

SCB Project Report 2012

Carbon Offset Project at Rooihoek, South Africa

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Ecological Footprint Committee

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1 Summary

It is recommended to the Board that the SCB carbon offset project contract be revised to continue support at Rooihoek in the Baviaanskloof Mega Reserve in South Africa (Figure 1) as an experiment in restoration while the Society is credited with carbon offset units from spekboom restoration already advanced in Addo Elephant National Park, Darlington Section (Figure 2). The experimentation at Rooihoek will involve replanting of spekboom and planting of additional species to enhance the substrate, and the area's biodiversity, as well as trials of herbivore exclusion by temporary electric fence. The eventual result of this experiment is aimed more at biodiversity conservation than at carbon accrual. The lessons learned from the past 6 years of restoration projects across the Eastern Cape region, led in part by SCBs Rooihoek project, include a need for co-adapted species in a multi-species habitat, and wildlife restraint at first, and subsequently removal of temporary restraint fences after enough plants are rooted. Follow-up monitoring will determine the level of herbivory that this habitat can withstand, and the temporary fence allows experimentation to determine management options with respect to the access of wildlife.

In the meantime, the Department of Environmental Affairs (DEA) and the Eastern Cape Parks and Tourism Agency (ECPTA) have discussed with the National Parks at Addo the designation of a parcel that is already restored for claim by SCB of sufficient credits to meet the carbon offset target set in the original contract with ECPTA. Decisions remain to be made about how SCB completes its commitment to the 2007 SCB conference attendees who donated to the program. Until now, the intent was for SCB to claim carbon offset credits from the Rooihoek site, but there is the choice to select a parcel at Addo from which SCB carbon offset credits can be claimed. Once SCB has approved a strategy, members of the Rhodes Restoration Group will aid SCB in revising the calculations in the contract which establish the credits needed from either ECPTA or National Parks. These calculations would include background levels of sequestered carbon (i.e. standing stock) as well as projections of each areas potential for further carbon sequestration in the time frames originally set.

2 Rooihoek Project Update

The South African government has supported academic research and public works in green agriculture, and the Rhodes Restoration Group (RRG, with an office at Rhodes University) is a scientific collaboration that has been studying the Subtropical Succulent Thicket biome as a candidate for developing the nation's carbon trading potential. With the assistance of members of RRG, SCB launched its project for offsetting our carbon footprint of attendees who traveled to South Africa for the ICCB in 2007. The RRG has been conducting research and field experiments across the range of habitats that includes spekboom (*Portulacaria afra*) thicket, habitat that plays host to elephant, rhino, leopard, Cape buffalo, kudu and many smaller antelopes (Figure 1).

The SCB project at Smitskraal, in Rooihhoek within the Baviaanskloof Mega Preserve (Figure 2), was revisited in July 2012 as a follow-up to two inspections in 2011, first by Ron Abrams in March and again by Richard Cowling in September. The 2012 visit was with Andrew Knipe of the Gamtoos Irrigation Board (GIB), the field manager responsible for implementing and following up on SCB's project under the South African Department of Environmental Affairs (DEA) program. The plantings at Rooihoek were performed by GIB and Eastern Cape Parks (ECPTA) as part of a Public Works job creation program.

The site selected by SCB for restoration epitomizes the challenges of native habitat restoration because it is in an area decimated by drought and overgrazing from pastoral farming (Figure 3). The selected hilly site overlooks the Kouga River, which suffers from impacts of erosion and siltation due to the barren lands surrounding it (Figure 4). The land is very steep with most topsoil dried and blown or washed away, and so the Rooihoek plantings are encumbered by sporadic rains, little or no soil for a plants foothold and high density of herbivores foraging on the young plantings (Figure 5). The access to the site is as rugged as possible, with dirt tracks crossing rivers and mountains (Figure 6), thus limiting the opportunity for follow-up cultivation and monitoring.

At the outset, several milestones were established for the Rooihoek project, but the conditions at the site did not produce good results as shown by a

monitoring map produced by RRG after field visits during 2008-2010 (Figure 7). The new spekboom plants at Rooihoek are struggling (Figure 8), compared to native spekboom thicket, which looks much more dense and diverse (Figure 9), leaving SCB's project a long way from success. Despite these challenges, ECPTA, DEA and GIB have replanted the project areas (Figure 10) and are committed to at least one or two more replantings in their continuing effort to learn how to restore the worst case scenarios of the Baviaanskloof valley. Christo Marais, DEA Director of these efforts, considers SCB's presence, with its commitment to both science and economics, as critical to his Department's program and the enormous investment the South Africans are making in green agriculture.

The lessons learned by the Rooihoek activities are both logistical and biological aspects of restoration ecology. In a comparative sense, at Rooihoek the harsh substrate conditions limit the size of spekboom cutting that can be used. Observations of the plantings were made at Addo, last year at Darlington, and this year at Paterson (main section of the Elephant Park, Figures 11-12) and a section at the Fish River Provincial Preserve (Figure 13). In both areas, the plantings are made in deeper soils on less steep slopes, in an area that receives more rainfall. Individual survivorship and growth per individual plant are better in Addo than in Rooihoek. These observations show that the use of longer, fuller spekboom cuttings (complete with meristem, Figure 14), placed 16-20 inches deep in rich soils produce much greater potential for carbon sequestration over the type of timeframe for which SCB has contracted.

