



Information Sheet

1. WETLANDS

~~6.201.3~~ *6.201.3 Understanding and managing wetlands for the sugarcane farmer



***Note: The number of this Information Sheet has been changed to fit in with our new classification system. Contents will be reviewed in due course.**

What is a wetland?

The word 'wetland' is a family name given to a variety of ecosystem types such as rivers, springs, seeps, marshes, pans, mangrove swamps and estuaries. In these guidelines we will deal with marsh or 'vlei' type wetlands, otherwise known as palustrine wetlands.

Are wetlands important?

Wetlands form an integral part of the earth's hydrological cycle and help manage catchment water supply. Collectively wetlands are considered the third most important life support system on the planet. Nature – one of the world's most respected scientific journals – reported that, worldwide, wetlands are worth some \$4 trillion a year.

Wetland type and health affect the quantity, quality and reliability of a catchments water supply. They need an assured supply of sufficient water of adequate quality in order to maintain their levels of health and benefits to society.

The functions and benefits that wetlands provide are varied and include:

- Water supply.
- Erosion and flood control.
- Sediment trapping.
- Important habitats.
- Carbon sinks.
- Source of natural products.

Are wetlands protected?

Wetlands are protected by international, national and provincial legislation. The most relevant legislation relating to wetlands is briefly outlined below:

The National Water Act (NWA)

The Act clearly defines a wetland as "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soils."



A typical palustrine wetland in KZN.

Importantly, the NWA includes wetlands as a type of 'water-course'. Wetlands are considered an integral part of the water resource by the NWA and are fully covered by this law.

The NWA provides for the use, protection and management of water resources. Importantly, the Act recognises that aquatic ecosystems have a right to water in order to sustain their functioning (ecological Reserve).

National Environmental Management Act (NEMA)

While the NWA provides for the conservation and utilisation of the water resource, the NEMA is concerned with the management of all natural resources, including wetlands and rivers.

An important principle of the NEMA is the statutory onus on every person who may or does cause degradation of the environment to prevent, minimise or rectify the damage.

The legislation also advocates the "Precautionary Principle". In other words, when there is insufficient or inconclusive evidence or knowledge, every effort must be taken to minimise or mitigate environmental impacts .

Conservation of Agricultural Resources Act (CARA)

This Act (together with the NWA) is probably the main legislation driving compliance on the farm. It is geared towards the prevention of soil erosion and the control of weeds and

invader plants (all of which are commonly found in wetlands). It is likely that if a farmer is applying recognised good agricultural practice, they will meet the objectives of the Act.

Ramsar Convention on Wetlands

South Africa signed the Ramsar Convention in 1975. The Convention recognises the important role wetlands play in maintaining ecological processes key to sustaining life on the planet. This means South Africa is committed to prevent further wetland loss and degradation whilst promoting the wise use of wetlands.

Identifying wetlands

Wetlands must have one or more of the following attributes to be classified a wetland:

- Wetland (hydromorphic) soils.
- The occasional presence of water loving plants (hydrophytes).
- A high water table resulting in saturation at or near the soil surface.

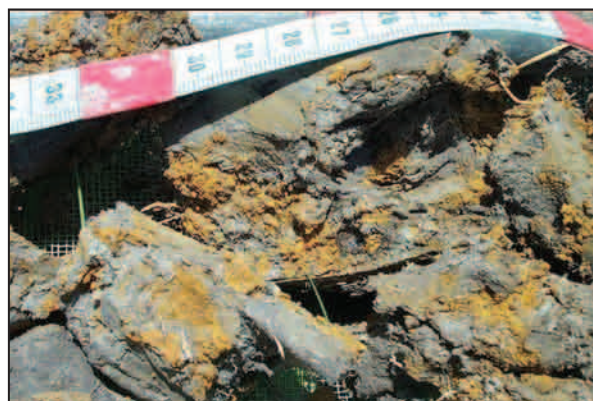
Although water is the primary driving force behind all wetlands, its dynamic nature and high seasonal variation make it a poor indicator of the outer edge of a wetland.

Instead, indirect indicators of wetness are used: hydromorphic soils, hydrophytic vegetation and terrain unit (useful in highly modified systems on sandy soils).

The best indicator of wetlands is hydromorphic (wet) soils. Certain characteristics develop in the soil profile as a result of prolonged and frequent saturation. Colours are often the most typical indicators of saturation. Generally the longer and more frequent the saturation; the more prominent black or grey colours dominate the soil matrix. Orange mottles within a black or grey matrix are indicate a fluctuating water table and is a typical feature of wetland soils.



Wetlands are important providers of ecosystem services to society. This wetland filters, cleans and provides water to communities without municipal water.



A typical orange-mottled wetland soil showing a grey matrix.

Not all wetland soils have mottles. Soils having high organic carbon and/or are permanently wet are normally very darkly coloured (i.e. black or grey-black). Alternatively leached wetland soils will be light grey.

Wetland delineation

Wetlands are delineated using a Dutch screw auger. Take soil samples at points moving outwards, away from the wettest part of the wetland. Proceed outwards from the wettest portion of the wetland, sampling the top 50 cm of the soil profile every few meters for signs of soil wetness. Keep a note of the type of vegetation, especially if sampling in a disturbed



Dutch screw auger.

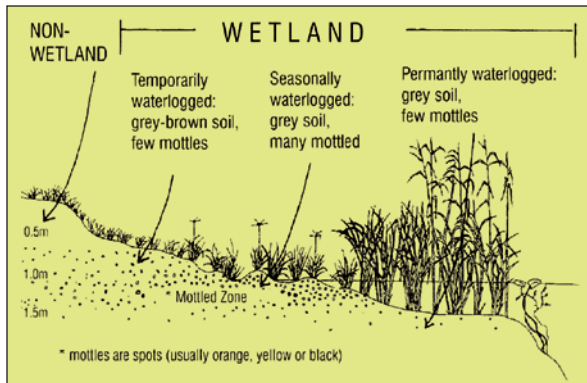
wetland. The outer boundary of the wetland is the point where hydromorphic indicators are no longer visible.

For more information on wetland delineation consult DWAF's (Department of Water Affairs and Forestry) guideline document: "A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas".

Impacts on wetlands

Wetlands are dynamic and sensitive ecosystems sensitive to land use change. Impacts fall into two broad categories: catchment impacts, which affect the quantity, quality and timing of water entering the wetland and within wetland impacts which affect the way water and sediment distributes through a wetland.

These impacts affect hydrology¹, geomorphology² and vegetation, which are the three driving forces underpinning wetland (and river) functioning and health.



Cross section of wetland soil zones.

Common impacts on wetlands are erosion, sedimentation, water abstraction, water diversion (drains), dams, invasive alien plants and conversion to agricultural production systems.

Managing your wetlands' catchment

Every effort needs to be made to limit catchment and within-wetland alterations. This can be achieved through:

Farm land use plan

A land use plan (LUP) is a combination of a soil conservation network, a cane extraction network and a production management programme.

As wetlands and rivers are a function of their surrounding catchments, correct land use planning is key to minimising impacts. A farm land-use plan does this by mapping and setting aside wetland and riparian areas. It also maps out contours, waterways, roads and fields; integral in minimising environmental impact (as well as helping achieve better yields and decreased long term costs).

Conservation terraces

Conservation terraces are hydraulically designed structures placed in the field to decrease erosion, thus protecting down-slope land, rivers and wetlands from sedimentation.

Conservation terraces discharge water from crest lines across the slope and into waterways in a controlled manner. Depending on soil type and slope, additional protection may be required to curtail erosion such as minimum tillage, trashing and strip replanting. All land over 3% slope must be protected by conservation terraces in order to avoid erosion.

Waterways

Waterways are structures, suitably protected by vegetation or paving, that are designed to safely convey the discharge from conservation terraces to a natural river, wetland or water course.

Roads

Roads must be sited, constructed and maintained to minimise soil loss. Primary roads, e.g. hilo roads must not be constructed within 20 m of a stream, river or wetland. No water is to be led off roads directly into watercourses, but must flow at least through 10 m of vegetation/cane field to trap sediment before entering a watercourse.

Minimum tillage

Minimum tillage is the practice of reducing or excluding conventional tillage to minimise soil disturbance and erosion. Minimum tillage (including hand chipping) must be practised on slopes greater than 11% on erodible soils, 13% on moderately erodible soils and 16% on resistant soils.

