

C.A.P.E. Estuaries Programme

**DEVELOPMENT OF THE ESTUARINE MANAGEMENT PLAN
FOR VERLORENVLEI: SITUATION ASSESSMENT
(FINAL DRAFT)**



C.A.P.E. Getrivierprogram

**ONTWIKKELING VAN 'N GETRIVIERBESTUURSPLAN VIR
VERLORENVLEI: SITUASIE ASSESERING
(FINALE KONSEP)**

An Executive Summary of a Project/'n Bestuursopsomming van 'n Projek:

C.A.P.E. Estuaries Programme. Development of the Estuarine Management Plan for Verlorenvlei: Situation Assessment

C.A.P.E. Getyrvierprogram. Ontwikkeling van 'n Getyrvierbestuursplan vir Verlorenvlei: Situasi Assesering.

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Executive Summary

Summary of Problems and Impacts

Through stakeholder consultation, 16 key activities have been identified as threatening (or potentially threatening) to the ecosystem services provided by Verlorenvlei. These activities contribute to an array of problems and associated environmental impacts and socio-economic consequences, when managed inappropriately, as illustrated in Tabel.5 and Tabel 6. From these tables it is clear that there are no one-to-one linkages between the activities, problems and impacts – several activities can contribute to one or more problems which, in turn, can contribute to more than one impact, and vice versa.

The following section provides a brief description of these key activities and their related potential impacts on the Verlorenvlei:

- **Veld fires** in and around Verlorenvlei lead to soil erosion and increased sedimentation. This can be particularly problematic at Verlorenvlei as it has a constricted outlet that prevents sediment scouring during floods leading to an accumulation of sediments in the system.
- **Road Infrastructure** refers to the roads and embankments in the floodplain and the crossings and culverts that transverse it. The roads and embankments stabilize the course of the vlei and often create a different substrate character compared with the natural situation. The numerous crossings and culverts (e.g. road bridge to Elandsbay, crossings to Grootdrift and Redelinghuys, informal crossings near mouth and railway bridge) cutting across the system frequently restrict its flow, stabilizes its course and leads to increased reed growth. The construction of informal crossings near the mouth and at the railway bridge has led to the destruction of habitat and disturbance of bird life.
- **Riparian Infrastructure** refers to all infrastructure in the floodplain of the system. Of particular concern are the low-lying properties near the mouth of the system, i.e. along the estuarine channel. There are numerous examples along the coast where this type of urban creep starts putting pressure on local authorities to manage the water level in a system artificially. An additional concern is the many fences that span the floodplain that restrict access and result in overgrazing in the areas where animals are kept. This causes changes in the species composition of the floodplain vegetation.
- **In-stream infrastructure** refers to jetties and pumphouses that could have a localized influence on circulation patterns in the vlei.
- **Recreational activities** include non-consumptive activities such as boating and swimming that may have a limited localized disturbance impact on the birdlife. Windsurfing, however, results in a high disturbance impact on the avifauna.
- **Open-cast Mining** of tungsten and molybdenum of is being proposed in the upper catchment of Verlorenvlei at Metonsoek. This mining development is likely to need significant freshwater supplies, hold significant risk for the sense of place in the area and can potentially cause pollution of the freshwater supplies flowing into Verlorenvlei.
- **Artificial breaching** of the mouth is rumoured to be undertaken as a result of the backflooding of the floodplain (grazing land) in the upper vlei. Artificial breaching can lead to loss of water column habitat and a reduction in estuarine productivity.

