BEGINNERS GUIDE TO SOUTH AFRICA’S FORESTRY ENVIRONMENTAL GUIDELINES
All industries that use or replace natural resources will impact on the environment to some extent and the forestry industry is no different. Forestry’s five major impacts are:

1. Reduction of stream flow in a water course
2. Impact on biodiversity
3. Impact on ecosystem structure
4. Impact on soil (soil loss and nutrient status)
5. Impact on carbon storage

**AS A RESULT THE SOUTH AFRICAN FORESTRY INDUSTRY IS COMMITTED TO ENSURE THAT:**

1) Plantation forest establishment and management takes place in the most socio-economically and environmentally acceptable way.

2) Natural resources are managed in a manner which will ensure the sustainability of the forestry enterprise and the biodiverse ecosystems around it.

3) People on whom the industry depends may work in safety and live under conditions of acceptable quality.

In order to do this a set of self-governing environmental guidelines have been drawn up.

**WHO ARE THE ENVIRONMENTAL GUIDELINES AIMED AT?**

The environmental guidelines are aimed at the forestry industry as a whole, from the large corporate companies to the small-scale farmers, and have been produced to be accessible to all.
These guidelines are designed to reduce the potential negative impacts of timber plantations through the implementation of environmental best management practices and compliance with the environmental laws. These are:

- **Mitigate the impacts on stream flow reduction**, through the removal of all alien and invasive species and the withdrawal of timber plantations from within the wetland buffer zones.

- **Minimise the impacts on biodiversity**, through the retention or establishment of natural vegetation corridors between the timber compartments and the management of such unplanted land for biodiversity conservation and functioning of ecosystem structures.

- **Reduce the impact on soil**, particularly on recently harvested compartments and from roads, through the retention of timber residue on the harvested compartment and the proper construction and maintenance of gravel roads.

Unravelling the concepts of environmental management and forest certification

**WHAT IS ENVIRONMENTAL MANAGEMENT?**

The primary objective of environmental management is to regulate the effects or impacts of our decisions, activities, products and services on the environment. These decisions and activities form part of everything we do in every aspect of our daily lives, be it the discarding of an empty bottle or the planning of a new plantation.

The basic objective of environmental management is to:

1) Be properly informed on the reaction to an action – i.e. what will happen if I harvest a tree and it falls into a watercourse?

2) Assess what can be done (mitigatory measures) to minimise or negate the negative and enhance the positive impacts of such an action.

3) Consider alternatives for the action or the location where the action will take place to minimise or negate the negative and enhance the positive impacts of such an action.
WHAT ARE THE LEGAL REQUIREMENTS?

There are numerous pieces of environmental legislation that govern the forestry industry in South Africa:

- National Forests Act 84 of 1998 – P7
- National Environmental Management Act 107 of 1998, as amended (including the EIA Regulations) – P9
- National Environmental Management: Biodiversity Act 10 of 2004 – P17
- National Environmental Management: Waste Act – P21
- Conservation of Agricultural Resources Act – P15
- National Environmental Management: Protected Areas Act
- National Heritage Resources Act 25 of 1999

For more information on the legal requirements placed upon the forestry industry by each of the above acts, please refer to the environmental guidelines. The page numbers above will refer you to the correct page.
WHAT IS FOREST CERTIFICATION?

During the past few decades, governments, environmental groups, industry and the public have become increasingly aware that consumer demands and market forces have the potential to exert influence on the management and use of natural resources. As a result, there have been a number of international government initiatives and private sector efforts to promote the concept of sustainable development. Forest certification programmes are an extension of this and essentially comprise:

1) Forest management certification:
   - Forest Stewardship Council® (FSC®)
   - Programme for the Endorsement of Forest Certification (PEFC)

2) Forest product certification:

Although it should be noted that currently only the FSC Certification Standard is adopted in South Africa, there is a local initiative for an additional certification system (South African National Forestry Assurance Scheme).