Strip planting (and harvesting)

Strip planting is the practice of replanting one or alternate inter-terrace panels during any one season. Strip planting is recommended on all slopes exceeding 2%, except on certain irrigation layouts. On slopes above 12% strip planting must be practised in order to reduce erosion.

Trashing

Trashing should be practiced on steep slopes and erodible soils. Trashed cane tops should be left scattered evenly in the field – scattered tops can increase yields by 5 tons/ha, increasing a farmers 'crop per (water drop' efficiency.

Managing your wetland

Cane should not be planted closer than 10 m from the defined edge of a wetland or dam. The Conservation of Agricultural Resources Act states that "Cane should also not be cultivated within the flood area of a watercourse or within 10 m horizontally outside the flood area of a watercourse."

What is a watercourse?

A river, spring or any natural channel, wetland, lake or dam in which water flows regularly (perennial – (90% of time) or intermittently (during wet season) – National Water Act 36 of 1998.

The following are important management considerations:

- Wetlands should not be planted to crops.
- Alien and invader plants should be removed.
- Wetlands must be managed correctly, e.g. controlled burning and controlled grazing.
- Access roads should not cross wetlands, or if unavoidable, crossing must be correctly constructed to avoid altering flows.

- Forested riparian zones should not be burnt.
- Indigenous vegetation along stream banks should not be removed.

Alien and invasive plants

Alien and invasive plants commonly colonise disturbed wetlands due to favourable, moist conditions and can radically alter wetland habitat and functioning. Such plants need to be sprayed using the correct herbicides or mechanically eradicated.

Burning

Wetlands should only be burnt every two to three years. If possible avoid burning the entire wetland. This allows unburnt patches to act as wildlife refuges. Avoid hot burns by burning during cool, moist times of the day in low wind conditions. Burning with a breeze under controlled conditions encourages a high, patchy burn, protecting soils, plant rootstocks and seedbeds.

Drains

Drainage of wetlands is illegal and is to be avoided. Where drains do occur within wetlands, every effort should be made to close them and rehabilitate the wetlands. See below for more information.

Pests and diseases

There is growing evidence that wetlands help control Eldana by providing a habitat for their natural predators and by being 'sinks' for the moth and caterpillar. Wetland habitats should therefore form part of a farms integrated pest management strategy (IPM).

Wet agricultural land

Wet agricultural lands (often called relic wetlands) are most often wetlands that have been drained in the past. This was unregulated before 1983. After 1983 no wetlands could be drained legally without a permit under CARA, or after 1998, under the National Water Act.

Under CARA and the NWA existing drains may not be widened or deepened mechanically and there should



Drain within a wetland planted to sugarcane.



Digging of new drains or mechanical maintenance of old drains is illegal without the relevant permission from the authorities.

be no evidence of erosion. It is unlikely now that permission will be granted to drain wetlands or modify existing drainage networks.

Where it is not practical or cost-effective to sustain crop production, or the drainage and cultivation is illegal under CARA and/or the NWA the wet agricultural land should be allowed to revert back to a wetland. A management and maintenance plan should be implemented which includes the closing of existing drains and the removal of alien invasive plants until indigenous vegetation has re-established.

References

A practical field procedure for identification and delineation of wetlands in riparian areas. Department of Water Affairs and Forestry: www.dwaf.gov.za/documents

Sustainable Sugar Cane Farm Management System – SuS-FarMS. Sustainable Sugar Initiative, WWF (South Africa) & Noodsberg Canegrowers. 2008.

National Water Act: www.dwaf.gov.za

Environmental Management and Legislation Overview. 2004. Sustainable Sugar Initiative, WWF (South Africa).

Guidelines for Integrating the Protection, Conservation and Management of Wetlands into Catchment Management Planning. 2003. Dickens.C., et al. WRC report TT220/04.

Resources: Mondi Wetlands Project. www.wetland.org.za

(Footnotes)

¹ Hydrology is the scientific study of the waters of the Earth, including their occurrence, distribution and timing, and their relation to people and the natural environment.

² Geomorphology is the study of the landforms on the Earth's surface, their history, and the processes (i.e. erosion) that mould them.

Compiled by Geoff Maher (Extension Resource Manager) and Vaughan Koopman (Wise Use Project Coordinator - Mondi Wetlands Programme)

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