- **Agriculture: Crop production and livestock grazing** in the catchment results in increased soil erosion and related sedimentation. This in turn is linked to increased reed growth in the upper reaches and a decrease in water clarity. Crop production is also linked to agricultural return flow carrying leached fertilizer (nutrients) and agrochemicals, a decrease in freshwater input and loss of riparian habitat.
- **Water abstraction** refers to sumps, river, groundwater and direct abstraction which collectively cause a significant reduction in the inflow of freshwater to Verlorenvlei. This in turn has decreased the average water level in the vlei, prevented regular natural breachings of the mouth and increased isolation of the system from the sea. Reduced water levels and flushing in turn has led to increased reed growth and blooms (blue green algae or parrot's feather).
- **Alien vegetation infestation in the catchment** of Verlorenvlei has contributed significantly to a decrease in surface and groundwater flow to the system.
- **Wastewater disposal** includes the disposal of non-reticulated sewage, washings from fishing boat and discharging of wastewater from a local pig farm. In appropriate disposal of waste water leads to nutrient enrichment and microbial contamination.
- **Solid waste disposal** especially leachate and litter from the municipal waste dump, which is situated within a few hundred metres of the vlei, can lead to microbial contamination, toxic substances entering the system or enrichment. Solid litter can lead to the entrapment of biota and reduction in the aesthetic value of the vlei. Dumping of building rubble in unauthorized sites (e.g. on the "Island") can lead to the loss of habitat and a decrease in aesthetic value.
- **Agricultural return flow** carrying leached fertilizers causes nutrient enrichment, which in turn leads to the blue-green algal blooms or extensive growth of parrot's feather. A relatively recent phenomenon is the occurrence of avian botulism in wading birds, also linked to poor water quality.
- **Harvesting of reeds and sedges** can lead to reduction in the abundance of plant species. While the burning of reeds and sedges can lead to an increase in sedimentation and changes in the nutrient cycle of the vlei.
- **Gill netting** refers to the targeting of indigenous estuarine dependant and associated fish species for local consumption. Gillnetting leads to recruitment failure of estuarine associated species (including over-exploited species such as white steenbras) and results in a decrease of the system's nursery value. It also may enable alien fish species to become established.
- **Introduction of alien fish species** has caused the displacement of indigenous species.
- **Agriculture: Livestock grazing of riparian zone** reduces the vegetation cover which, in turn, allows greater amounts of sediment to be washed into the vlei during heavy rains. In addition over-grazing this will also lead to changes in the species composition/abundance of the vegetation around the system.
- **Alien vegetation infestation in the floodplain** leads to changes in the species composition (biodiversity loss) and reduction in water level.

Table 1: An overview of key activities and linkages to potential environmental problems if managed inappropriately

CATEGORY	ACTIVITY	PROBLEM								
		Siltation	Physical habitat alteration/ destruction	Alteration of salinity regime	Eutrophication	Toxic chemical pollution	Microbial contamination	Littering	Suspended solids	Direct Alteration of biomass/species
Land-use & Infrastructure Development	Alien vegetation infestation in flood plain	x	x	x						x
	Veld fires	x	x						x	x
	Road Infrastructure (including roads, crossings, culverts)	x	x	x					x	
	Riparian Infrastructure (including fences, bird hides, low-lying developments)	x	x	x					x	
	In-stream infrastructure (e.g. jetties, pumphouses)	x	x							
	Recreational activities (boating, windsurfing, swimming)		x					x		x
	Mining (Tungsten/Molybdenum)	x	x			x			x	
	Artificial breaching		x							x
	Agriculture: Crop production & Livestock in catchment	x	x		x	x	x		x	
Water Quantity & Quality	Water abstraction (river, groundwater, direct abstraction, sumps)		x	x	x					
	Alien vegetation infestation in catchment causing flow reduction		x	x	x					x
	Wastewater disposal (non-reticulated sewage, boat washing, effluent from pig farm (?))				x	x	x			
	Solid waste disposal (building rubble, leaches and litter from municipal dump)		x			x	x	x	x	x
	Agricultural return flow			x	x	x	x			x
Living Resources	Harvesting and burning of reeds and sedges		x		x				x	x
	Gill netting of indigenous fish species							x		x
	Introduction of alien fish species								x	x
	Agriculture: Livestock grazing of riparian zone	x	x							x

Table 2: Environmental impacts and socio-economic consequences potentially associated with specific problems

