

WATER RESEARCH COMMISSION

POLICY CONSIDERATIONS FOR NONPOINT SOURCE MANAGEMENT IN SOUTH AFRICA

AS INPUT TO THE WATER LAW REVIEW PROCESS

by

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This report was compiled under the auspices of the Water Research Commission and the Water Law Review process, through the project on the "Development of a Guide to Assess Nonpoint Source Pollution of Surface Water Resources in South Africa".

EXECUTIVE SUMMARY

As part of the South African Water Law Review process, a number of task teams were established within the Department of Water Affairs and Forestry to address key policy issues. The study team associated with an ongoing Water Research Commission project on the "Development of a Guide to Assess Nonpoint Source Pollution of Surface Water Resources in South Africa", were requested to provide nonpoint source input to the Source-Directed Management component of the Water Environmental Quality Policy task team. This document presents the resulting recommendations, together with relevant background information and arguments.

The key recommendations for the Water Law Review process are summarised below, while the rationale supporting them is provided in the main text of the document.

Definitions and Classification

Nonpoint source management operates in the context of pollution source management, associated with water environmental resource protection. The following definitions were adopted as the basis of this nonpoint source investigation.

- *Pollution is defined as the introduction of substances or energy to the water environment at levels which have an unacceptable impact on the water environment or its users.*
- *All potential sources of pollution are classified as point, infrequent incident or nonpoint sources.*

Nonpoint sources are usually defined in the negative, being those sources which are not point or incident sources. However, a plausible extended definition was adopted for this document.

- *Nonpoint sources are sites of human activity which contribute to washoff or leachate over a dispersed area, usually associated with hydrometeorological events, but not including point discharges or infrequent incidents.*
- *Nonpoint sources include concentrated sources, diffuse sources (either collected or uncollected) and instream activity.*

Classification of nonpoint sources is required for legal purposes, because the appropriate management approach varies for different nonpoint source types. Although all human activity potentially has an impact on the receiving water environment, cost-effective nonpoint source management requires the prioritisation of those activities with the greatest impact. Therefore, a simple classification system is required to enable and focus nonpoint source control and enforcement. "Cutoff levels" should define the intensity or size of these activities, above which nonpoint source management is required, based on the potential impact on the receiving water environment.

- *Classification of nonpoint sources should be based on source type (land use activity), with cutoff levels reflecting the size and intensity of the activity which has a potential impact on the receiving water environment.*

The listing of those activities which are classified above the “cutoff levels”, should be enabled through the water act, as the basis for nonpoint source management. Regulations for control and enforcement should be specified according to these classes (i.e. listed activities).

Control and Enforcement

The difficulty of proving the direct relationship between nonpoint source discharge and observed pollution events requires that nonpoint source management is focused on control of the activity at source and/or the delivery pathways to the receiving water environment.

- *A source-directed approach is required for effective nonpoint source management, focussing on the production of waste and the process of delivery, before it enters the receiving water environment.*

Source-directed management of nonpoint sources cannot be based on effluent discharge standards, but must rather be through the implementation of practices which will reduce the risk of nonpoint source discharge to the receiving water environment.

- *Nonpoint source regulations should require the implementation of Best Management Practices (BMP's) associated with listed nonpoint source classes (activities).*

Best Management Practices are the combination of practices which provide an affordable, effective and sustainable means for controlling discharge from particular nonpoint sources.

- *National regulations should be specified for different listed nonpoint source classes and possibly receiving environments reflecting acceptable risk, but with the option of catchment specific regulations as part of catchment management plans.*

The process of classifying and listing nonpoint sources should be transparent and subject to public consultation. Similarly, the specification of appropriate regulations (BMP's) should be open to public debate, and should reflect the technical and economic possibilities associated with each nonpoint source class.

The approach to enforce a source-directed approach to nonpoint source management should be administratively simple and cost-effective to implement. The proposed approach is based on registration of all listed activities with the relevant water authority. This should also imply compliance with the relevant regulations (BMP's) for that activity. No further permitting should be required for those activities which comply with the regulations.

- *Registration of all listed nonpoint sources should be required, along with compliance to the relevant regulations.*

Those individuals who cannot comply with the specified regulations must apply for an exemption permit, motivated and supported by a thorough impact assessment. The resulting permit conditions would specify alternative practices to control the nonpoint source impacts on the receiving water environment.

- *Permitting should only be required for nonpoint sources which cannot comply with the specified regulations.*

This approach to permitting nonpoint sources is recommended to reduce the administrative costs of nonpoint source management, while focussing on situations which are likely to have a significant impact of the receiving water environment.

The basis for prosecuting nonpoint sources should avoid the legal difficulties in linking nonpoint source contributions to a pollution effect in the receiving water environment. This may be done by linking prosecution to non-compliance with BMP's specified by the relevant registration or permit conditions.

- *Prosecution should be based on violation of registration or permit requirements.*

Other regulations and initiatives which should be explored and possibly enabled through the water law include:

- *Restricting critical activities in sensitive catchments, through a permitting and or impact assessment process.*

This may be linked to the preceding approach, in that certain listed activities would require a permit in catchments which are classified as sensitive, according to the national resource classification system.

- *Application of discharge standards to collected washoff or leachate from certain listed nonpoint sources should be regulated through point source administration.*

This may be appropriate for certain concentrated sources (such as landfills or feedlots) or collected-diffuse sources (such as urban storm water or irrigation return flow).

- *Using charges, taxes, subsidies, incentives and tradeable permits to influence decisions associated with nonpoint source management.*
- *Encouraging participatory approaches through information sharing and the adoption of voluntary actions in less sensitive situations, but providing appropriate administration for effective auditing.*

Monitoring and Assessment

- *Monitoring of nonpoint sources should focus on registration of listed activities and collection of information on generation at the source, supported by water quality sampling of collected washoff and leachate, as well as water quality in the receiving water environment near the source.*
- *Nonpoint source assessment should play an important role in development and implementation of regulations for nonpoint source management.*

ACKNOWLEDGEMENTS

This document was developed as input to the *Water Law Review* process, and in particular the Source-directed control component of the Water Environmental Quality Policy task. The work was made possible through the support and funding of the Water Research Commission as part of an ongoing project on the *Development of a Guide to assess nonpoint source pollution of surface water resources in South Africa*, being conducted jointly by Sigma Beta and the DWAF Institute of Water Quality Studies. Additional funding was provided by the Water Law Review process, through the Water Law Review Managers. This support is gratefully acknowledged.

This document is the synthesis of insights gained during discussions with a wide range of water resource managers, practitioners and researchers in South Africa, and review of international publications. Contributions from the following people are particularly acknowledged: Henk van Vliet, Sakkie van der Westhuizen, Meiring du Plessis, Caroline Palmer, Jane Harris, Heather MacKay, Gareth McConkey, Lin Gravelet-Blondin, Dewald Stein, Marius Keet, Rashid Khan and Johan van der Merwe, as well as the steering committee of the WRC project. Although this document would not have been possible without interactions with all these people, the ideas presented in the document represent the perspective of the authors.

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IN SOUTH AFRICA**

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I. INTRODUCTION

1.1 The Water Law Review Process

With the change in government following the elections in 1994, the Minister of Water Affairs and Forestry initiated a review of the current Water Act, to reflect the needs of all South Africans. This process has been based on two discussion documents, *You and Your Water Rights* and the *Water Law Principles*, together with extensive consultation through provincial workshops and written submissions from the interested public.

Following the development of the *Water Law Principles* discussion document, eleven task teams were established to address various important issues for a new Water Law, three of which were to address policy development. At the time of writing this document, there had been preliminary input by the project team into Policy papers and other task teams. These had been summarised into the *White Paper on a National Water Policy for South Africa* which was accepted by Cabinet and was under public review. The drafting of the Act was also underway, providing the legislation necessary to draft regulations to give effect to water quality policy.

1.2 The Purpose of this Document

As part of an ongoing Water Research Commission project on the "Development of a Guide to assess nonpoint source¹ pollution of surface water resources in South Africa", the study team were requested to provide input to the *Water Environmental Quality Policy* task team, as well as the task teams addressing *Control and Enforcement* and *Resource and Demand Monitoring and Assessment*. This document summarises the nonpoint source input to these tasks, and in particular for the Source-Directed Management component of the Water Environmental Quality Policy development.