ADVANTAGES OF CERTIFICATION

• Internationally recognised and often required by end users
• Ensures acceptable environmental and social standards are upheld
• Can command an often superior price through product differentiation
• Promotes a green conscious market

DISADVANTAGES OF CERTIFICATION

• Prohibitively expensive for medium and small growers
• Limit the management options available to the grower
FOREST MANAGEMENT CERTIFICATION

This process takes place at the level of the forest management unit (FMU) and is based on a set of forest management standards that have been developed by stakeholders and agreed by them to be acceptable and significant. Implementation of such standards should result in improved actions on the ground with measurable results over time, but initially requires:

- Self-assessment against certification standard and the implantation of corrective actions.

- Formal certification process, conducted by an accredited external auditor, which often entails a pre-assessment to identify deficiencies and then a main assessment evaluating all aspects of forest management practices.

- Following certification regular surveillance visits are performed by an independent body.

FOREST PRODUCT CERTIFICATION

This process is used to identify the wood, or wood or paper product, in question as originating from a certified source the FMU. To do this a chain-of-custody assessment is carried out, which links the buyers and sellers from the forest to the point of sale and assures end-use markets that the product originates from a certified forest.
What do the environmental guidelines cover?

#1: REDUCING THE VISUAL FOOTPRINT OF FORESTRY

LAND USE MAPS

Land use maps are elementary planning tools that assist landowners in identifying management priorities based on the inherent characteristics of the land.

The maps will assist a forester to make an informed decision on:

• Areas that are suitable for afforestation
• Commercial forest species that are suitable for the farm
• Site-specific management requirements
• Slope restrictions (to determine the site preparation method to be used)
• The conservation of protected environments
• The protection of water sources
• The choice of appropriate harvesting systems
• The suitability of locations for new infrastructure

The map needs to include:

• Existing or proposed forest management units
• The delineation of natural vegetation
• The identification of water courses and wetlands
• Soil map
• Existing roads and planned new roads
• Stream crossings
REDUCING THE VISUAL IMPACTS

It is undeniable that forestry creates features with strong visual dominance, but through careful and sensitive planning of newly afforested areas, the potentially negative visual effects of the plantation can be reduced. It should be noted that the practical application of this in established plantations is somewhat limited.

Visual impact planning takes into account:

- Character of the landscape
- Location of an observer in the landscape
- Scale and spatial arrangement
- Visual penetration
- Presence of man-made structures and unique landscapes

#2: PROTECTING CONSERVATION AREAS

FRESHWATER ECOSYSTEMS – these are all inland water bodies, whether fresh or saltwater, including rivers, lakes, wetlands, sub-surface waters and estuaries. They play a critical role in ensuring the delivery of water-related ecosystem services to all plant and animal communities and therefore need to be conserved. Guidelines page reference 27.
WETLAND AND RIPARIAN HABITATS – wetlands play a crucial role in regulating stream flow and assisting with water purification. They also protect and regulate water resources, aid in flood prevention, recharge ground water sources and remove pollutants. They are also important breeding grounds and usually biologically diverse. Guidelines page reference 27.

GRASSLANDS – these cover almost one third of South Africa’s land surface, but they are also one of the countries most threatened biomes. Second only to fynbos in plant diversity, they include just under half of the countries important bird areas, one third of the country’s 107 threatened butterflies and 15 of its endemic animals – an estimated total of 3,500 species. Conservation of grasslands within timber plantations is carried out on a landscape level ensuring the ecological function of the ecosystem. Guidelines page reference 30.

FYNBOS – it may only occupy 2.7% of southern Africa, but fynbos has the richest flora of all the biomes with over 9,000 indigenous plants and high levels of endemism. In South Africa fynbos also has the highest number of rare and endangered plants and animals of any biome. Guidelines page reference 31.

INDIGENOUS FORESTS – these are a group of indigenous trees with a closed canopy or a forest declared by the National Government. It is illegal to cut, disturb, damage or destroy indigenous trees unless you have a licence to do so or have been issued an exemption. Guidelines page reference 36.