ENVIRONMENTAL IMPACTS AND SOCIO-ECONOMIC CONSEQUENCES	PROBLEM								
	Siltation	Physical habitat alteration/destruction	Alteration of salinity regime	Eutrophication	Toxic chemical pollution	Microbial contamination	Littering	High Suspended solids	Direct Alteration of biomass/species
ENVIRONMENTAL IMPACTS									
Modification/loss in species composition	x	x	x	x	x	x		x	x
Smothering of benthic communities	x	x		x			x	x	
Entanglement of organisms (e.g. birds)							x		
Chronic effects on biota			x	x	x	x		x	
Mortality (acute effects) on biota			x	x	x	x		x	
Opportunistic/Nuisance/Harmful algal blooms			x	x					
Anoxic conditions		x		x					
Pathogenic infections in biota				x	x	x			
PUBLIC HEALTH & SAFETY									
Human health and safety risks through recreational activities		x		x	x	x			
Human health risk through ingestion of contaminated seafood				x	x	x			
FOOD SECURITY & POVERTY									
Loss in quality of seafood products				x	x	x		x	x
Loss of fisheries resources and revenue		x	x	x	x	x		x	x
OTHER SOCIO-ECONOMIC IMPACT									
Loss of aesthetic value (e.g. for tourism)	x	x		x			x	x	x
Loss of coastal real estate, public facilities and recreational potential		x		x		x	x	x	x

Summary of Legislation and Responsibilities

An array of existing Acts (both national and provincial) governs the activities identified as posing threats to the ecosystems services provided by Verlorenvlei. A summary of relevant Acts and responsible departments/authorities pertaining to the different activities is provided in Table 3.

Table 3: Summary of relevant legislation and responsible departments/authorities pertaining to identified activities in Verlorenvlei

CATEGORY	ACTIVITY	RELEVANT LEGISLATION	RESPONSIBLE DEPARTMENT/ AUTHORITY
Land-use & Infrastructure Development	Alien infestation	Nationla Water Act (NWA) 1998 Conservation of Agricultural Resources Act (CARA) 1983 Biodiversity Act 2004	Dept of Water Affairs (DWA) Dept of Agriculture, Forestry and Fisheries (DAFF) Dept of Environmental Affairs (DEA)
	Veld fires	CARA 1983 Biodiversity Act 2004	DAFF DEA
	Road Infrastructure	Municipal systems Act 2000 Integrated Development Plans (IDPs)	Dept. Provincial and Local Government Local Authorities
	Riparian Infrastructure	Municipal Systems Act 2000 IDPs	Dept. Provincial and Local Government Local Authorities
	In-stream infrastructure	NWA 1998 Integrated Coastal Management Act (ICMA) 2008 Municipal Systems Act 2000	DWA DEA:MCM Dept. Provincial and Local Government/ Local Authorities
	Recreational activities	NWA 1998 Marine Living Resources Act (MLRA) 1998 Provincial Conservation Ordinances	DWA DEA: MCM CapeNature
	Mining	Mineral and Petroleum Resources Development Act 2002	Dept of Mining (DM)
	Artificial breaching	NWA 1998/ICMA 2008	DWA/DEA:MCM
	Agriculture: Crop production and livestock	NWA 1998 CARA 1983	DWA DAFF
Water Quantity & Quality	Water abstraction	NWA 1998 Water Services Act IDP	DWA Local Authorities
	Wastewater disposal	NWA 1998/ Water Services Act ICMA 2008 IDP	DWA DEA:MCM Local authority
	Solid waste disposal	ICMA 2008/ NEMA 1998 National Waste Management Bill Solid Waste Management By-laws (?)	DWA Local Authorities
	Agricultural return flow	NWA 1998 CARA 1983	DWA DAFF

CATEGORY	ACTIVITY	RELEVANT LEGISLATION	RESPONSIBLE DEPARTMENT/ AUTHORITY
Living Resources	Harvesting and burning of reeds and sedges	CARA 1983 MLRA 1998	DAFF DEA: MCM
	Gill netting	MLRA 1998 Provincial Conservation Ordinances	DEA: MCM CapeNature
	Introduction of alien fish species	MLRA 1998 Provincial Conservation Ordinances	DEA: MCM CapeNature
	Agriculture: Livestock grazing in flood plain	CARA 1983 MLRA 1998	DAFF DEA: MCM

