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Guidelines for reforestation projects in the Walker Bay Fynbos Conservancy

INTRODUCTION

The Walker Bay region on the western rim of the Agulhas Plain in South Africa is home to the Swartkransberg complex of indigenous forests. In a region dominated by species-rich, fire-prone fynbos shrublands, this complex of forest patches is an unusual and unexpected characteristic of the natural landscape and one of the most important natural features within the Walker Bay Fynbos Conservancy (WBFC). Over the last 25 years great strides have been made in securing these forests for conservation and various programs have been implemented aimed towards their conservation and rehabilitation by committed conservancy members.

Historically it is valuable to try understand approximately what size these forests were prior to European arrival in the Cape. Analysis of the earliest aerial photography compared to current day forest sizes suggests minor changes in forest areas within the WBFC since the 1930's. Theories suggesting that these forests were once much larger and possibly connected is highly speculative. There is currently a study being undertaken by Dr. Saúl Manzano, Prof Lindsey Gillson and Yolanda Chirango of the Plant Conservation Unit at the University of Cape Town exploring the palaeoecology of the fynbos-forest ecotone of these forests, using pollen cores. A second study exploring the characteristics of soil and general substrate inside versus outside contemporary forest boundaries has also recently been commissioned. These studies should shed some more scientific light on the subject.

What we do know is that the forests and (and fynbos) in some of the low-lying areas of the WBFC have been impacted by past human activity and subsequent alien plant invasion and active reforestation in these areas is appropriate and important.

Currently a number of reforestation projects are being implemented independently within the broader WBFC by its members. These include but are not limited to:

1. Platbos "Trees for Tomorrow" which has planted more than 87 000 trees around the Platbos forest independently and in association with their reforestation partner, Greenpop.
2. Farm 215 is one of the reforestation sites of the Trees for Tourism program of the South African Reforestation Trust. As from 2011 many Thousands of trees have been planted on Farm 215.
3. The Flower Valley Conservation Trust's Stinkhoutsbos reforestation project focuses on the rehabilitation of the Stinkhoutsbos Forest on Flower Valley.
4. The Future Trees project, started on Grootbos Nature Reserve in 2008 focusses on planting areas of the Grootbos forests that were impacted by the 2006 wild fire and earlier human activities.

5. Bodhi Khaya Reforestation Project, initiated on Bodhi Khaya and aimed at restoring lost forests of the Uilkraal valley.

Following discussions within the committee and management team of the WBFC it was agreed that a set of guidelines relating to reforestation projects should be drawn up and that a section on reforestation should be included in the next version of the WBFC and Walker Bay Protected Environment (WBPE) conservation management plans.

TEN GUIDELINES FOR REFORESTATION IN THE WBFC

Our 10 guiding principles for reforestation within the WBFC (adapted from to Di Sacco *et al* 2021) are outlined below. These have been described in more detail in the text that follows:

(1) Protect existing forest first; this is especially important in terms of removal of alien vegetation from within and from the perimeter (minimum 50m) of all indigenous forests in the WBFC

(2) Use natural regeneration wherever possible; nature often heals itself quicker and more efficiently than through active planting programs.

(3) Keep it local and select species to maximize biodiversity; only local indigenous species should be planted.

(4) Use resilient plant material (with appropriate genetic provenance) and preferably supporting local Conservancy nurseries;

(5) Select appropriate areas for restoration that will not impact negatively on fynbos or wetland species.

(6) Ensure long term conservation security of planted areas.

(7) Plan ahead for future management of alien vegetation control, fire management, infrastructure development, capacity and seed supply;

(8) Learn by doing (using an adaptive management approach) as many lessons have already been made with regards when, where and how to plant.

(9) Make it pay& maximize biodiversity recovery to meet multiple goals (ensuring the economic sustainability of the project) by focusing on the design of long-term strategies to tackle the climate and biodiversity crises and support livelihood needs.

(10) Work together by planning and implementing a cohesive reforestation plan involving all stakeholders across the landscape.

(1) Protect existing forest first

The number one conservation priority within the Walker Bay Fynbos Conservancy is to safeguard and protect all existing natural landscapes. This includes our remaining intact indigenous forests as well as all fynbos, strandveld and wetland communities. The first step to protecting these landscapes has been through membership of private properties in the WBFC. The next step involves securing these conservation-worthy natural landscapes through inclusion in formally recognized conservation areas including Contract Nature Reserves, the Walker Bay Protected Environment and conservation servitudes. Protection alone is not enough and the second priority is the effective management of these areas for long-term conservation of the biodiversity they sustain. In the case of our forests this is primarily the removal of invasive species from within and from a minimum of 50 m outside the forest perimeter. Other forest-specific conservation interventions include the managing of fuel loads around forests to minimize the impacts of wildfires and monitoring of diseases and drought related stresses.