CLIFF EDGE AND ROCKY OUTCROPS – appearances are often deceiving, because these often have high levels of biodiversity with many indigenous plants having a special affinity to these areas along with numerous birds and small mammals. They are also aesthetically attractive. Guidelines page reference 32.
CULTURAL AND TRADITIONAL SITES – These sites are protected in terms of the National Heritage Resources Act and may not be destroyed, damaged, disfigured, excavated, altered or removed from their original site without a permit. Sites range from burial grounds and graves, to structures older than 60 years, archaeological and palaeontological sites, meteorites and ruins. Guidelines page reference 33.

SPECIES OR ECOSYSTEMS DECLARED AS THREATENED OR PROTECTED - In South Africa, 34% of ecosystems are threatened.

Of this:

• 21 are critically endangered, meaning they have undergone severe degradation of ecological structure, function or composition.
• 58 are endangered.
• 70 are vulnerable (at high risk of undergoing significant degradation).
• Only 298 are classified as intact.

Although there is no legally binding protection in place in terms for listed threatened ecosystems, farmers are encouraged to implement management plans to protect all natural ecosystems on their land. These agreements may vary in degrees of legal commitment and resulting benefits to the landowner.

Red Data List species and those listed as ‘threatened’ and ‘protected’ need to be effectively conserved. This includes mapping their distribution and the application of appropriate management and monitoring practices.
#3: MANAGING THE RISK OF FIRE

An adequate and appropriate fire management plan is essential to ensure that the plantation forests, together with the conservation areas and ecological processes, are protected. A fire management plan, which considers the management of plantation debris, is also a useful tool. This latter approach is used to reduce the fuel load (fire risk) present under both immature and mature trees, thereby limiting the spread of fire. However, special precautions and expertise are needed to develop and implement this tool.

All landowners have a legal obligation to prepare firebreaks. There also are strict guidelines governing the preparation and location of firebreaks (farm boundaries and internal firebreaks) as well as equipment and personal protective clothing.

The application of fire is a natural event in the cycle of ecosystem functioning in South Africa. Before implementing a fire is important to consider the type of biome. Some biomes benefit from fire, like fynbos and sourveld grasslands, while others are home to species that need longer grasses to ensure their survival i.e. African Grass Owls and therefore need bigger breaks between burns.

#4: INTEGRATED PEST MANAGEMENT (IPM)

IPM is an ecosystem-based strategy for pest management that focuses on the long term prevention of pests and diseases and their damage through a combination of control methods such as:

- biological control
- habitat manipulation
- modification of cultural practices (best tree varieties for the site)
- use of chemicals
- use of resistant varieties of commercial trees
IPM aims to suppress pest populations below the economic injury level (EIL), a suitable threshold that ensures the economic impact of the pests is low before there is a financial need to implement a control programme to avoid significant tree loss.

The United Nations’ Food and Agriculture Organisation defines IPM as:

‘the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment’.

IPM emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. IPM allows for safer pest control which includes managing insects, plant pathogens and weeds.

THERE ARE SIX BASIC PRINCIPLES OF IPM:

1. ACCEPTABLE PEST LEVELS: with the emphasis being placed on control rather than eradication.

2. PREVENTATIVE CULTURAL PRACTICES: selecting the best varieties for local growing conditions.

3. MONITORING: regularly inspecting and identifying potential pests in the area being managed.

4. MECHANICAL CONTROL: should the pests reach an unacceptable level, mechanical control options (traps, hand-hoeing, tillage, barriers, etc.) should always be the first option.

5. BIOLOGICAL CONTROL: the use of natural biological process and materials to control pests. The use of beneficial insects, biological insecticides, etc.

6. RESPONSIBLE USE: if synthetic pesticides are used they need to be done so responsibly, making sure the least environmentally detrimental types are used, and matching the application technique to the crop, pest and pesticide.
#5: ADDRESSING DAMAGE-CAUSING ANIMALS

Foresters who are faced with timber damage or livestock loss from damage-causing animals must be aware of the regulations and comply strictly with the conditions contained in the permit.