Summary of Existing Responses

In many instances activities that pose a threat to the ecological and socio-economic ecosystem services provided by Verlorenvlei are governed by specific legislation. Also, there are a number of existing management actions or responses aimed at mitigating or minimising such threats (Chapter 7). A summary of the estimated severity of the impacts, as well as the status of existing legislation and management initiatives pertaining to specific activities is provided in Table 4. Note that this is not an absolute rating but rather a qualitative evaluation to enable prioritization of management actions

Table 4: Summary of (negative) impacts on Verlorenvlei (depicted as *H= high; M = medium; L = low*) and the status of existing legislation and management initiatives (*G = good; F = Fair; P = poor*) pertaining to identified activities

CATEGORY	ACTIVITY	"IMPACT"		"RESPONSE"	
		Ecological Impact Severity	Socio-Economic Impact Severity	Legislation	Management Responses
Land-use & Infrastructure Development	Agriculture: Crop production	H	L	F	F
	Alien infestation	M	L	F	G
	Veld fires	L	L	G	F
	Road Infrastructure	L	L	F	F
	Riparian Infrastructure	M	L	G	F
	In-stream infrastructure	L	L	F	F
	Recreational activities	L	L	F	G

CATEGORY	ACTIVITY	"IMPACT"		"RESPONSE"	
		Ecological Impact Severity	Socio-Economic Impact Severity	Legislation	Management Responses
	Mining (proposed)	H	H	P	F/P
	Artificial breaching	H	L	F	P
	Solid waste disposal	L	L	G	P
Water Quantity & Quality	Water abstraction	H	H	G	P
	Wastewater disposal (non-reticulated sewage & wash water from boats)	M	M	F	P
Living Resources	Harvesting and burning of reeds and sedges	M	L	F	P
	Gill netting	H	M	G	F/P
	Introduction of alien fish species	H	M	G	P
	Agriculture: Livestock	H	L	F	P

Bestuursopsomming

Opsomming van Probleme en Impakte

Deur middel van raadpleging, is 16 sleutelaktiwiteite geïdentifiseer as bedreigend (of potensieel bedreigend) tot die ekosisteedienste wat deur Verlorenvlei verskaf word. Hierdie aktiwiteite dra by tot 'n verskeidenheid van die probleme en gepaardgaande omgewingimpak en sosio-ekonomiese gevolge, as hulle ontoereikend bestuur word, soos geïllustreer in Tabel 1 and Tabel 2. Van hierdie tabelle is dit duidelik dat daar geen een-tot-een-verhouding tussen die aktiwiteite, probleme en invloede is nie - verskeie aktiwiteite kan bydra tot een of meer probleem, wat weer kan bydra tot meer as een impak, en andersom.

Hieronder volg in kort beskrywing van die sleutelaktiwiteite en hul verwante potensieële impakte op Verlorenvlei:

- **Veldbrande** in en rondom Verlorenvlei lei tot erosie en 'n toename in sedimentasie. Dit is spesifiek problematies vir Verlorenvlei omdat dit 'n vernoude mond het wat sediment-uitskuring tydens vloede verhoed en wat dan lei to akkumulاسie van sediment in die stelsel.
- **Padinfrastruktuur** verwys na die paaie en keerwalle in die vloedvlakte en die kruisings en kasduikers (culverts) wat dwars oor die vlakte loop. Die paaie en keerwalle stabiliseer die loop van die vlei en skep dikwels 'n verskillende substraat karakter in vergelyking met die natuurlike toestand. Die talle kruisings en kasduikers (bv. die pad brug na Elandsbaai, die kruisings by Grootdrift en Redelinghuys en informele kruisings naby die mond- en spoorbrug) sny oor die stelsel heen en belemmer dikwels die vloei, stabiliseer die lope en lei tot verhoogde rietgroei. Die bou van die informele kruisings naby die mond en by die spoorbrug, het gelei tot die vernietiging van die habitat en die ondergang van die voëllewe.
- **Rivieroewerinfrastruktuur** verwys na al die infrastruktuur lanfs die ower van die van die stelsel. Van besondere belang is die laagliggende eiendomme naby die monding, d.w.s. langs die riviermonding-kanaal. Daar is talle voorbeelde langs die kus waar hierdie tipe van stedelike kruip druk begin plaas op plaaslike owerhede om die watervlak in 'n stelsel kunsmatig te bestuur. 'n Ekstra bekommernis is die klomp heinings wat oor die vloedvlakte gespan is wat toegang beperk en wat lei tot oorbeweidings in gebiede waar diere aangehou word. Dit veroorsaak veranderinge in die soort samestelling van die vloedvlakte plantegroei.
- **Binne stroominfrastruktuur** verwys na die vasmeerplekke en pompstasies wat 'n gelokaliseerde invloed op sirkulasiepatrone in die vlei kan hê.
- **Ontspanningsaktiwiteite** sluit in die nie-verbruikende bedrywighede soos roei en swem wat 'n beperkte gelokaliseerde versteuring op die voëllewe kan hê. Seilplank aktiwiteite, aan die ander kant, veroorsaak hoë versteuring van die voëllewe.
- **Oopskag mynbou** van wolfram en molibdeen word tans voorgestel vir ontginning in die bo-opvangsgebied van Verlorenvlei by Metonshoek. Hierdie mynbou-ontwikkeling gaan waarskynlik beduidende varswater voorrade benodig, 'n beduidende risiko vir die gevoel van plek inhou en ook potensieële besoedeling van die varswater invloei in Verlorenvlei tot gevolg hê.
- **Kunsmatige oopmaak van die mond** word vermoed as gevolg van die terugvloei in die vloedvlakte (weidingsgrond) in die boonste vlei. Kunsmatige oopmakings kan lei tot die verlies van waterkolom habitat en 'n verlaging in die produktiwiteit van die getyriewer.

- **Landbou: Gewasproduksie en veeweiding** in die opvanggebied veroorsaak verhoogde erosie en verwante sedimentasie. Hierdie toestand is weer gekoppel aan verhoogde rietgroeï in die bolope en 'n afname in die waterdeursigtigheid. Gewasproduksie is ook gekoppel aan landbou terugvloei wat kunsmis (voedingstowwe) en landbouchemikalieë dra, 'n afname in varswaterinloop en die verlies van rivieroewers habitat.
- **Wateronttrekking** verwys na seiferput-, rivier-, grondwater- en direkte onttrekking van water wat gesamentlik 'n beduidende afname in die invloei van varswater na Verlorenvlei veroorsaak. Die onttrekkings lei weer daartoe dat die gemiddelde watervlak in die vlei daal, dit verhoed die gereelde natuurlike oopmakings van die mond en veroorsaak groter isolasie tussen die stelsel en die see. Verlaagde watervlakke en swak uitspoeling lei ook weer tot verhoogde riet- en alge-groeï (blou groen alge of die plant Parrots' feather).
- **Uitheimse plantegroei infestasië** in die opvangsgebied van Verlorenvlei het aansienlik bygedra tot 'n afname in oppervlak-en grondwatervloei in die stelsel.
- **Afvalwater** sluit in die verwydering van ongekoppelde riool, waswater van vissersbote en moontlik afvalwater van 'n plaaslike varkplaas. Ongedolgtreffende wegdoening van afvalwater lei tot voedingstof verryking en mikrobiëse besmetting.
- **Die vaste afval**, veral syferwater en rommel uit die munisipale stortingssterrein, wat binne 'n paar honderd meter van die vlei geleë is, kan lei tot mikrobiëse besmetting, toksiese stowwe of voedingstofverryking van die stelsel. Rommel kan lei tot die verstrengeling van biota en vermindering van die estetiese waarde van die vlei. Storting van bourommel in ongeoorloofde plekke (bv. op die "eiland") kan ook lei tot die verlies aan habitat en 'n afname in die estetiese waarde.
- **Landbou terugvloei** wat kunsmis dra, veroorsaak voedingstofverryking, wat weer lei tot die groei van blou-groen alge of uitgebreide groei van die plant, Parrot's feather. 'n Relatief onlangse verskynsel is die voorkoms van voël botulisme in waadvoëls, wat ook gekoppel word aan swak waterkwaliteit.
- **Oes van riete en moerasgras** kan lei tot 'n vermindering in die voorkoms van skekre plant spesies. Verbranding van riete en moerasgras kan ook lei tot 'n toename in sedimentasie en die veranderinge in die voedingstof siklus van die vlei.
- **Kieuwnette** verwys na die vangs van inheemse getyrvier-afhanklike en getyrvier-geassosieerde visspesies vir plaaslike verbruik. Kieuwnette belemmer ook beweging van getyrvier-verwante spesies (insluitende oor-ontginde spesies soos die wit steenbras) tussen die vlei en die see. Die gevolg is 'n afname van die stelsel se waarde as bewaringsplek vir klein vissies en ander organismes. Dit kan ook uitheimse visspesies in staat stel om te vestig.
- **Invoer van uitheimse visspesies** het die verplasing van die inheemse spesies veroorsaak.
- **Landbou: Veeweiding op die rivieroewers** verlaag die plantbedekking, wat weer kan veroorsaak dat groter volumes sediment in die vlei gewas word tydens swaar reën. Behalwe oorbeweiding lei dit ook tot veranderinge in die soort samestelling/hoeveelheid van die plantegroei rondom die stelsel.
- **Uitheimse plantegroei infestasië** in die vloedvlakte lei tot veranderinge in die soort samestelling (verlies aan biodiversiteit) en die verlaging in die watervlak.