Clearly, any strategies and regulations to control the impacts of human activities on the water environment must be based on a sound understanding of the *processes* contributing to the deterioration of the quality of that environment. While these *processes* are generally easy to define, quantify and control for point sources, the factors contributing to nonpoint source contamination are complex and are more difficult to manage. As such the drafting of legislation to give effect to nonpoint source control is likely to be enigmatic, and is likely to require a higher level of technical and scientific input.

Contributions from the Water Research Commission project team have already influenced the formulation of appropriate policies to address nonpoint sources of pollution. This document plays a dual role in that it not only provides the details and rationale of the nonpoint source input to the Water Law Review Process, but also attempts to provide background information on the general philosophy and nonpoint source management

¹ Nonpoint sources of water resource contamination represent those areas which contribute washoff or leachate from a dispersed area under hydrometeorological inputs (see Chapter III).

possibilities upon which these recommendations were based. This is due to the nature of legislation being a distillation, and in some cases a simplification, of many ideas. Thus, this document provides a unique opportunity to provide both technical and non-technical readers with reference material for interpreting the nonpoint source components of the future Water Act and to indicate the basis upon which recommendations were made.

The document is primarily aimed at providing input to drafting legislation for nonpoint source management and outlines some the considerations necessary for this process. It is recognised that the nonpoint source management clauses of the new Water Act are likely to have an enabling character, with additional regulations being required to implement the Water Act. Therefore, it is hoped that the document will also provide a sound basis for the drafting of future regulations to give effect to the Source-Directed Management policy outlined in the White Paper on a National Water Policy for South Africa, specifically for the control of nonpoint sources of pollution. Together with other reports produced as part of the current WRC project, it should assist water quality managers in understanding the factors contributing to nonpoint source pollution, and to interpret the provisions of the new Water Act in this light.

1.3 The Context of Nonpoint Source Policy

There are a number of issues upon which the opportunities and constraints for nonpoint source management policy are dependent. The implications of particular issues will be incorporated into the pertinent discussions throughout this document.

While it is recognised that the White Paper on a National Water Policy for South Africa has already outlined broad policies and approaches for Source-Directed Management, the new Water Act must make provision to manage the *processes* contributing to nonpoint source contamination of the water environment. Legislation and policies to give effect to this management must encompass;

- the types of nonpoint source activities which may be regulated,
- the institutions which should implement management,
- the approaches appropriate to control and enforce nonpoint source management strategies, and
- the monitoring required to assess nonpoint source contributions to water environmental problems.

In addition to this the White Paper has already indicated that economic incentives may be used to encourage a reduction in pollution. Given that the contributions from nonpoint sources are often difficult to assign to different source areas and are also difficult to quantify, economic incentives appropriate to nonpoint sources will differ from those suited to point sources. As such this document has drawn on, and has provided input to, the deliberations of a number of task teams involved with the Water Law Review process. These include the *Institutional*, the *Control and Enforcement*, the *Water Environmental Policy*, the *Economics* and the *Monitoring and Assessment* task teams. Discussion documents produced by these task teams provide additional background information.

More importantly, legislation and regulations to control the water environmental impacts from nonpoint sources must be consistent with the overall Water Environmental

Protection Policies being developed by the Department of Water Affairs and Forestry. The White Paper on the National Water Policy for South Africa has indicated that protection of the water resource must be based on setting clear objectives for each aspect of the resource (ie water quality, water quantity, habitat structure and living organisms), and that these objectives will be identified via a national resource classification system.

A key feature of this approach is the requirement for sustainable utilisation of water resources; balancing short-term needs for water resource utilisation and development with the long-term need to protect the integrity and resilience of aquatic systems. Within this, source-directed management provides the framework for nonpoint sources management, aimed at preventing contamination before it reaches the water environment. Policies and strategies to address nonpoint source pollution must integrate with the water environmental classification system, such that nonpoint source management practices can be implemented at the desired level of protection for the receiving water resource.

On a wider scale, the approach to nonpoint source management must be implementable within the broader South African context. Water environmental management in South Africa is likely to be plagued by a lack of both human and other resources for quite some time into the future. This document therefore attempts to outline an approach to nonpoint source management that is administratively simple to enforce and control.

1.4 A Definition of Pollution Sources

There are a number of definitions of *pollution*, not all of which are workable in a legal context. Pollution is usually a relative concept in which the concentration of a constituent is defined against some reference level. This differs from *contamination*, which may be taken to represent the absolute presence of a water quality constituent, and *waste*, which refers to all redundant material or energy that is discharged into the water environment.

- The most encompassing definition of *pollution* is *an alteration in the (physical, chemical, radiological or biological) quality or energy of the (ground or surface) water environment caused by human activity*. This implies that pollution is any alteration from the *background water quality* (associated with pristine conditions). Identification of this background and attribution of the contributions from different sources makes this a legally unworkable definition.
- A more user oriented extension to this definition may be based on the *introduction of substances or energy to the water environment at levels which threaten the current or future use of the water environment or the aquatic environment itself*. However, this may be interpreted as any deviation from background water quality, given our lack of understanding of the impacts of changing water quality on the aquatic environment. Once again the difficulty in identifying the level at which impacts are observed makes this unwieldy in legal terms.
- A more workable definition is the *introduction of substances or energy to the water environment at levels which have an unacceptable impact on the water environment or its users*. This “fitness-for-use” type definition is consistent with the definition of water environmental objectives and thus is simpler to interpret legally, i.e. as

exceedence of the requirements of the aquatic ecosystem or users. However, this definition is not related to the contribution by individual polluters (sources), without some further conditions, and thus cannot be the basis of source-directed management.

- The most specific definition of pollution is based on the *violation of relevant regulations or permits*. This may include allowable pollution loads to the water environment or required actions to prevent pollution. It is the simplest to apply, but does not reflect the impact on the water environment or users. This shortcoming may be overcome by linking the regulations to the water environmental objectives in each catchment, but this would require considerable assessment.

The need to link pollution to the water environmental objectives implied that the third definition is the most appropriate. However, this definition requires that the management of sources is based on violation of regulations and permits, without having to prove that these sources were directly responsible for pollution. This discussion is extended in Chapter 4.



Water Law Recommendation:

Pollution is defined as the introduction of substances or energy to the water environment at levels which have an unacceptable impact on the water environment or its users

Sources are sites of human activity which *may* contribute to pollution of the water environment. Their management should not necessarily be based on their direct contribution to pollution, but rather on the potential impact that they may have on the water environment. Three different types of source were identified to reflect their different characteristics in terms of source-directed management.

Point sources: may be defined as identifiable effluent sources emanating from a discrete defined conveyance with potentially quantifiable flow and quality.

Incidents: may be defined as accidental discharges or failure of management systems which occur infrequently at unforeseen locations, and thus have a transient nature.

Nonpoint sources: represents all other sources (including instream activities), the contributions from which occur over a dispersed area and cannot be directly identified.



Water Law Recommendation:

All potential sources of pollution are classified as point, infrequent incident or nonpoint sources.

1.5 Characterisation of Nonpoint Sources

The relationship between contaminant sources, the water environment and water users may be simplified into four generic elements, representing the process of water quality contamination. *Production* represents the generation of contamination at a source, *delivery* reflects the contaminant pathway between source and receiving water body, while *transport* is related to movement and transformation of the contaminant through the receiving water environment, which represents the resource upon which *use* is dependent (Pegram *et al*, 1997).

Source-directed management should address the production and delivery elements, even though its objective is protection of the receiving water environment. This may be done either through direct control of the waste production process or through control of delivery into water bodies. The former approach is desirable in terms of preventing (or minimising) the risk of pollution, but requires direct control over economic activities. This is unlikely to be acceptable for the Water Act, which implies that pollution prevention will only be realised through voluntary actions and broader environmental legislation.

On the other hand, the Water Law should control the delivery of waste to the water environment, and thus may require actions to be taken to manage delivery, either at the source or during the delivery process. This is the focus of source-directed management under the Water Law.



Water Law Recommendation:

A source-directed approach is required for nonpoint source management, focussing on the production of waste and the process of delivery, before it enters the receiving water environment.