While any person may apply for a permit, the actual process is dependent on a number of requirements, including:

- all applicable legal requirements
- whether the species is listed as a critically endangered species, an endangered species, a vulnerable species or a protected species, and
- certain methods of hunting of a listed species are prohibited – such as use of poison, traps, snares, dogs and various forms of firearms.

The provincial department responsible for the conservation of biodiversity in a province must determine whether a listed species can be regarded as a damage-causing animal. In the case of damage-causing animals originating from a protected area, the regulations provide for various control options.

While the regulations allow the use of lethal control measures for listed threatened or protected damage-causing species, there is a strong thrust towards non-lethal, holistic, ecologically acceptable and ethical management of damage-causing animals.
In the forestry environment and under certain circumstances, the following are often considered damage-causing:

**RODENTS:** There are 75 of indigenous rodent species in South Africa; 25% of these can be considered agricultural pests. Guidelines page reference 50.

**BABOONS AND OTHER PRIMATES:** During the last decade, the damage to timber plantations by baboons has reached alarming proportions and current information indicated over 100,000 ha of timber land has been damaged to some extent. Guidelines page reference 51.

**BROWSING ANTELOPE:** Various antelope cause damage to saplings of various species, and while this is often isolated, it can become significant. Guidelines page reference 52.

**DOMESTIC LIVESTOCK:** These have the potential to damage newly planted compartments and also can impact conservation areas. Guidelines page reference 52.

**#6: DEALING WITH ALIEN AND INVASIVE SPECIES**

Alien and Invasive Species (AIS) are listed in two separate laws and are required to be removed or controlled. It is therefore not only a lawful requirement, but a civic duty to undertake the control of alien and invasive plants/weeds. Most programmes consist of three phases:
INITIAL CONTROL: the first attempt to control an invasive species infestation. This may be a dense population of the target species, or simply a few scattered plants. Initial controls are seldom 100%, especially in dense infestations.

FOLLOW-UP CONTROL: the second attempt to control an invasive species. Access is normally easier than in the initial control, and allows for the easier application of herbicides. If a follow-up is not completed timeously (normally the next growing season), the site can rapidly revert to its original infested state. Follow-up operations should be completed before implementing a new initial control in another area.

MAINTENANCE CONTROL: is reached when the follow-up control phase can be completed using the formula of : one labour unit per 10 ha per day.

#7: ENVIRONMENTAL ASPECTS OF SILVICULTURE

The major focus of silviculture is to reduce the impact of forestry operations on the soil, adjoining conservation areas and on any water resources that may be present. The following must always be considered:

SOIL IMPACT: Soil may be eroded or compacted as a result of forestry operations, so careful planning is needed in the initial stages for all operations. Soil is a living, dynamic resource that supports plant life, and on which sustainable agricultural and timber crops depend. Each soil type has its own characteristic chemical, physical and morphological properties. Landowners or managers should have a working knowledge of the soils on the property to make sound management decisions.
**SITE SPECIES MATCHING:** The timber-growing regions of South Africa cover a range of growing conditions with regard to latitude, climate, altitude, lithology, soils, topography and biotic factors. Species respond differently to these individual conditions and different combinations of them. The key to ensuring a successful forestry enterprise, while minimising environmental impact, is to choose the right species for the right environmental conditions.

**LAND AND SOIL PREPARATION:** Soil preparation aims to achieve optimum tree growth choosing the most suitable and environmentally appropriate methods and equipment.

**WATER USE OPTIMISATION:** As water is a scarce resource, management interventions should be considered by landowners to optimally use the water that they have been allocated.