Tabel.5: 'n Oorsig van sleutelaktiwiteite en hulle verwante potensiële omgewingsprobleme indien aktiwiteite ondoetreffend bestuur word

KATEGORIE	AKTIWITEIT	PROBLEEM								
		Siltasie	Fisiese habitat wysigings/ vernietiging	Verandering van sout- regime	Eutrofiëring	Giftige chemiese besoedeling	Mikrobiese besmetting	Rommelstrooi	Gesuspendeerde stowwe	Direkte Verandering van biomassa / spesies
Grondgebruik-en Infrastruktuurontwikkeling	Oorname deur uitheemse indringerplante in die vloedvlakte	x	x	x						x
	Veldbrande	x	x						x	x
	Pad-infrastruktuur (insluitend paaië, kruisings, kasduikers)	x	x	x					x	
	Rivieroewer-infrastruktuur (insluitend heinings, voëlskuiling, laagliggende ontwikkelinge)	x	x	x					x	
	Binne-stroom infrastruktuur (bv. vasmeerplekke en pomp-stasies)	x	x							
	Ontspanningsaktiwiteite (bootvaar, seilplank, swem)		x					x		x
	Mynbou (Wolfram / Molibdeen)	x	x			x			x	
	Kunsmatige oopmakings van mond		x							x
	Landbou: Gewasproduksie & Vee in die opvangsgebied	x	x		x	x	x		x	
Water Kwantiteit & Kwaliteit	Wateronttrekking (rivier, grondwater, direkte abstraksie, seiferputte)		x	x	x					
	Oorname deur uitheemse indringerplante in die opvangsgebied (veroorsaak vloed verminderings)		x	x	x					x
	Afvoer van afvalwater (ongekoppelde riool, boot waswater, afvalwater van vark-plaas (?))				x	x	x			
	Vaste afval (bourommel, syferwater en Rommel van munisipale stortingsterrein)		x			x	x	x	x	x
	Landbou terugvloei			x	x	x	x			x
Lewende bronne	Oesting en verbranding van riete en moerasgras		x		x				x	x
	Kieuwnette van inheemse visspesies							x		x
	Invoer van uitheemse visspesies								x	x
	Landbou: Vee weiding op rivieroewers	x	x							x