The generic characteristics of nonpoint sources, which distinguish them from point or incident sources, include:

- Contaminant generation (production) occurs over an extensive area.
- Without management, discharge (delivery) enters surface or ground waters in a diffuse manner at intermittent intervals, usually driven by climatic events.
- Monitoring and quantification of nonpoint source discharge is complicated, therefore source contributions to surface or ground waters are difficult to assign.
- Land and runoff management is usually more effective than control or treatment of discharge.
- Performance monitoring of land (source) management practices, is usually more appropriate than compliance monitoring of discharge effluent standards.
- The extent of nonpoint source contamination is related to natural catchment conditions compounded by climatic events, which means that impacts vary greatly between geographic regions and between years.
- The water quality constituents usually associated with nonpoint sources in South Africa are suspended solids, nutrients, faecal bacteria, salinity and toxic compounds.

1.6 Catchment Orientation of Nonpoint Source Management

Due to the relative ease of monitoring point sources, their management can be successfully implemented through “end-of-pipe” discharge management. As point sources are regulated and controlled, nonpoint sources often emerge as the primary cause of water quality problems in the catchment water environment.

The measures needed to control nonpoint source discharge are diverse and the responsibility for their implementation is broad. This type of holistic management is best done at a catchment scale, because local groups best understand site-specific problems and should have ownership of the solutions. Catchment management therefore supports (and in some cases is a prerequisite for) effective nonpoint source management and should be based on the integration of a range of strategies to control pollution. These strategies should be economically achievable, and may be associated with implementable management practices.

Best Management Practices (BMP's) are the combination of practices which provide an affordable, effective and sustainable means for controlling discharge (delivery) from particular nonpoint sources. They are most effective when selected for local catchment conditions within the context of catchment management. However, a range of generally appropriate BMP's may be specified for different nonpoint sources classes, providing for different local conditions, and possibly taking account of the acceptable risk associated with the receiving water environment classification.

Nonpoint source management requires the development of a legislative environment to enable the appropriate authorities to specify, control and enforce the implementation of BMP's where necessary, guided by policy which is appropriate to the social, political, economic, technical and physical context of South Africa. Providing the background to this policy is the main task of this document.

1.7 Structure of the Document

Chapter II provides an overview of some of the major legislative issues providing the opportunities and constraints for nonpoint source management.

Chapter III investigates the possibilities for nonpoint source classification as the basis for nonpoint source management.

Chapter IV is the core of the document, which reviews the options for nonpoint source control and enforcement in terms of regulatory, economic and participatory approaches, and then goes on to indicate the way in which these may be applied.

Chapter V provides some indication of the specific requirements for monitoring and assessment of nonpoint sources for management purposes.

Chapter VI summarises the recommendations made throughout the document.

II. THE LEGISLATIVE ENVIRONMENT

2.1 The Constitutional Context

With the adoption of the Constitution in 1997, South Africa gained a framework within which all legislation must be developed and applied. In particular, the Bill of Rights outlines the rights of all South African citizens, which may not be violated by legislation or regulations. This obviously has implications for the management of nonpoint sources.

Some of the main elements of the Constitution which should be considered for nonpoint source management include:

- The right to an *environment*, which is not harmful to peoples health and well-being.
- The right to a lawful, procedurally fair and justifiable administrative *justice* system.
- The right to ownership and control of *property*.
- The right to pursue *economic activity*.
- The right to *equality* before and equal protection by the law.
- The right to *information* held by the state, which is required to exercise other rights.

The management of South Africa's water resources is also specified by the Constitution to be a national competency, and is reiterated in Water Law Principles 1, 2 and 12.

2.2 The Water Law Principles

The Fundamental Principles accepted by the national cabinet (DWAF, 1997a), outline the framework for the development of a new Water Law and were the basis upon which the National Policy (DWAF, 1997b) was developed. These were also the only available guidelines at the time of writing this document. Those principles which have the greatest bearing on nonpoint source management are:

Principle 2. In a relatively arid country such as South Africa, it is necessary to recognise the unity of the water cycle and the interdependence of its elements...

Land use and development in a catchment have an impact on the quantity and quality of the surface and ground water resources, which is the underlying concept of nonpoint sources. Runoff from nonpoint sources is required to supply downstream users, but the associated washoff can cause water quality problems. This provides the rationale for linking land use and water resource management (Principle 18).

Principle 15. Water quality and quantity are interdependent and shall be managed in an integrated manner, which is consistent with broader environmental management approaches.

Nonpoint source management should be consistent with and make use of the Integrated Environmental Management (IEM) and Integrated Pollution Control (IPC) procedures, thereby providing legal mechanisms for managing production of waste at the source.

Principle 17 implies similar environmental management (IEM and EIA) requirements for water resource development and supply activities.

Principle 16. Water quality management options shall include the use of economic incentives and penalties to reduce pollution; and the possibility for irretrievable environmental degradation as a result of pollution should be prevented.

This implies the use of economic instruments for nonpoint source management, based on linking the economic cost associated with resource deterioration (lost value) to the responsible activities. The first clause underlies the “polluter pays” concept, while the second clause implies the “precautionary approach” in information-poor situations.

Principle 18. Since many land uses have a significant impact on the water cycle, the regulation of land use shall, where appropriate, be used as an instrument to manage water resources within the broader integrated framework of land use management.

This principle provides the basis for nonpoint source management within a catchment context, because nonpoint sources are associated with land use. It enables water resource managers to influence land use development (probably only under certain conditions), or at least to require on-site activities which mitigate nonpoint source contributions.

Principle 23. Responsibility for the ... management of available water resources shall, where possible and appropriate, be delegated to a catchment or regional level in such a manner as to enable interested parties to participate.

This principle recognises and supports the need for water resource (including nonpoint source) management to be performed at a catchment level (possibly within the context of catchment management) and that this management should be based on consensus building to facilitate voluntary participation of the affected parties.

Principle 24. Beneficiaries of the water management system shall contribute to the cost of its establishment and maintenance on an equitable basis.

This should include the beneficiaries of improved water quality associated with nonpoint source management systems. Together with Principle 23 this provides the basis for regional catchment management institutions which could provide the basis for nonpoint source management at a catchment level.

2.3 Other Legislation

Effective nonpoint source management requires that water managers can influence the siting and management of land use activities, which is the jurisdiction of many other government departments. Most of the discussion in this document assumes the Department of Water Affairs is the lead agent for managing water quality. In cases where another departments are the lead agent, water quality managers have limited scope for intervention. The lack of a veto further disempowers water quality managers, particularly when the function of the lead agent department is to promote the activity.

Where possible, other legislation should be consistent with and support the requirements of nonpoint source management. Other national, provincial and local authorities which promulgate legislation with an impact on nonpoint source pollution include:

- Environmental Affairs (see the extended discussion below).
- Agriculture, particularly concerning soil erosion / resource conservation.
- Mineral, in terms of the Environmental Management Plan Report (EMPR).
- Health, particularly for control of facilities causing health hazards.
- Land and Housing, particularly through the *Development Facilitation Act* (DFA).
- Local authorities, in terms by-laws.
- Energy, particularly for atmospheric deposition.
- The *Reconstruction and Development Programme* (RDP).

It is preferable that the legislation and associated jurisdiction for nonpoint source management lies with the Department of Water Affairs, possibly in partnership with the Department of Environmental Affairs. The *Integrated Pollution Control* (IPC) process could provide the basis for this type of cooperation. Furthermore, the Department of Environmental Affairs potentially has direct control over land use activities and development through the Integrated Environmental Management (IEM) system and requirements for Environmental Impact Assessment (EIA). A unique opportunity exists for this initiative, with the concurrent *Water Law Review* and *Consultative National Environmental Policy Process* (CONNPEP).

2.4 Institutional Issues

It is critical that any legislation and associated regulations for nonpoint source management are consistent with and are implementable through the relevant institutional arrangements, in terms of their mandate and capacity. At the time of writing of this document, many institutional and restructuring issues were being addressed, both within the DWAF and in other government departments. Furthermore, a separate task team was investigating this issue for the Water Law (DWAF, 1997c). Therefore this document does not address the institutional issue in any detail.