**STAND DENSITY:** Planting trees at a lower density reduces the impact plantations have on stream flow. However weed control within the forest management unit may need to be increased as canopy closure is slower (lower tree density allows more light in which enhances weed growth). Stand density is usually determined by the following factors:

- The desired production or species grown
- The length of rotation
- The thinning regime employed
- Site potential

**WEED CONTROL:** This is one of the most important silviculture operations which allows for early stand growth and uniformity, reduction in seedling mortality and improvement of yields and reduction in fire hazards. To reduce the environmental impact of weeds, control of specific species that compete with the trees for water and nutrients is suggested.

**UNSUITABLE LAND = UNPLANTED LAND:** Trees should not be planted where they cannot be managed and harvested according to best practices. This applies particularly to steep, rocky and inaccessible areas where road access is not present, or where road construction would create unacceptable impacts on the environment. Trees should also not be planted on marginal sites, such as sites with shallow soils or dry aspects, or where the climate is unsuitable and the impacts on the natural environment are potentially significant.


Harvesting has a significant impact on the soil environment including:

- the use of heavy machinery that compacts the soil
- accelerated soil loss as a result of soil disturbance
- the development of extraction routes and depot sites

Harvesting operations should aim to minimise the environmental footprint, particularly the rehabilitation of the compartment after the trees have been harvested. Unwanted timber in the harvested compartment should be removed, as far as is practically possible, while ensuring that there is sufficient mulch left in-field to allow for nutrient recycling and protection of the soil.

To minimise the impact of harvesting the following aspects need to be considered:

**PLANNING:** In all stages of planning, consideration should be given to the impacts on the environment and to minimise these and rehabilitate where necessary.

**TERRAIN AND TOPOGRAPHY:** Classifying the terrain by the soil type, condition and slope will help minimise soil erosion and compaction.

**HARVESTING SYSTEM:** The environmental conditions and product should always determine the harvesting system. The following also need to be considered: felling direction; extraction routes and landings; depots; site hygiene; and rehabilitation.
The comprehensive South African Forest Road Handbook (2014) designed specifically for South African conditions is available on the ICFR website – www.icfr.ukzn.ac.uk/publications, free of charge, and should be used as the source manual for road design, construction and maintenance.

Road, associated structures and watercourse crossings can potentially be a source of erosion and cause the sedimentation of water resources with negative impacts on the aquatic biodiversity and water quality. A well-planned road network that minimises the negative impacts on both water quality and biodiversity is what all foresters should strive for and the rehabilitation and restoration of the area afterwards should be part of the plan prior to the implementation of a road network.

The South African Constitution states that everyone has the right to adequate housing and that the state must take reasonable legislative and other action to achieve the realisation of this right. For accommodation provided by the landowner, it is suggested that landowners familiarise themselves with the National Building Regulations and Building Standards Act 103 of 1977 which provides technical information and specifications on buildings and their construction.

The provision of staff housing calls for a variety of social and environmental considerations that should be taken into account. These include: water supply, site hygiene, waste disposal, location and infrastructure.
A forest estate is a source of products and services other than timber. From commercial to recreational aspects, these are referred to as non-timber forest products (NTFP) and include:

- **RIVERS, STREAMS AND WETLANDS**: fishing, sailing and water collection
- **DAMS**: as above and for recreational use as picnic sites
- **HIKING, TRAIL RUNNING AND MOUNTAIN BIKING**
- **GRAZING**: estates are often used by both traditional and commercial farmers
- **PICNIC AND CAMPING SITES**
- **FLORA AND FAUNA**: bird watching, nature conservation, harvesting of medicinal plants and honey
- **NATURAL FEATURES**: access to lookout points, waterfalls, sites of historic or cultural significance.

Their importance should not be underestimated in terms of their financial value to the land owner and their contribution to local and regional ecological infrastructure and ecological services.

The planning, implementation and maintenance of NTFP and services should be fully integrated with timber activities and seen as an asset that may yield direct financial benefits or indirect social and environmental benefits.
Producing Forestry South Africa’s Environmental Guidelines was a huge undertaking and required a combined effort from a great number of individuals who gave their time and intellect freely.

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THANK YOU!