



**Stream source wetlands Sp
protection guide** compiled by Jon
Mondi Wetlands programme, 1997 SECOND ED



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INTRODUCTION

Springs are stream source wetlands (see pages 3&4) that occur in steeper, younger valleys just below the watershed. Water inflow is diffuse and outflow can be diffuse or channelled. Overgrazing, trampling and erosion of the higher ground above these wetlands is likely to decrease infiltration of water into a spring, whilst

local human and livestock activities can lead to pollution of the water.

The rationale of natural spring protection is firstly to secure the integrity of the wetland; (its functions and values to the region) by protecting it from human or livestock damage, and secondly, where required, to contain, filter and store a limited quantity of spring water for local use.

The method of protection or extraction does not imply damming the "spring" as this could retard or stop the flow or even force the water to re-route itself to another eye-Local water extraction at a stream source should only allow limited draw- off so as not to impair these "little" wetlands function of assisting continued streamflow.

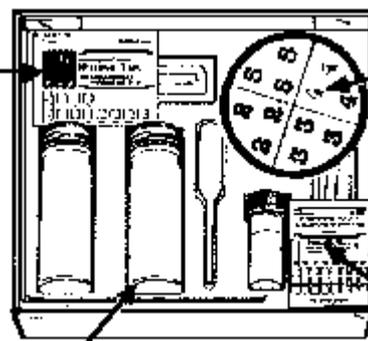
NOTE: Before using "spring" or stream water it is wise to test its quality in order to determine whether it is fit for human and animal consumption. Simple and easy to use books and water test kits are available from SHARE-NET, Wildlife Society of Southern Africa, P-O- Box 394, Howick. 3290. Tel: (0322) 303931. The booklets also offer easy methods of treating polluted water.

WATER TEST KITS

Coliform Kit



Chemical enrichment nitrates

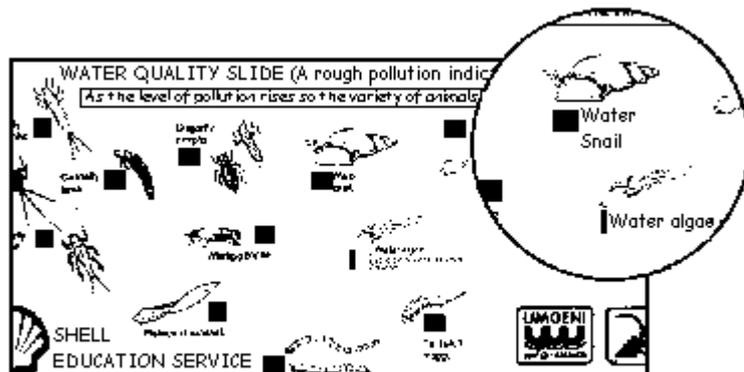


Water clarity (turbidity)

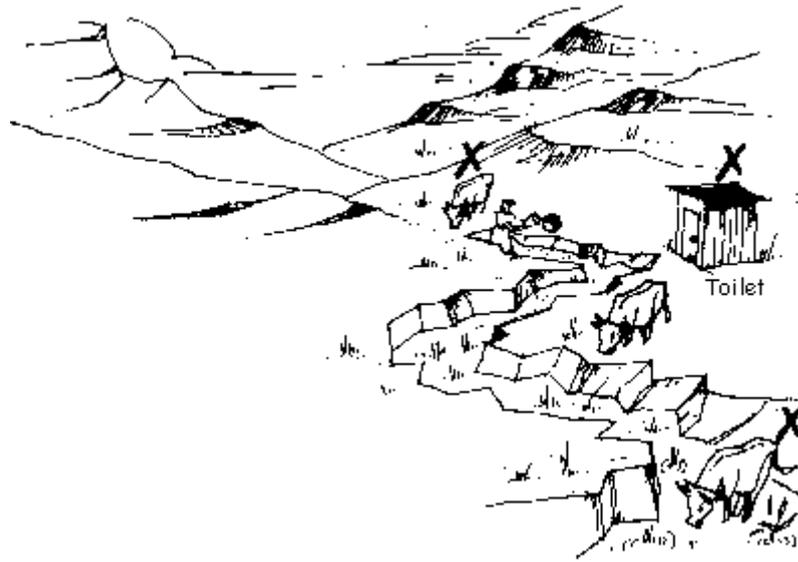
Chemical balance (ph)

Oxygen and bacteria

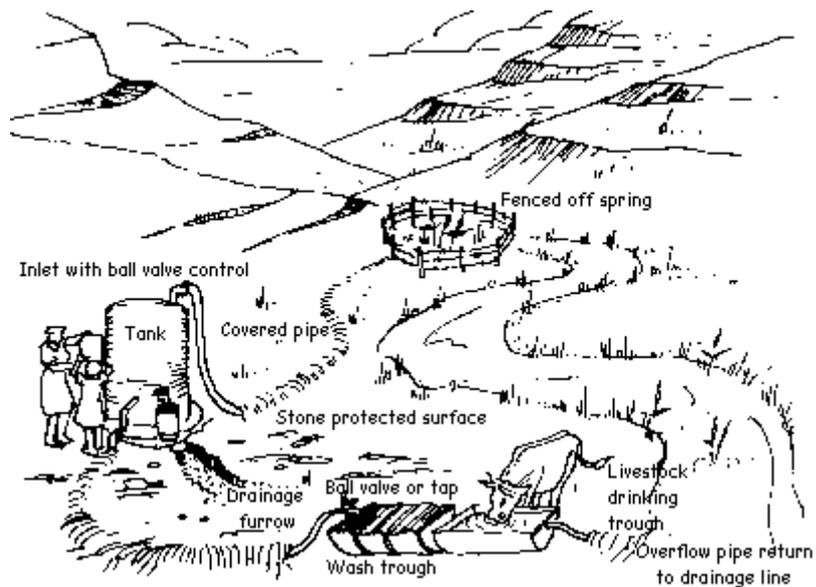
Green Tin



General guidelines for spring protection



- Fence off "spring" to keep out livestock.
- Avoid siting toilets or rubbish dumps within loom of "spring"
- Site the tank/reservoir and troughs away from drainage line.
- Ensure the top of tank/reservoir is below level of "eye of spring"
- Minimise trampling/mud puddling damage by surfacing area with stones.
- Ensure that overflow pipes return to the drainage line.
- Bury all pipes to protect them from trampling or fire damage



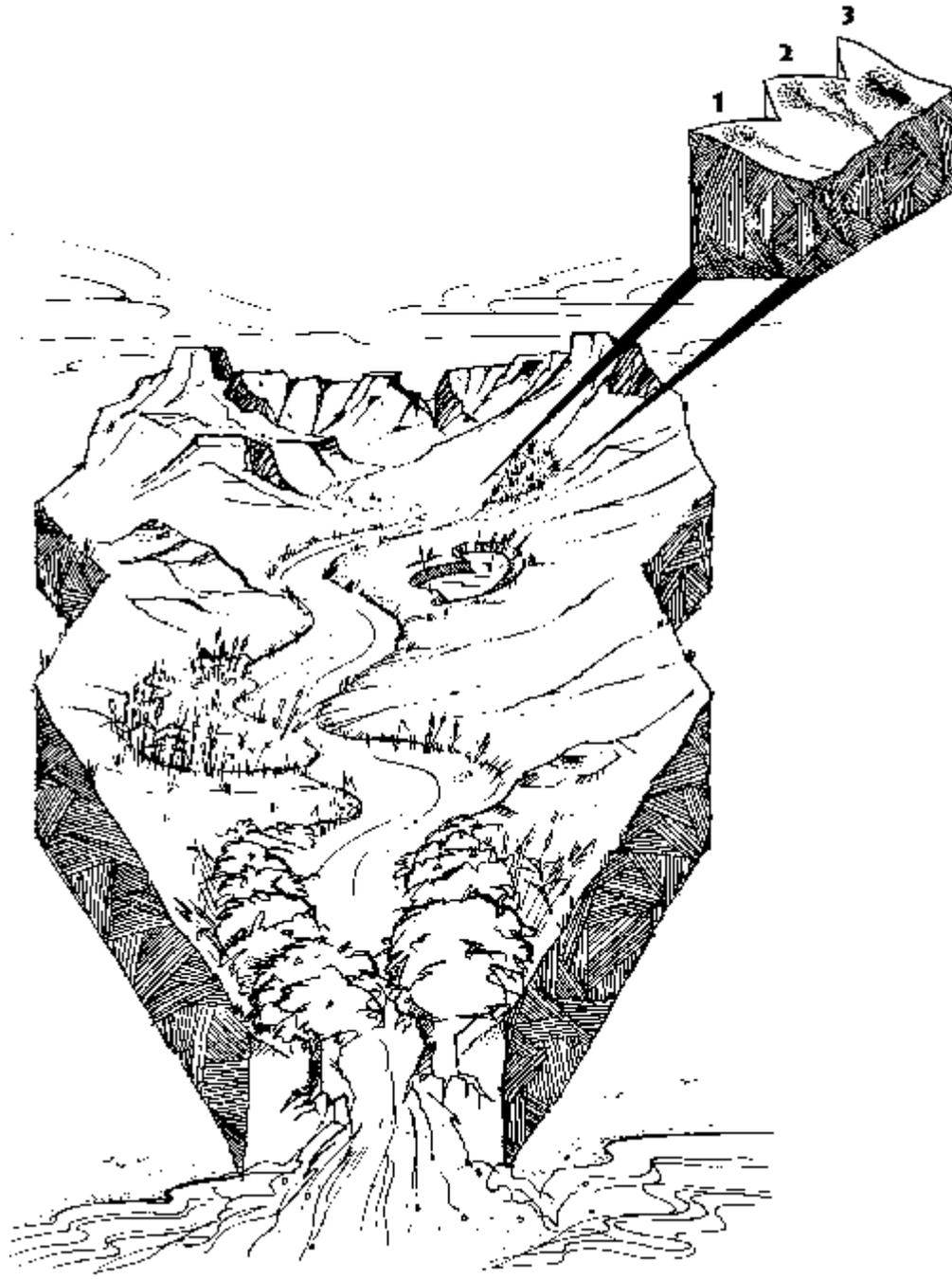
Where to find springs

"Springs" occur in many situations such as rocky hillsides, seepage slopes or plains, and at the head of dongas (usually eroded springs and seepage slopes). These springs and seepage slopes or plains develop when rainwater sinks through the soil on higher ground and meets an impermeable layer of rock or clay along which the water flows to surface out of the ground at the source or eye of the "spring".

These settings are easily overlooked as "wetlands" and because they are often the only oases in the otherwise dry landscape, they can be overused as a water source by people and a "green-bite" and water source by domestic stock and game.

Unfortunately the overuse of these areas can have serious effects on the continuing waterflow of rivers during

dry periods plus many of these areas are now apparent as dongas on our hillsides.



Rocky hillside
 "spring"
 wetland

These occur as an "eye" at a geological contact (change in bedrock type) or at fractures or joints in otherwise solid bedrock.



Seepage slope/plains wetland

These generally occur in valley head areas and result from impeded drainage and where the water table is at or near to the ground surface.



Donga "spring" wetland

These are deeply incised erosion gullies with one or more "eyes" occurring at the impermeable soil or bedrock interface exposed at the head of a donga.

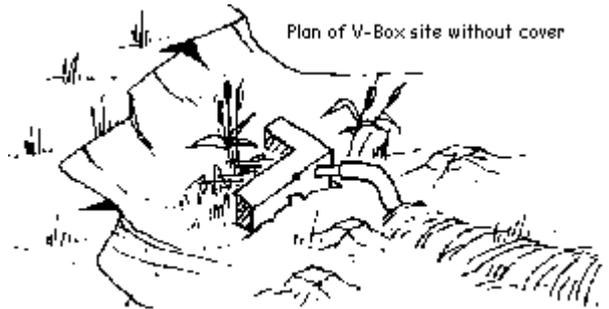
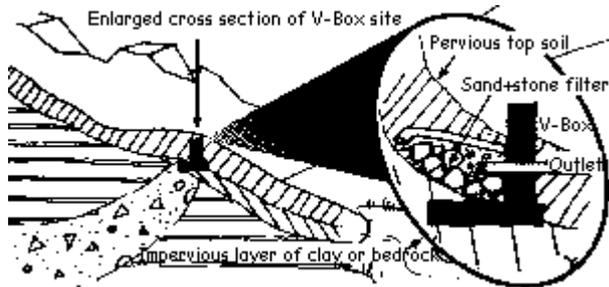


Methods of water extraction from springs

ROCKY HILLSIDE SPRING WETLAND



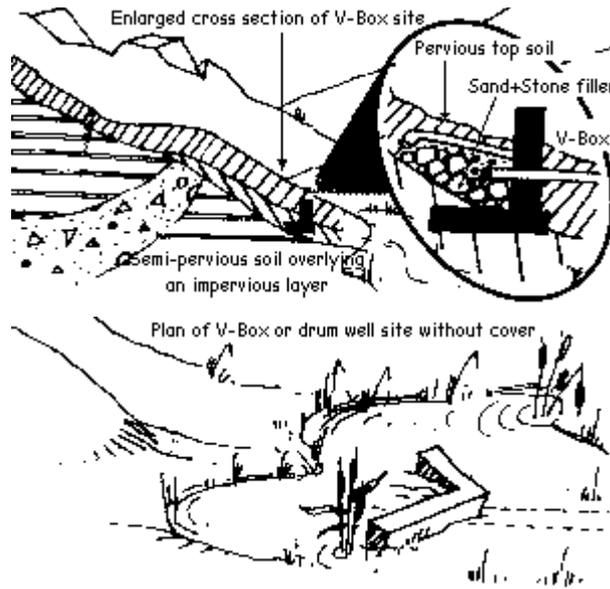
A V-Box is constructed to contain the spring water and to provide a draw-off point to lead to a tap or reservoir.



SEEPAGE SLOPE / PLAINS WETLAND



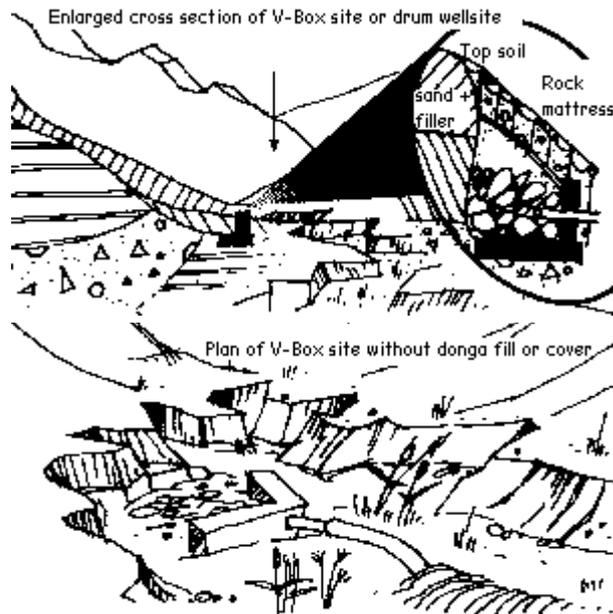
A V-box is constructed or a drum-well set in the wetland to contain water and to provide a draw-off point to lead to a tap or reservoir



DONGA SPRING WETLAND



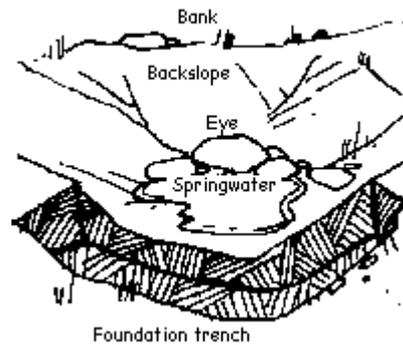
A V-box is constructed to contain the spring water and to provide a draw-off point to lead to a tap or reservoir. The sand & stone filter protects the "eye" whilst the donga fill reduces further erosion thus protecting the wetland up-slope.



V-BOX CONSTRUCTION

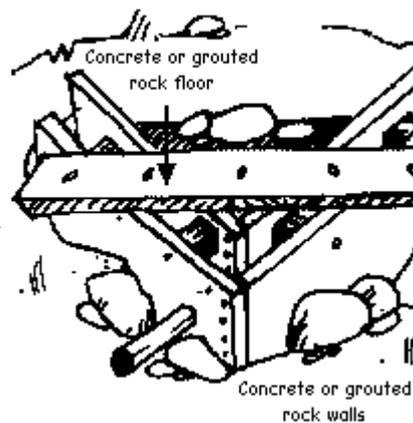
Digging the V-box foundation

Mark out the size of the V-Box - it may have to capture one or more "eyes". Dig the trench a little wider than the walls - and dig into the slope about half a metre. Chisel rough chips out of any rock to improve the cement bond. Do not disturb the eye at all.



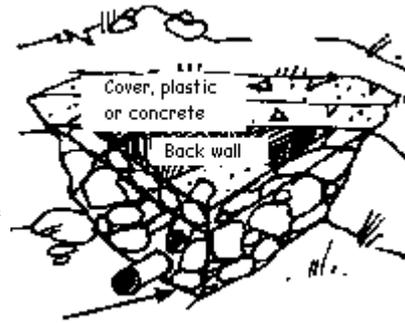
Constructing the mould and V-box

Place wooden mould into - trench and separate the walls with blocks nailed higher than the concrete. Steady the whole with rocks. Oil inside of the mould to prevent the cement sticking. Nail a plank across the mould to steady them. Remove the moulds 3 days after pouring concrete. Should the V-Box leak cast a concrete floor.



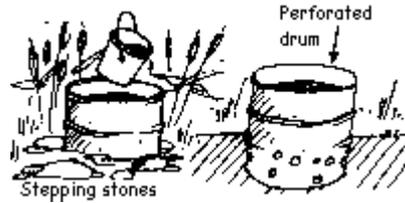
Fitting the cover and laying the pipes

A removable lid is used to keep the dirt out. Cast a roof of reinforced concrete or use plastic sheeting. The outlet and overflow pipes must be set below the dry season level of the spring. Cover the inlets of the pipes in fly-screen or geo-fabric. All pipes should be buried for protection.



Drum well set in seepage slope/plains wetland.

Water can be bucket drawn or piped



Glossary of terms

Catchment area	The area of land which catches rainfall for a particular river, lake or estuary.
Channel (of water)	The bed in which a stream of water runs.
Conservation	The wise use of natural resources.
Diffuse	To spread out freely in all directions.
Erosion	The movement of soil and rock material by agents such as running water, wind, moving ice and gravitational creep.
Functions (of wetland)	Wetland functions refer to the many physical, chemical and biological processes that take place in wetlands.
Impervious	Incapable of being penetrated by water.
Infiltration	The passage of water through the surface of the soil via pores or small openings. It is governed by the permeability of the soil profile, and non-capillary porosity of the soil surface.
Pollution	The contamination of the purity of the environment.
Restoration(of wetlands)	The act of enhancing the condition of degraded wetlands to a level whereby certain of the functions which the system formally provided become replaced.
Seepage area	An area commonly found at a change of slope and at the head of drainage lines (often in association with dolerite and shales) in which there is a high incidence of springs.
Transpiration	The process by which water in plants is transferred to the atmosphere as water vapour.
Wetland	A collective term used to describe those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. The internationally accepted definition of a wetland includes- areas of marsh, fen, peat-land or water whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed six metres.

Further reading

Conservation of Agricultural Resources Act 43 of 1993. Government Printer, Pretoria, Republic of South Africa.

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