Tabel 6: Potensiële Omgewingsimpakte en sosio-ekonomiese gevolge wat verband hou met die spesifieke probleme

OMGEWINGSIMPAK EN SOSIO-EKONOMIESE GEVOLG	PROBLEEM								
	Siltasie	Fisiese habitat wysigings/ vernietiging	Verandering van sout- regime	Eutrofiëring	Giftige chemiese besoedeling	Mikrobiese besmetting	Rommelstrooi	Gesuspendeerde stowwe	Direkte Verandering van biomassa / spesies
OMGEWINGSIMPAKTE									
Verandering / verlies in die spesiesstelling	x	x	x	x	x	x		x	x
Versmoring van biota in sediment	x	x		x			x	x	
Verstrengeling van organismes (bv. voëls)							x		
Chroniese effekte op biota			x	x	x	x		x	
Mortaliteit (akute effekte) op biota			x	x	x	x		x	
Opportunistiese / Lastige / Skadelike alge groei			x	x					
Anoksiese toestande		x		x					
Patogeniese infeksies in biota				x	x	x			
VOLKSGESONDHEID EN VEILIGHEID									
Menslike gesondheid en veiligheidsrisiko's as gevolg van ontspanningsaktiwiteite		x		x	x	x			
Menslike gesondheid risiko deur die inname van besmette seekos				x	x	x			
VOEDSELSEKERHEID & ARMOEDE									
Verlies in die kwaliteit van die seekosprodukte				x	x	x		x	x
Verlies van die vissery hulpbronne en inkomste		x	x	x	x	x		x	x
ANDER SOCIO-EKONOMIESE IMPAKTE									
Verlies van estetiese waarde (bv. vir toerisme)	x	x		x			x	x	x
Verlies van die kuseiendomswaarde, openbare fasiliteite en ontspanningsgeriewe potensiaal		x		x		x	x	x	x

Opsomming van Wetgewing en Verantwoordelikhede

'n Verskeidenheid van bestaande wette (beide nasionaal en provinsiaal) beheer tans die geïdentifiseerde aktiwiteite wat 'n bedreiging inhou vir die ekosisteedienste wat deur Verlorenvlei verskaf word. 'n Opsomming van die relevante wette en verantwoordelike departemente/owerhede met betrekking tot die gelyste aktiwiteite word in Tabel 3 aangedui.

Tabel 7: Opsomming van die relevante wetgewing en verantwoordelike departemente/owerhede met betrekking tot die geïdentifiseerde aktiwiteite in Verlorenvlei

KATEGORIE	AKTIWITEIT	RELEVANTE WTGEWING	VERANTWOORDELIKE DEPARTEMENT/OWERHEID
Land-use & Infrastructure Development	Oorname deur uitheemse indringerplante	Nasionale Water Wet (NWW) 1998 Bewaring van Landbou Hulpbronne Wet (BLHW) 1983 Biodiversiteit Wet 2004	Dept Waterwese (DW) Dept Landbou, Bosbou & Vissery (DLBV) Dept Omgewingsake (DO)
	Veldbrande	BLHW 1983 Biodiversiteit Wet 2004	DLBV DO
	Padinfrastruktuur	Munisipale Stelsels Wet 2000 Geïntegreerde Ontwikkelingsplanne (GOPs)	Dept. Provinsiale en Plaaslike Regering Plaaslike Owerhede
	Rivieroewerinfrastruktuur	Munisipale Stelsels Wet 2000 GOPs	Dept. Provinsiale en Plaaslike Regering Plaaslike Owerhede
	In-stream infrastruktuur	NWW 1998 Geïntegreerde Kusbestuur Wet (GKW) 2008 Munisipale Stelsels Wet 2000	DW DO:MCM Dept. Provinsiale en Plaaslike Regering Plaaslike Owerhede
	Ontspanningsaktiwiteite	NWW 1998 Marine Hulpbronne Wet (MHW) 1998 Provinsiale Bewaringsordonansies	DW DO: MCM CapeNature
	Mynbou	Minerale en Petroleum Hulpbronontwikkeling Wet 2002	Dept Mynwese (DM)
	Kunsmatige oopmakinga	NWW 1998/GKW 2008	DW / DO:MCM
	Landbou: Gewasproduksie en Vee	NWW 1998 BLHW 1983	DW DLBV
Water Quantity & Quality	Water onttrekking	NWW 1998 Waterdienste Wet GOPs	DW Plaaslike Owerhede
	Afvoer van Afvalwater	NWW 1998/ Waterdienste Wet GKW 2008 GOPs	DW DO:MCM Plaaslike Owerhede
	Vaste afval	GKW 2008/ NEMA 1998 Nasionale Afvalbestuur Konsepwet Vaste afval bestuursverorderings	DW Plaaslike Owerhede