However, institutional arrangements associated with nonpoint source management in South Africa are potentially very complex, due to the significant vertical and horizontal fragmentation implied in the previous section. Regulations under the Water Act will have to take cognisance of the Constitutional powers allocated to Provincial and Local Government, as well as the mandates of other national departments. The establishment of Catchment Management Agencies with authority over many water resource management functions, must also be considered. Importantly, any management system developed for nonpoint source management must reflect the resources available for its implementation. This critical factor was considered throughout this document.

2.5 Policy Imperatives

Policy should be built on commonly accepted physical-technological, economic or socio-political doctrines or imperatives, which reflect tradition, scientific knowledge and common sense. Many of these are incorporated into the South African Constitution,

Water Law Principles and other Legislation. These imperatives should guide the selection of policy options for Water Resource Management. Those that have the greatest bearing on nonpoint source pollution control are

Equity: No single group or individual should bear a disproportionate cost in meeting water quality objectives.

Polluter Pays: Those causing pollution through production or consumption bear the primary responsibility for the consequences of pollution and its mitigation, through appropriate valuation of environmental resources and their use.

Sustainability: Actions which reduce future social, economic or ecological choices should be avoided, to ensure inter-generational equity.

Precautionary Principle: Actions which may have an irreversible or uncertain impact on the environment should be avoided, to ensure sustainability.

Efficiency: Policy should support options which are effective in maximising the short and long term socio-economic benefits, while minimising the costs.

Source-directed management: Pollution should be managed as close to the source as possible to increase efficiency and anticipate problems before they arise.

Acceptability: Legislation should only be adopted if people and groups to whom it applies generally accept its legitimacy and are willing to follow the rules.

Enforceability: Only laws which can be enforced should be adopted, to prevent eroding the public confidence and the effectiveness of the legal system, but conversely adequate resources and training must be provided to enforce legislation.

Flexibility: Policy and legislation should be framed such that it is applicable to different situations and is dynamic to adjust to changing conditions (including transition).

Integration: All elements of a pollution problem should be considered and resolved in an holistic manner, to produce efficient and equitable solutions.

Delegation: Responsibility and authority for water quality management should be delegated to the most local functioning level of authority in a catchment, in order to incorporate local interests and facilitate effective implementation.

The imperatives will not necessarily be unanimous in their support or opposition of a particular policy option and it is the resolution of these contradictions to find a balance, which is the aim of policy development within a political and legislative environment. Furthermore, the historical context of water resource management and South African society as a whole, will require a period of transition between the previous and new legislation during which historical inequities are redressed and new precedence is formed. This may result in short-term elevation of certain imperatives and subordination of others. However, the legislative framework for nonpoint source management must reflect the desired long-term imperatives, with "sunset" clauses allowing short-term adjustments.

III. NONPOINT SOURCE DEFINITION AND CLASSIFICATION

3.1 Introduction

The aim of this document is to provide a policy framework for nonpoint source management, as input to the Water Law Review process. Classification of nonpoint sources is the basis for this framework, because it enables the grouping of similar sources to facilitate their administration in a consistent manner. It allows the formulation of regulations which are appropriate for source directed management within the context of protection of the water environment.

Although a number of approaches to nonpoint sources classification are possible, only the simplest and most easily applied classification system which achieves the aim of grouping for administration should be used as the basis for the policy framework. Unnecessary complexity only causes problems for the administration of regulations, even though it may seem logical from a technical viewpoint.

3.2 Definition of Nonpoint Sources

The definition of nonpoint sources is difficult, due to the range of sources falling under this category, compounded by the usual definition in the negative as indicated by the term *non* (i.e. what nonpoint sources are not). The following plausible definition is used in this document, based on the discussion presented in Chapter 1.

Nonpoint Source Definition:

Sites of human activity (including instream activities) which contribute to washoff or leachate over a dispersed area, usually associated with hydrological events, but not including point discharges or infrequent incidents.

3.3 General Nonpoint Source Classification

Classification enables the grouping of similar non-point sources for administration in a consistent manner, while minimising the government resources required for management. As such it provides the basis of the legislative framework for nonpoint source management, and enables the formulation of standard management practices that are both technically and economically appropriate for different types of nonpoint sources.

Classification of nonpoint sources may be based on a range of criteria, each of which has advantages, as well as limitations. Important issues which may be included in the classification include (due to their implications for assessment and management):

- the extent of the source,
- the type of contaminants generated,
- the mechanisms of discharge, and
- the severity of impact.

Due to the “everything else” nature of nonpoint sources, no single classification of nonpoint sources is adequate. The following four general classes of nonpoint sources may be identified, examples of which are presented in Table 1 below.

Concentrated (class 1): Localised high contamination areas with significant pollution potential, from which the surface washoff or leachate can be captured, including but not limited to mines (and tailing dumps), confined animal facilities (feedlots), waste disposal sites (landfills), construction sites and certain industrial sites.

Diffuse-collected (class 2): Extensive areas from which surface runoff or leachate is collected into conveyancing systems, such as irrigation return flow from agricultural fields and stormwater runoff from urban areas.

Diffuse-uncollected (class 3): Extensive areas from which discharge to surface or ground water occurs in a diffuse and intermittent manner from the atmosphere or land.

Instream activity (class 4): Impacts on the integrity (health) of the aquatic habitat, including water quality, through activities directly in surface waters or on the riparian zone (aquatic environment), such as construction, dredging, ploughing, dumping, household or recreational activities.

Table 1. Land use activities associated with the source based classification system.

Point Sources	Incidents	Nonpoint Sources			
		Concentrated	Diffuse-collected	Diffuse-uncollected	Instream activity
<ul style="list-style-type: none"> - Domestic waste water - Industrial effluent 	<ul style="list-style-type: none"> - Transport accidents - Pipeline failures - Infrequent sewer failures - Industrial accidents 	<ul style="list-style-type: none"> - Waste disposal sites - Confined animal facility - Mines - Construction sites - Industrial sites 	<ul style="list-style-type: none"> - Irrigation drainage - Urban storm water 	<ul style="list-style-type: none"> - Agricultural lands - Urban areas - Informal settlements - Rural settlements - Transport infrastructure - Atmospheric deposition 	<ul style="list-style-type: none"> - Construction - Dredging - Agriculture - Livestock - Recreation

In terms of a simplified nonpoint source classification, collected-diffuse (class 2) could be incorporated into the point source classification and regulated as such, and/or combined with the uncollected-diffuse sources into a general diffuse source category. However, in terms of consistency of nonpoint source management, this may not be the best approach.



Water Law Recommendation:

Nonpoint sources include concentrated sources, diffuse sources (either collected or uncollected) and instream activity.

3.4 Further Classification of Nonpoint Sources

The above nonpoint source classes reflect the main differences between nonpoint sources, and thus provide a sound basis for general classification. However, the intra-class differences in impacts and appropriate management practices are too great for this to be the only classification system. Therefore, one or more of the classification schemes outlined in the following discussion is required.

Severity of impact: Classification may be based on the expected impact on the water environment, for example *low*, *significant* and *critical* impact. Specific land use activities would need to be classified, but it is essential that the classification be based on consensus. If applied on a national basis, representatives of individual source types may protest their classification within the context of a particular catchment, making the system more difficult to administer. Furthermore, it may be difficult to assess the generic impact of a land use activity on the water environment without a comprehensive impact study. It may also be difficult to specify land management practices appropriate for all sources within a class. However, this approach may be appropriate for catchment management, where classification could be done through an impact study in a specific catchment during the development of a management plan.

Waste generated: Classification may be based on the types of waste which may be generated by different land use activities. This could include the main groupings of the nonpoint source constituents of concern, which are suspended solids (sediment), nutrients, faecal bacteria, salinity (inorganic) and toxic (or hazardous) compounds. All land use activities with potential non-point source problems would be classified, with some sources being characterised by more than one waste type. This approach has the advantage that management practices are usually designed for removing or treating different types of waste, although the appropriate management practices differ between source types, due to technical and economic considerations, and the potential severity of impact may be far greater for certain sources. Thus, further sub-classification would probably be required for it to be effective. However, it may be appropriate for classification of concentrated sources, particularly if a collected effluent emission (point source) standard approach were adopted.

