 RECOMMENDATIONS

The Project Team requests the assistance of the reviewers of this Draft Report (December 2007) in correcting any errors and furnishing any outstanding and relevant information (Section 12) before the project moves into the next stage of developing strategies at the end of January 2008.

The assessment is based on available data. It is recommended that the reviewers satisfy themselves that this provides sufficient basis on which to proceed. The subsequent planning exercise of preparing Management Action Plans and an Estuary Zoning Plan would be effected through a process of picking up and carrying forward all the ‘action items’ highlighted in this report as pertinent to the preparation or implementation of the EMP.
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