KATEGORIE	AKTIWITEIT	RELEVANTE WTGEWING	VERANTWOORDELIKE DEPARTEMENT/OWERHEID
	Lanbou Terugvloei	NWW 1998 BLHW 1983	DW DLBV
Living Resources	Oesting en verbranding van riete en moerasgras	BLHW 1983 MHW 1998	DLBV DO: MCM
	Kieuwnette	MHW 1998 Provinsiale Bewaringsordonansies	DO: MCM CapeNature
	Invoer van uitheemse visspesies	MHW 1998 Provinsiale Bewaringsordonansies	DO: MCM CapeNature
	Lanbou: Vee weiding in vloedvlakte	BLHW 1983 MHW 1998	DLBV DO: MCM

Opsomming van Huidinge Reaksie

In baie gevalle word die aktiwiteite wat 'n bedreiging inhou vir die ekologiese- en sosio-ekonomiese dienste wat deur Verlorenvlei verskaf word, beheers deur spesifieke wetgewing. Verder is daar 'n aantal bestaande bestuursaksies of reaksies wat daarop gemik is om verligting of vermindering van sodanige bedreigings te bewerkstelling. 'n Opsomming van die beraamde intensiteit van die impakte van hierdie aktiwiteite, asook die status van die bestaande wetgewing en bestuur inisiatiewe wat betrekking het op die spesifieke aktiwiteite word in Tabel 4 aangedui. Let daarop dat hierdie nie 'n absolute waardering is nie, maar eerder 'n kwalitatiewe evaluering om bestuursaksies te kan prioritiseer.

Tabel 8: Opsomming van (negatiewe) impakte op Verlorenvlei (voorgestel as *H= hoog; M = medium; L = laag*) en die stand met betrekking tot bestaande wetgewing en bestuursinisiatiewe (*G = goed; M = Middelmattig; S = Swak*) pertaining to identified activities

CATEGORY	ACTIVITY	"IMPACT"		"RESPONSE"	
		Ecological Impact Severity	Socio-Economic Impact Severity	Legislation	Management Responses
Land-use & Infrastructure Development	Agriculture: Crop production	H	L	M	M
	Alien infestation	M	L	M	G
	Veld fires	L	L	G	M
	Road Infrastructure	L	L	M	M
	Riparian Infrastructure	M	L	G	M

CATEGORY	ACTIVITY	"IMPACT"		"RESPONSE"	
		Ecological Impact Severity	Socio-Economic Impact Severity	Legislation	Management Responses
	In-stream infrastructure	L	L	M	M
	Recreational activities	L	L	M	G
	Mining (proposed)	H	H	S	M/S
	Artificial breaching	H	L	M	S
	Solid waste disposal	L	L	G	S
Water Quantity & Quality	Water abstraction	H	H	G	S
	Wastewater disposal (non-reticulated sewage & wash water from boats)	M	M	M	S
Living Resources	Harvesting and burning of reeds and sedges	M	L	M	S
	Gill netting	H	M	G	M/S
	Introduction of alien fish species	H	M	G	S
	Agriculture: Livestock	H	L	M	S