Source type: The two preceding classification schemes are implicitly based on the characterisation and grouping of land use activities. This may lead to disagreement about the classification procedure and inappropriate specification of management practices. Alternatively, direct classification of nonpoint source types, based on land use activity, overcomes these drawbacks. The dangers of this approach is that the list may become too long and difficult to apply, would require different management practices to be specified for each source type, and may overlook some non-point source types. A list representing about 15 generic source types, similar to that which has been formulated as part of the IPC process, could be developed and occasionally updated. The advantages of this approach are that management practices may be implicitly specified for the type of waste generated and the potential severity of the impact, but reflecting the economic and technical constraints on management of different land use activities. Regulations may be set on a sectoral basis, thereby facilitating consensus building, with "cutoff points" being explicitly defined according to the important nonpoint source characteristics of the relevant land use activity.

Cutoff level: Most land use activities in a catchment generate and discharge some waste. To avoid overloading the regulatory authority, as well as to focus energy on those nonpoint sources with potentially significant impacts, a cutoff level should be incorporated into the classification system. This could be through omission from a source type list of those land use activities which do not have a significant impact (for example conservation areas). Alternatively, the specification of a cutoff level for those activities on the source type list may be based on one or more easily measurable characteristics, which are related to the nonpoint source water quality impact (such as the number of livestock head in a confined animal facility). The latter cutoff level would need to take cognisance of the cumulative impact that a number of smaller sources below the specified cutoff would have on a catchment. An intermediate cutoff level may represent a “proxy” for the severity of impact, differentiating sources with potentially critical impacts, requiring more comprehensive management systems, from those only requiring routine management practices.

Based on the above discussion, a three tiered classification system may be defined:

- primary classification* of the main nonpoint source classes;
- secondary classification* of source types, based on land use activities; and
- tertiary classification* based on a cutoff level (representing severity of impact).

However, this classification potentially complicates the legislative framework. Thus, in terms of the Water Law classification, it may be simplified into classification of source type, based on a list with cutoff criteria defining those sources which should be included.

Land use activities which should be included need to be identified as a matter of urgency, and agreed with interested parties through a national consultative process. This list should be published, with periodic updating as further information becomes available. Legislation should be associated with these categories, eg. requiring effluent of a specific emission standard from a concentrated source or requiring certain performance standards (management practices) to be associated with a given land use activity.



Water Law Recommendation:

Classification of nonpoint sources should be based on source type (land use activity), with cutoff levels reflecting the potential impact on the receiving water environment. Nonpoint source regulations should be defined according to these classes.

IV. CONTROL AND ENFORCEMENT

4.1 Introduction

Control of nonpoint sources is dependent upon the identification, selection and legislation of appropriate policy. *Policy options* provide the framework and generic approaches to meet the goals of water resource management. The selection of nonpoint source policy options should therefore be consistent with the policy imperatives (outlined above), as well as the South African Constitution, the Water Law Principles and other existing and planned legislation.

Policy options may be grouped into those based on *regulation, economic incentives and participation*. Elements of each of these groups should be incorporated into the enabling legislative framework provided by the Water Law and are discussed in this Chapter.

Management tools provide the strategies and practices for implementing policy. Best Management Practices (BMP's) represent the most effective tools to implement nonpoint source policy, because they provide the basis for source directed management for nonpoint sources. As they should only be selected once the legislative framework is developed, BMP's are not addressed explicitly in this document. However, cognisance must be given to the probable management tools associated with a policy option, in order to evaluate its potential effectiveness.

4.2 Approaches to Control and Enforcement

Three philosophically different, but not mutually exclusive approaches may be adopted for water quality management. Each has implications for the nonpoint source policy options which may be adopted, because they provide water managers with authority over different parts of the pollution generation, mobilisation and transport pathways (i.e. the catchment hydrological cycle).

Receiving water environmental objectives: may be specified in the receiving surface or ground water bodies which are undoubtedly the jurisdiction of the Water Act. This is the philosophical basis for water quality management, but does not in itself provide the mechanisms to prevent pollution, except in a reactive mode through reservoir system operation and/or instream remediation.

Discharge standards: may be specified for any point or nonpoint source discharge (emission) into a receiving water body, because the Water Act must have direct jurisdiction over discharges to water bodies. Together with receiving environmental objectives, this is the recommended approach for management of point sources to minimise pollution. However, nonpoint source discharges are usually difficult if not impossible to monitor and therefore to enforce compliance with relevant standards.

Source-directed management: provides water quality managers with influence over the source of any activity which may contribute to pollution of water resources, such as

the manufacturing process or land management techniques. The precautionary principle and source-based control imperatives imply source management as the first approach to pollution control. Source management may be voluntary, but compliance is then not guaranteed. If it is legislated, the consent of other regulatory authorities is required, and landowners' Constitutional rights must not be violated.

A source-directed policy provides the most effective nonpoint source management approach, but may raise political problems for legislation and implementation. However, as discussed in Chapter 1, source directed controls (BMP's) which address the discharge (delivery) process, rather than the waste generation (production) process, are more likely to be acceptable. These do not regulate how economic activity is conducted, but rather the precautions which must be implemented to mitigate impacts on the water environment.

4.3 Life-cycle Stages

To be effective, nonpoint *source management* should address all relevant stages in the life cycle of any activity, with each stage possibly requiring different legislation (regulations).

Planning: Addressing nonpoint source issues proactively during inception, planning and/or design, before the commencement of any activity, facilitates cost-effective management. This includes the siting of activities away from critical areas, which cause excessive nonpoint source pollution, as well as the design of management systems to mitigate any negative impacts.

Implementation: The implementation (construction) phase of many activities (developments) generates the greatest pollution potential. Specific mitigating measures should be adopted and audited.

Operation: Measures to mitigate the impacts of ongoing operation of any potentially polluting nonpoint source activity need to be implemented and these need to be monitored and audited over its life-span.

Rehabilitation: For those activities with a finite life-span, measures need to be adopted to ensure rehabilitation of the nonpoint source to prevent or mitigate impacts after operation has ceased.

4.4 Regulatory Policy Options

Prescriptive "command and control" regulations have traditionally been the most commonly used means of water quality management. Their strength is that a focused regulation may be formulated to address a specific threat, in order to ensure a desired result where monitoring and enforcement processes are good. This feature is particularly important when risks must be avoided in the management of sensitive catchments. The land use-based regulatory policy options indicated in Water Law Principle 18, provide an essential base to the nonpoint source management system, upon which other more flexible but less assured options may be built.

Flexibility should be built into the regulatory environment where possible, because regulations tend not to encourage individuals to do better than the standard, may not allow individuals to choose the least cost response, and may not consider issues of equity and efficiency. This may be achieved by requiring one or more alternatives to be selected from a range of options, according to local conditions.

Prohibitions: This requires authority to forbid or restrict certain critical land use activities which are known to have significant nonpoint source impacts in sensitive catchments. The focus would be on those land use activities classified as critical, particularly in the context of the receiving water environment classification system. Land use zoning provides an obvious vehicle for this option, or permitting as is the case for forestry. The issues surrounding the water law's jurisdiction over economic activity would need to be addressed, together with appeal procedures. Coordination with other planning authorities may be required for effective implementation. Prohibition of development in the flood plain and riparian strip is crucial for nonpoint source management, and this jurisdiction should be incorporated into the Water Act. This option is recommended for control of critical nonpoint source classes, if it is politically feasible.

Regulations: These would prescribe the use of nonpoint source management measures for certain land use activities classified as having potentially significant nonpoint source impacts, based on the classification of land use activities. A range of acceptable management measures (i.e. technology-based performance standards or BMP's) would need to be identified and published for each of the nonpoint source classes (possibly for each stage in the activity life-cycle), with emphasis on the delivery process. Individuals may select from this list, with permits (and impact assessments) only being required if none of the measures are feasible, due to site-specific economic or technical reasons. Registration and auditing would be required for any listed activity, particularly in sensitive catchments (see *Permitting*). This option is recommended for control of all nonpoint source classes, but may require jurisdiction of the Water Act over certain land use activities, and thus may overlap with other authorities.