Rich soils and good rainfall conditions are not available at Rooihoek. It is the severe soil loss within remote areas of the Baviaanskloof that first attracted SCB to the area in an effort to combine biodiversity protection (thicket habitat recovery) with meeting a carbon offset target. However, it seems that no matter how much longer the SCB contract would be extended, it is not likely that Rooihoek will achieve its carbon goals without some innovative additions to the field strategy. The survival of plantings at Rooihoek has been lower than 50%, while in parts of Addo survivorship has reached 90% overall, hence the better likelihood that SCB's carbon offset target can be met by claiming credits from a parcel at Addo. Moreover, the surviving plants at Addo show larger, more robust stems, leaves and roots, thus providing more carbon capture than the struggling plants at Rooihoek.

3 SCBs Contract Status

The question now to be answered is how to extend the SCB project, and disburse the designated funds for South Africa. The project operators (ECPTA and GIB) were meant to meet two milestones between 2009 and 2010; demonstration of survivorship suitable to meet the offset goal and calculation of the carbon sequestration rate to date. The survivorship report of 2010 and SCB inspection of 2011 showed that plant mortality was such a problem that calculation of the carbon stock baseline, as the premise to calculating a sequestration rate, was not feasible. The SCB contract provided for a payment of R50,000 to South Africa when the plantings were complete to a point which allowed a useful carbon sequestration rate to be derived. Hence, the payment was suspended and research and negotiations began in March of 2011 to determine how to continue SCBs commitment to both the habitat restoration for biodiversity purposes, as well as the carbon offset target to which contributing members donated their funds.

In a conference call/meeting between key parties (Dr.s Abrams, Cowling, Marais and Rieves), options were reviewed and a strategy derived that is now being transmitted to SCBs Ecological Footprint Committee (EFC), who will make their recommendation to the Board of Governors for a decision. It was agreed as a premise that SCB will continue to remain involved at Rooihoek, where some experimentation will now be added to the project by ECPTA with labor support from DEA. However, the remaining funds available from SCB could then be used to contribute to Addo Parks activities, where carbon capture is expected to be much higher than at Rooihoek. In an unusual partnership, SCB aims to be involved in two areas, claiming carbon credits from its designated parcel of 28 hectares already planted at Addo Elephant National Park, while also continuing to make a significant contribution in working with ECPTA to restore habitat for biodiversity conservation in the Baviaanskloof Mega Preserve.

4 Rationale for SCBs New Strategy

In deriving the recommended strategy, field visits were made to a wide array of spekboom restoration projects over two years, spanning a wide range of the Eastern Cape Succulent Thicket Biome (Figure 15) by Dr. Ron Abrams currently Chairman of the EFC. In conjunction with site visits, Dr. Abrams worked with each of the regions experts and spent some days with the Rhodes University Department of Environmental Science when they collected monitoring data on spekboom restoration sites in the Fish River Provincial Preserve. The return visit in 2012 was specifically intended to bring the decision about the contracts future to a conclusion.

During the 2012 visit to Rooihoek the entire 28 hectares was walked. While plantings performed in the year since the March 2011 inspection showed improvement, the evidence for herbivory was still overwhelming. But the July 2012 period followed some good rains in Baviaanskloof, and the spread throughout the project area of considerably more ground cover by grasses and forbs reinforced an idea raised during 2010-2011 and discussed at Rhodes University. Between 2009 and 2011, ECPTA with participation by Living Lands (graduate students using ECPTA and DEA facilities but supported by funds from the Netherlands), had developed a biodiversity nursery at Kouga Dam, with the idea to introduce groundcover plantings in addition to the spekboom replanting at project sites within their purview, with the purpose of enhancing biodiversity in addition to a carbon sequestration objective.

As part of the 2012 trip into Baviaanskloof, Andrew Knipe and Dr. Abrams visited the farm of Pieter Kruger at Sandvlagt. Kruger has signed an agreement with Living Lands whereby he is restoring spekboom habitat using GIB labor on tracts which he has committed to conservation. This private-government partnership is an important opportunity and one the South African government is emphasizing for farmers where climate change and overgrazing has degraded private farmlands. At Zandvlagt we inspected spekboom plantings of the same age as those at Rooihoek and included both open and fenced planting areas. The plantings were on a northfacing slope, and although it was not as steep as Rooihoek, it had similar soils. The entire area was fairly well covered by grasses and forbs and the spekboom survivorship was higher, with individual plants more robust than at Rooihoek. The success at Sandvlagt, especially within the enclosure, was a clear example of

how much difference can be attributed to the absence of herbivory, or the reduction of it by provision of other plants.

At Smitskraal, a Game Exclusion parcel near Rooihoek, further evidence was seen of the challenge we face at the SCB planting site. Even though a few Kudu were observed inside the fence, this enclosure also showed robust spekboom restoration, despite at least some herbivory. At the restoration areas of Addo Elephant National Park that are now being planted with spekboom, further insight was gained into the potential for planting success by talking with the field crews planting spekboom. The Fish River Provincial Park was also visited, where restoration is underway and where extensive tracts of pristine spekboom habitat were explored. With this cross-section of succulent thicket biome conditions as a reference, discussions were held with a number of experts, including Dr. Ayanda Sigwela (NMMU), Dr. Richard Cowling (NMMU), Dr. Christo Marais (SA DEA), Mr. Wayne Erlank (ECPTA), