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DESIGN OF WETLANDS REHABILITATION INTERVENTIONS IN ALPINE WETLANDS OF LESOTHO

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SUMMARY

Lesotho's alpine wetlands are rare ecological features in Southern Africa. They are distinct floristically and structurally from other wetland systems in Southern Africa. Their unique combination of peat-forming soil types and vegetation communities makes them worthy of international recognition.

Alpine wetlands in Lesotho are in a poor condition. Their degradation status can be attributed to two main factors; the climate which has become drier over the years and poor land use practices, overgrazing and trampling by livestock.

The extent of the desiccation and degradation of the wetlands has not been quantified but few examples quoted in literature, research and reports highlights the poor condition, and hence the need for a coordinated approach to their management.

Alpine wetlands are not common and as such there is limited global experience in restoration of alpine wetlands. Mountain peatlands are very difficult to restore and some areas are not easily accessible.

The following general design approaches have been used to secure remaining intact areas by:

1. stabilising headcut erosion, slow the discharge of the water from the wetland areas.
2. Encouraging the re-establishment of wetland vegetation.

The types of rehabilitation intervention that can be applied to the various wetlands are very much determined by the nature and size of the problems observed in each wetland. In all cases, removal of over-grazing pressure is essential to the success of the rehabilitation efforts.

KEYWORDS: alpine, degradation, design, rehabilitation, wetland

BACKGROUND

The wetlands in the Lesotho highlands consist primarily as peatlands, with 1-2.5 m of peat accumulated in the valley bottom. The Lesotho alpine wetlands are rather dominated by many small sedges and grasses and it is the decomposition of these plant types that contribute to the development of peat in the bogs (Schwabe, 1995). Many of these wetlands have been damaged as a result of overgrazing the watershed. The overgrazing has reduced vegetative cover and compacted the soil surface, resulting in increased surface runoff. The altered hydrologic condition of the watershed has resulted in the formation of gullies, which are now functionally draining the wetland.

RESTORATION TREATMENTS

There is limited details of previous wetland rehabilitation projects carried out in Lesotho other than the largely unsuccessful installation of gabions in erosion gullies downstream of road culverts reported by Wetland Consulting Services (WCS, 1999) and in DWA (2005).

Restoration treatments are designed with the objective to re-establish the basic ecological functions that are characteristic of alpine wetlands in Lesotho. The approaches emphasize practical alternatives that use locally available resources and considerations are/should also be given to establishing the feasibility or critical factors affecting rehabilitation of wetland conditions.

There is no universal method to restore wetlands as it is dependent on the site characteristics. (Good, 2006) proposes two main approaches for the rehabilitation of wetlands which comprise of Conservation of ecologically important sites and the identification and reduction of peat destructive activities.

The strategy implemented is dependent on the specifics of the site, socio- economic aspects and the quality of the wetland. (Trepel, 2007) The ecological approach involves a process of supporting the healing process for the ecosystems; this includes the re-establishment of the mechanisms to allow for the accumulation of peat. The methods generally are relatively long-term procedures. (Quinty and Rochefort, 2003)

DESIGN CRITERIA

There is no universal method to restore wetlands as it is dependent on the site characteristics. The rehabilitation intervention design type selected will always have to be appropriate to the type of problem being addressed and the objectives of the rehabilitation (Good, 2006). However, the following principal design criteria need to be taken into account in the development of rehabilitation designs for these wetlands.

a. Estimated Peak Discharges

Peak discharges for each wetland should be estimated

b. Site Access

Most alpine wetlands are remote with some very high and steep mountain passes.

c. Local Materials and Resources

It is important that any material e.g. rock used is taken from outside of the wetland areas as disturbance of any rock within the wetlands is likely to create further potential points of erosion.

d. Exclusion of Livestock from Rehabilitation Areas

The exclusion of livestock from at least the vicinity of the rehabilitation intervention and preferably the complete watersheds for a season or two after construction to allow vegetation to re-establish as quickly as possible will be essential to the success of any rehabilitation efforts. Fencing would be preferable and would need to be integrated with education of the herdsmen and use of the guards to protect the fencing from vandalism and theft.

e. Other Considerations

Vandalism of rehabilitation interventions is an issue that needs to be taken into consideration

In this regard, concrete structures that are immune to vandalism and require little maintenance are preferable. However, Aesthetics is another consideration that needs to be taken in account as the wetlands have appeal from a tourism point of view. Furthermore, snowfalls and cold weather conditions are also factors that need to be taken into consideration in any construction during the drier winter season.

The following interventions are being used in the on-going Wetlands Rehabilitation and Conservation Project in the alpine Wetlands of Lesotho and their success are being closely monitored. The interventions include: Concrete Structure, Gabion Structure, Sack Gabion and Rock Packs, Ecologs, Bio-Jute, Road Cross- Drains and Revegetation.



Ecologs



Sack Gabion and Rock Pack



CONCLUSION

Overgrazing and livestock trampling, as noted by the various previous studies, are the root cause of most of the problems affecting the Lesotho alpine wetlands, in cases exacerbated by other factors such as runoff from roads and quarries. It is therefore essential that, if any rehabilitation works are to be successful, animals are excluded from at minimum the immediate area of any rehabilitation interventions constructed and preferably the entire restoration watersheds for a season or two after constructions to allow vegetation to re-establish successfully.

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