(2) Use natural regeneration wherever possible

Natural regeneration can be cheaper and more effective than tree planting where site and landscape conditions are suitable. Semi-degraded areas with intact soil-structure (for example after the removal of alien vegetation) can often recover through natural resprouting and recolonization over time. However, heavily degraded (deep ploughed) landscapes, as are typical in some of the low-lying areas of the WBFC, will not recover without active planting and/or seed sowing of indigenous species.

(3) Keep it local

Only local indigenous species should be planted. The species used must also be chosen according to the habitat being planted (i.e. match the species to the forest type, dry (short) forests or wet (tall)).

3.1 Examples of key dry forest/thicket species:
Sideroxylon inerme (milkwood)
Chionanthus foveolatus (fine-leafed ironwood)
Olea exasperata
Olea europea ssp africana (wild olive)
Euclea racemosa (sea guarrie)
Cassine peragua (bastard saffronwood)
Gymnosporia buxifolia (spike thorn)

3.2 Examples of key wet forest species:
Apodytes dimidiata (white pear)
Olinia ventosa (hard pear)

Curtisia dentata (assagai tree)
Rapanea melanaphloeos (Cape beech)
Celtis africana (white stinkwood)
Kiggelaria africana (wild peach)
Afrocanthium mundianum (rock elder)
Ilex mitis (African Holly)
Diospyros whyteana (bladder nut)
Ocotea bullata (black stinkwood)

Each forest varies slightly in species and densities of the different species. Ideally reforestation related to individual forest areas should replicate these species compositions and densities.

3.3 What not to plant
Don't buy in material from other regions. Stay away from popular indigenous trees that don't belong in our area (e.g. *Harpephyllum caffrum*, *Ekebergia capensis*, *Podocarpus latifolius, Acacia karoo, Virgilia oroboides, Syzigium cordatum* etc.)

(4) Use resilient plant material

Wherever possible trees should be sourced from local Conservancy partner nurseries. Platbos, Farm 215 (through the Trees for Tourism Program), Witkrans and Grootbos propagate local indigenous trees from local genetic sources. Please check with the nursery owner that the plant material has been propagated from local genetic material. Ideally reforestation of an individual forest should be done with seedlings grown from that forest.

(5) Select appropriate areas for tree planting

This is the trickiest part of the guidelines. What we don't want to do is plant trees in inappropriate habitats, especially areas that would naturally recover to fynbos or wetland. Fynbos and wetland flora and fauna is often highly localized and home to endemic and rare species. These can be outcompeted by 'introduced' indigenous trees. Ultimately fire is also a major driver in this region and significant effort can be wasted if forest rehabilitation areas subsequently burn in wild fires.

5.1 Use aerial photography
As a starting point it is suggested to plant where we know forests used to occur from aerial photographs. The earliest aerial photography of our region is from the 1930''s. We can use this photography in comparison with current forest distribution to determine areas that have been felled and/or lost to fires and alien plants. For example, the potato fields that have been rehabilitated at Platbos or the Stinkhoutsbos Forest on Flower Valley that has reduced in size by nearly 6 hectares between the 1930's and 2006 owing to felling and wild fires.
It has been argued that much damage could have happened to pre-colonial forests prior to the 1930's and some areas were likely deforested prior to these earliest

aerial photographs been taken. In these cases, it is important to take into account the substrate characteristics, fire protection characteristics and evidence from the naturally recovering flora.

5.2 Focus on appropriate converted lands

While there may be a lack of clarity on exactly where the forest fynbos mosaic margins existed in some low-lying areas, once deep ploughed and converted to agricultural lands, fynbos vegetation cannot and will not recover without active rehabilitation. Let's focus on these areas, but only where we are convinced forest species could thrive.

As such, we believe it appropriate to potentially plant indigenous trees in these heavily disturbed, low-lying areas within the WBFC. These sites must however provide habitat suitable for trees/thicket (deep soils, a fair degree of fire protection, enough moisture for natural establishment). The exact areas will need to be defined by the reforestation working group.

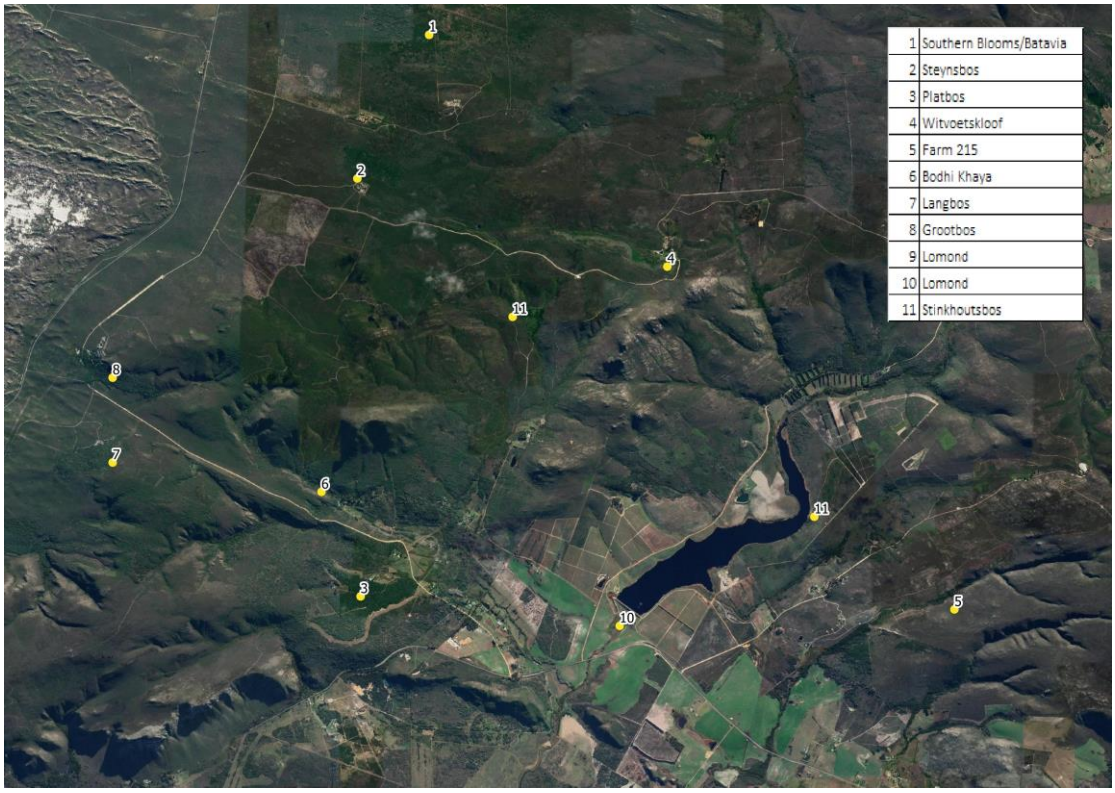

Figure 1. Proposed approximate reforestation sites within the central Walker Bay Fynbos Conservancy area.

(6) Ensure long term conservation security of planted areas

Focus on sites which will maximize long-term investments in reforestation. It is vitally important that any reforestation areas be located at sites that have long-term conservation status and are well protected from future fire events. The proposed reforestation areas shown in Figure 1 all fall within areas proposed for statutory conservation through either falling in proclaimed nature reserves or within the Protected environment conservation layer that is currently being constituted. It is equally important that sites be chosen based on fire refuges and that long-term fire protection be included in the management of these sites.

(7) Plan ahead for future management

The forest and fynbos habitats of the Walker Bay region are highly susceptible to invasion by introduced tree species, most notably *Acacia saligna* (port jackson), *Acacia cyclops* (rooikrans), *Leptospermum laevigatum* (Australian myrtle), *Pinus sp, Eucalyptus sp.* and stinkbean. It is important that a long-term weeding/alien clearing program be incorporated into any reforestation plan, as invasive species will outcompete the indigenous tress and increase the fire threat.

(8) Learn by doing

Through the existing structures of the WBFC and the Protected Environment ensure tree planting initiatives are aligned with these Conservancy guidelines. Many lessons have already been learnt over the last two decades with regards successful reforestation methods. Let's share and learn from each other and at the same time be prepared to adapt and change our methods based on lessons learnt from previous years. A monitoring program for seedling establishment, growth rate and medium to long term survival is proposed for tree planting projects that fall within the WBFC.

(9) Make it pay & maximize biodiversity recovery to meet multiple goals

In order to ensure that reforestation programs are not once off events, but support the long-term management of the planting site and broader conservation landscape, it is important to investigate models for the economic sustainability of these projects by focusing on the design of long-term strategies to tackle the climate and biodiversity crises and support livelihood needs. As we know, reforestation can be an effective part of a broader conservation business model. The statutory conservation commitment made by our landowners, through the proclaimed nature reserves and the Protected Environment has the capacity to tick most of the boxes of a sustainable approach to reforestation, which in turn opens opportunities for developing models with companies to fund reforestation and fynbos rehabilitation work and further reforestation as a business model for individual landowners and the WBFC as a whole.

(10) Work together

While a number of reforestation initiatives are currently being implemented independently across the landscape, it is proposed that a cohesive rehabilitation plan

involving all stakeholders across the landscape be integrated into the Walker Bay Protected Environment and Walker Bay Fynbos Conservancy management plan (which will be updated in 2021/22). It has been suggested that a reforestation working group be established involving interested and effected parties to guide future collaboration in this sector.

Literature cited

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