An alternative allied approach would be to use the Integrated Pollution Control (IPC), being developed as part of the Environmental legislation, to promulgate and audit regulations for complementary actions required for certain land use activities.

Discharge standards: Effluent discharge standards may be required for particular nonpoint sources, similarly to point source emissions. This is only appropriate for nonpoint sources which may be collected and discharged at a point (Classes 1 and 2), to enable compliance monitoring and would require concurrent regulations dictating the land use activities which require collection of washoff and/or leachate. The specified standards should take account of the type of pollutants commonly associated with the land use activity and the technical and economic capacity to achieve the standards. Only exceptions from these regulations and standards would need to be permitted, although all sites would need to be registered, to facilitate compliance monitoring and auditing. This option is recommended for many Class 1 nonpoint sources classified as having critical or significant water quality impacts (eg. mines, waste disposal sites, confined animal facilities and key industrial sites) and certain (toxic or hazardous) pollutants from some Class 2 nonpoint sources (eg. urban storm water and irrigation), but should be administered under the point source regulations.

Government intervention: In cases that regulations are not viable or private responsibilities are not clear, government may take responsibility. This may include “buying up” sensitive areas to protect catchments (in conjunction with conservation authorities) and rehabilitating critical sources which have been abandoned (such as mines). This can be a very expensive option, but the framework should be in place to enable departments to do this when necessary. The use of a national (Water) *Environmental Fund* (see below) may make this more achievable. It is recommended that this option be pursued, but not necessarily within the Water Law (possibly the Environmental Law).

Devolution: The Water Law may enable the devolution of authority for nonpoint source management to regional, catchment or local authorities. Along with this authority could be the responsibility for developing a “State of Nonpoint Sources” report, proposing an associated management plan (or system) to address key problems. Furthermore, provincial, catchment or local regulations (by-laws) which control nonpoint sources, may be promulgated in association with other relevant regulatory authorities as the lead agents. Auditing of these functions would be performed by the national department, with access to government funding, loans and benefits being conditional on the achievement of the specified responsibilities. This option is recommended for all nonpoint source control, but is dependent upon appropriate institutional arrangements, adequate capacity, and integration into other initiatives for devolution of catchment management authority.

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Water Law Recommendation:

- *Nonpoint source regulation should require the implementation of BMP's associated with listed (classified) nonpoint source types.*
- *The possibility for restricting critical activities in some catchments, possibly through an impact assessment process, should be explored.*
- *Application of discharge standards to collected washoff from listed nonpoint sources should be regulated through point source administration.*

4.5 Economic Policy Options

Economic instruments are designed to influence decision making behaviour by altering the costs and/or benefits of different activities. For nonpoint source management, this implies penalising activities which cause pollution and/or rewarding activities with positive or benign impacts, to ensure that resource use decisions take account of all the social and ecological (environmental) costs and benefits (externalities). Internalising these impacts implies that water quality management becomes an integral part of the decision making about production and consumption choices. This should lead to more socially optimal and equitable outcomes and is consistent with the “polluter-pays” imperative outlined in Water Law Principle 16. It also enables individuals to be flexible in their response, thereby encouraging innovative and locally appropriate solutions.

The difficulty in implementing these options is the valuation of environmental costs and benefits of pollution. Furthermore, the impacts of different economic instruments on decision making, and thus the reduction of nonpoint source pollution, are not well

understood, and can cause unforeseen market distortions. However, economic instruments provide an important opportunity to manage nonpoint sources and so should be developed in conjunction with the regulatory options, particularly in less sensitive catchments. Therefore, the Water Law should provide the enabling legislative framework to facilitate the promulgation of economic instruments for nonpoint source management, preferably in association with other regulatory authorities.

Charges: This includes requiring individuals to pay for all the costs associated with an action, such as applying for an exemption permit, a pollution discharge levy, or a permit to conduct a restricted (critical) land use activity in a sensitive catchment. These charges should be based on the administrative, social and/or environmental costs of single (exemption permit) or ongoing (discharge levy) actions, but the method of calculation must be transparent. They should be significant enough to have an impact on individuals' decision making, but must not violate the equity imperative. This means that charges should also be related to the economic benefits of an activity. Penalties for violating regulations may also be proportionate to the costs of all the social and environmental impacts of that violation. It is recommended that this approach be explored for setting penalties on violation of regulations or standards, as well as permit application charges, and levies on the discharge of collected pollutant loads (Class 1 and 2 nonpoint sources).

Taxes: These imply the application of taxes (or tariffs) to inputs or outputs from critical land use activities which cause nonpoint source pollution (such as fertilizer), in order to alter production decisions to account for the full social and environmental costs. They should be based on the externalities of pollution caused by that production, otherwise markets may be distorted. Estimating these externalities is complex and other government departments and private interests are likely to oppose additional taxes. Furthermore, equity implies that all activities contributing to a problem should be taxed, which complicates the implementation. South African taxes are raised through the Treasury and cannot be earmarked for use, which implies that taxes should only be used to alter economic decisions. It is recommended that this option be further investigated, taking account of the acceptability and equity issues, as well as possible partnerships with other departments, such as Environment and Agriculture.

Incentives: This includes the initiation of incentive programmes, in conjunction with other departments, to encourage individuals to adopt measures which mitigate nonpoint source pollution or to change land use activities to those with lower impacts. These may include conditional access to government benefits or loans, provision of seed funding for pilot programmes, or "renting" critical areas from land owners to prevent degradation of sensitive catchments. The water quality benefits arising from the incentives should exceed the costs. It is recommended that this option be further investigated, particularly in the context of catchment management and supporting the initiatives of other departments.

Subsidies: These involve making funds available to compensate for market distortions or enable economically disadvantaged groups to implement nonpoint source control measures. They are most appropriate for once off capital expenditure, rather than for ongoing operation or production, otherwise unsustainable use or production may be promoted. Therefore subsidies by other departments which encourage activities which

contribute to nonpoint source contamination should be discouraged. Subsidising investment in nonpoint source control measures as part of the Community Water Supply and Sanitation Projects is particularly important for future water quality management. The water quality benefits of any investment should outweigh the subsidy costs. Cost sharing (or “matching funds”) should be promoted, particularly where the subsidy enables implementation of BAT rather than BATNEEC. This option should be further explored, particularly for capital projects.

Tradeable permits: The Water Law may enable a legislative framework for the sale or renting of the allocated (or permitted) right to pollute within a given catchment. For nonpoint sources this may be associated with the discharge load from a regulated Class 1 (or 2) nonpoint source, but requires a complex assessment procedure to determine the highly variable loads from these source types. However, trading of technology based performance standards (management measures) is not appropriate, because the impacts of not having measures in place are even more difficult to assess. Trading the right to conduct restricted land use activities in sensitive catchments is possible, and provides another mechanism for flexibility, but the potentially different impact on the receiving environment associated with nonpoint source siting must be addressed. This option is not generally recommended for nonpoint source control.

Environmental fund: Operators of critical land use activities which potentially cause considerable nonpoint source pollution (either during operation or after closure) may be required to set aside funds (either before commencement or during operation) which may be used to mitigate impacts, remediate accidents or rehabilitate the site after closure. The issue of liability for pollution needs to be addressed, particularly where a nonpoint source has changed ownership. A similar fund may be contributed to by the beneficiaries of a catchment management system to provide finance, as specified in Principle 24. Alternatively, a fund may be used as insurance against violation of permits or regulations, which may be returned upon successful completion or adequate operation of the activity. This option is highly recommended, but requires cooperation of other government departments to require payment.



Water Law Recommendation:

The possibility for using charges, taxes, subsidies, incentives or tradeable permits for nonpoint source management should be investigated further, and the enabling legislative framework should be provided.

4.6 Participative Policy Options

The most effective nonpoint source control is based on appropriate land use management. Regulatory controls and economic instruments provide the basis for managing the major problems, but the complex administrative and legislative requirements may make it infeasible to apply these options to all nonpoint sources. Influencing individuals' decision making through non-coercive and non-economic options can be cost-effective and sustainable, particularly for less severe nonpoint source impacts. Although these options are not necessarily part of the legislation, they represent important Policy Options, which should be facilitated through the Water Act, by providing supportive enabling legislation.

Regulatory agreements: The DWAF may enter a contract with another department or private organisation, which formally specifies what each party agrees to do, and the implications if either party defaults. The contract or covenant may be legally binding and provide a mechanism for extensive public participation and consensus building, particularly where a diverse group is involved. This approach may be used when regulatory options are not appropriate or do not apply, and provide the means for several impactors in a catchment to develop their own binding regulations. This option is recommended, particularly for situations in which several nonpoint sources contribute to a problem which is not particularly severe and/or regulation is complicated by the inability to monitor and allocate contributions.

Voluntary guidelines: An alternative to regulation is to encourage the voluntary adoption of nonpoint source management measures through public pressure, moral persuasion or education about the social and individual benefits (see *Information sharing* below). Government support for public education and sectorally directed extension efforts should be supported. Appropriate management measures (guidelines) for different land use activities may be compiled and publicised, particularly for those nonpoint source types with less severe impacts. The department should also initiate and support pilot projects. This option is recommended, particularly for nonpoint sources with less severe impacts, even though the benefits are generally long-term and difficult to assess.

Self-regulation: In order to reduce the administrative burden of enforcing nonpoint source management, the responsibility for regulating or monitoring implementation may be delegated to catchment agencies, local authorities or private individuals. This may be applicable to either legislated regulations or voluntary guidelines. To prevent non-regulation from resulting, unscheduled audits by independent parties or the regulatory authority should be conducted. This option is recommended for nonpoint sources with less severe impacts in less sensitive catchments.

Information sharing: Public support is crucial for nonpoint source management initiatives, while public pressure can influence decisions about production and consumption. However, this is only gained through information dissemination about the severity, causes and impacts of the nonpoint source pollution. Therefore, the department should support research and require data collection and information disclosure by all authorities and significant polluters. This option is recommended, particularly in terms of information disclosure.

Common law: Civil law provides a mechanism for private individuals to address problems with other private polluters, without the intervention of the state. This option requires the issues of *locus standi* and liability to be addressed, so that an individual may represent a common interest and the burden of proof is shifted from the victim to the polluter. This option should be explored, because it adds to the nonpoint source management capacity of the regulatory authority.



Water Law Recommendation:

Participatory approaches should be encouraged through information sharing and enabling the adoption of voluntary actions in less sensitive situations, but providing for appropriate administration for auditing.

4.7 Application of Legislated Options

Specification of management approaches (and/or systems) for different nonpoint source classes has the advantage of providing a measure of protection for the water environment while contributing to more streamlined administrative and regulatory procedures. However, uniform specification does not allow the flexibility to take account of local conditions. Therefore, a balance must be enabled between the reliability of general uniform approaches and the flexibility of site-specific management alternatives. Options may be specified nationally, may differ according to the sensitivity of the receiving water environment, or may be catchment specific. Although this issue is important for economic and participatory options, it has particular relevance for "command-and-control" regulatory options and the specification of performance standards (Best Management Practices).

National: National application of management approaches would be specified for all nonpoint sources in a given class (i.e. listed activities). National application has the advantage of simplicity and uniformity. This should ideally have wide acceptance and be based on the economic and technical opportunities for management of different nonpoint source types. National application has the disadvantage of not accounting for the varying sensitivity of different receiving catchment aquatic environments.

In terms of the implementation of regulations, the responsible authority or individual would be required to choose from a specified list of management practices associated with that class of nonpoint source. Those that implement these management practices (performance standards) would only be required to register, and then be responsible for any associated monitoring and reporting. Only those that wish an exemption from the specified performance standards would be required to do an impact assessment and apply for a permit. This approach limits the demands placed on the regulating authority.

Table 2. Framework of nonpoint source regulations for receiving environments.

Receiving Environ. Class	Concentrated		Diffuse-collected		Diffuse		Instream
	Feedlot		Formal Urban Residential		Dryland Crops		Construct.
	>500 head	>2000 head	>10 000 people	>100 000 people	>100 ha	>5 000 ha	-
A	IA	IA	IA	IA	IA	IA	IA
B	SMP _{1a}	SMP _{1b} ES _{1b}	SMP _{4a}	SMP _{4b} ES _{4b}	SMP _{7a} Econ ₇	SMP _{7b} Econ ₇	IA
C	SMP _{2a}	SMP _{2b}	SMP _{3a}	SMP _{3b}	SMP _{5a}	SMP _{5b}	SMP _{6a}
D	SMP _{1a}	SMP _{3b}	SMP _{3a}	SMP _{3b}	SMP _{5a}	SMP _{5b}	SMP _{6a}
Marine	-	-	SMP _{2a}	SMP _{2b}	SMP _{2a}	SMP _{2b}	SMP _{2a}

IA = Impact assessment required.

SMP = List of standard management practices for that land use class.

ES = Emission standard (list of constituents and concentrations).

Econ = Economic instruments (such as fertilizer tariffs).

Receiving water environmental classification: Appropriate management approaches could be set for different nonpoint source classes, but taking cognisance of the acceptable risk associated with the receiving water environmental classification. Nonpoint source management in catchments with sensitive receiving environments would have to be precautionary, which implies more stringent requirements (lower risk). Specification of the required performance standards could reflect this risk, by being designed for a lower risk of failure. The examples in Table 2 illustrate a possible framework for a receiving environment based approach.

Catchment specific: In certain catchments, nonpoint sources may dominate the impacts on receiving water environmental quality, causing it to exceed instream water quality requirements. In these cases additional site-specific management of some nonpoint sources may be necessary, based on assessment of the catchment contributions to the existing water quality problems. Identification of nonpoint sources with critical, significant or negligible impacts would be the objective of this nonpoint source assessment, and would provide the basis from which to prioritise nonpoint source management. Catchment specific nonpoint source management measures (and associated practices) could be set as part of the Catchment Management process.



Water Law Recommendation:

National regulations (eg. restrictions, BMP's and or discharge standards) should be provided for different nonpoint source classes and possibly receiving environments reflecting acceptable risk, but with the option of catchment specific regulations as part of catchment management plans.

4.8 Permitting

Permits authorise the recipient to conduct a regulated activity. There are two possible approaches to permitting for nonpoint sources.

- Permits are required for all regulated activities
- Permits are only required when a regulation cannot be met.

The second option is recommended to reduce the administrative burden and costs of nonpoint source management, and make it similar to the recommendations for point source management.

Identification of Critical Nonpoint Sources

The management of nonpoint sources is dependent upon an effective classification system. A possible system has been outlined in this document. Development of a framework for this classification system is an urgent priority and should occur concurrently with the current Water Law Review process, for possible inclusion in the new Act.

This framework would provide the basis for classifying nonpoint source types, which could then be listed and updated when necessary. The classification procedure must be transparent and subject to a process of public consultation and comment. A list of technically-based performance standards (BMP's) must also be developed, along with requirements for monitoring, auditing and reporting. This would provide the basis for

prosecution where necessary. These standards should reflect the technical and economic possibilities in each of the classes, to reduce exemption applications.

The IPC approach proposes that land use "IPC permits" would be issued to nonpoint sources. In this case it may be counter-productive for the water authority to issue separate permits. However, the IPC permit should ideally also consider the interaction with the receiving water environmental classification. Coordination with the IPC approach should therefore be investigated in more detail, before nonpoint source permitting is incorporated into the Water Act.

Registration

Listed activities above a cutoff must be compelled to register with the water authority, providing details of the implemented performance standards which avoid the need for permitting. This enables their impact on the receiving environment to be monitored and the implementation of the required standards to be audited for control purposes. Where the nonpoint sources are not controlled by a single party or an obvious authority, as in the case of informal settlements without legal tenure, the issue of registration must be investigated. The water authority may be compelled to effect such registration with due cognisance of equity and other policy imperatives.

Permitting Process

The permitting process should be efficient and transparent, but should discourage widespread exemption applications, possibly through relatively high application charges. This implies that a record of all permit decisions must be available. The following process should be followed.

Pre-application: Before initiating an application for an exemption permit, the water authority should be consulted and made aware of the intention. This is particularly important in sensitive catchments, because knowledge that the permit is not likely to be granted may result in relocation to a less critical area, where the permit application is more likely to be approved.

Impact assessment: As it is preferable that permit applications should only be required where relaxation of regulations is necessary, a comprehensive (independent) impact assessment of the implications of relaxation must be completed before application, to enable the water authority to make an informed decision.

Application: The application should be submitted in full, corresponding to clearly defined requirements. The intention for relaxation and supporting information must be advertised to allow comment from interested and affected parties. A decision must be reached through a transparent process within a specified time period to avoid misunderstanding. Explanation of any rejected applications must be provided.

Issuing: The approved permit requirements must be unambiguously defined, including any revised management systems (performance standards) or discharge standards against which compliance is to be measured. Monitoring, auditing, reporting and review requirements must also be clearly outlined. The results of the application (and when applicable the permit requirements) should be published in line with the requirement for information disclosure.

Appeal: A simplified appeal mechanism should be provided when the permit is rejected, although ongoing drawn-out appeals should be restricted.

Review: The permit should outline the period and requirements for review, at which time the permit may be repealed or revised. No permit should be issued indefinitely. Violation of permit conditions may also initiate a review.

Auditing

All listed nonpoint sources, whether permitted or not, should be subject to ongoing self regulated monitoring and periodic and/or unscheduled auditing. The results of this monitoring and auditing should be publicised.

Prosecution

The Water Act should shift the burden of proof towards the polluter and allow the prosecution to use more circumstantial evidence than currently allowed. Results of bio-monitoring should also be permissible as evidence. This is particularly important for nonpoint source prosecutions, because routinely monitored data is difficult, if not impossible to obtain.

Spot fines may be introduced and policed by pollution control officers from the water authority for violation of regulations for critical land use activities. An appeal mechanism would need to be implemented, taking account of mitigating circumstances.

Information disclosure

In line with international trends and the desire for transparency and public participation, any information produced from nonpoint source monitoring or assessment associated with registration, permitting or auditing should be available to the general public. An informed public can assist the regulatory authority in enforcing nonpoint source control. The requirement for information disclosure should be legislated, with exemptions based on confidentiality being subject to permit and stringent auditing requirements.



Water Law Recommendation:

- *Registration of all listed nonpoint sources, with associated regulations.*
- *Permitting only required for nonpoint sources which cannot comply with the specified regulations.*
- *Prosecution based on violation of registration or permit requirements.*
- *Information disclosure on nonpoint source registration, permitting and auditing.*

V. MONITORING AND ASSESSMENT

5.1 Introduction

In addition to the monitoring required by the water authority to assess the state of the receiving water environment, monitoring and assessment specifically to evaluate the impact of nonpoint sources on the quality of the water environment must be considered.

5.2 Monitoring

By definition, monitoring of nonpoint source discharges is difficult, if not impossible. Therefore, innovative approaches are required for nonpoint source monitoring.

Collected effluent: For those nonpoint sources from which surface washoff or leachate is collected (eg. *class 1 and 2*), the quality of this effluent may be sampled. This provides information about legal releases into the receiving water environment or surcharges associated with failures from a containment system (thereby becoming an *Incident* source), which may be used as the basis for prosecution of violations.

Receiving environment: Water quality sampling and biomonitoring in the receiving surface or ground water environment, either by the nonpoint source operator or the water authority, can provide an indication of the impact of one or more upstream sources. Although this type of monitoring is not definitive, it can provide the motivation to implement more stringent standards, but is unlikely to be the basis for prosecution of nonpoint sources (except for toxic or hazardous discharges).

Land use: The required registration of listed land use activities (nonpoint source types) provides the basis for monitoring the extent of nonpoint source activity, and thus assessing its potential impact. Information about the performance standards implemented at each nonpoint source should also be collected. Water authority auditing for non-registration or non-compliance should supplement this monitoring, and provide the basis for prosecution.

Contaminant generation: Information about the production, transport, storage and use (particularly land application and atmospheric emissions) of certain listed nonpoint source related substances should be available to the water authority. This information may be obtained either from an environmental authority or directly from the producers. This would include hazardous contaminants, such as pesticides, as well as other contaminants, such as fertilizer.



Water Law Recommendation:

Monitoring of nonpoint sources should focus on registration of listed activities and collection of information on generation at the source, supported by water quality sampling of collected washoff and leachate, as well as water quality in the receiving water environment near the source.

5.3 Assessment

The difficulty of monitoring nonpoint sources requires greater emphasis to be placed on nonpoint source assessment, than is usually necessary for point sources. Assessment is particularly important for the design of site-specific management practices for critical nonpoint sources in key catchments, and the development of appropriate general performance standards or economic instruments for listed nonpoint sources (activities).

Impact assessment: Detailed investigation of the water quality impacts and risks to the aquatic environment from a listed nonpoint source would only be required when the specified performance standards cannot be met and/or where it is located in highly sensitive catchments. This assessment would need to provide information about the impact of the source, with and without any proposed management measures, taking account of the existing development and conditions within the catchment.

Catchment management: In catchments where point source emission standards and nonpoint source performance standards alone are not sufficient to meet instream water quality requirements, assessment of the integrated impacts of all (point and nonpoint) sources would be required. This would provide the basis for applying more stringent performance standards to those nonpoint sources with significant or critical impacts.

Listing nonpoint sources: The process of identifying those land use activities which should be listed nonpoint sources, together with appropriate cutoff levels, is likely to have significant economic consequences for a wide range of sectors, including industry, mining, agriculture and local government. Therefore, this process must be supported by general ongoing assessment (and research) of the potential nonpoint source impacts of the land use activities to be listed.

Performance standards: As with the listing of nonpoint sources, the specification of appropriate performance standards must be supported by scientific assessment of the general cost-effectiveness and risks to the aquatic environment of different nonpoint source management measures and practices. Emission standards for certain class 1 and class 2 nonpoint sources should also be investigated, together with the performance standards required to collect discharges. This must take cognisance of what is economically and technically realistic for that land use activity, to gain general consensus from different sectors and thereby reduce the number of exemption permit applications.

Economic instruments: The use of economic instruments to influence decision making about nonpoint sources requires comprehensive assessment of the effectiveness of the planned intervention, as well as the potential unintentional market distortions. Information is required about the actual social and environmental economic costs of certain activities which are to be targeted, and the potential economic benefits from implementation. This information is crucial to address any political opposition.



Water Law Recommendation:

Nonpoint source assessment should play an important role in development and implementation of regulations for nonpoint source management.

VI. RECOMMENDATIONS

6.1 Interim Measures and Time Frame

It will take some time before the nonpoint source policy framework will take effect. The current Water Act does not specify standard management practices, and does not specifically address nonpoint sources. Thus, the provisions in sections 22 and 23 of the existing Water Act would have to be used until the new Act is promulgated, along with the relevant sections in other Acts through other departments as lead agent.

As listing and registration will form the basis for ensuring that specified regulations are implemented, a nonpoint source list should be identified as soon as possible. The development of nonpoint source regulations for these listed sources must be developed as a priority, based on the risk of impact, as well as technical and economic considerations. Receiving environment or catchment related regulations may be required, when these are developed during the implementation of the classification system.

6.2 Summary Recommendations

Enabling non-point source regulations to be promulgated through the new Water Act is somewhat more complex than enabling regulations for point sources. As such the ideas and options outlined in the preceding discussion need further debate and clarity. However, at this time it is recommended that the new Water Act include the following broad provisions, to facilitate the later formulation and legislation of regulations aimed specifically at nonpoint source management.



Summary Water Law Recommendations:

- *A source-directed philosophy should be adopted.*
- *Classification of nonpoint sources according to general land use activity*
- *Formulation of a list of nonpoint source types with cutoff levels reflecting the potential impact on the water environment.*
- *Specifying regulations for appropriate national or uniform best management practices, for each listed nonpoint source class*
- *Specifying regulations to reflect the acceptable risk of pollution in different receiving environments.*
- *Setting more stringent regulations within catchment management plans.*
- *Registration for all listed nonpoint sources, along with the relevant regulations.*
- *Permitting required for those nonpoint sources not adopting the specified regulations.*
- *Prosecution based on violation of registration or permit requirements.*
- *Information disclosure on nonpoint source registration, permitting and auditing.*

VII. REFERENCES

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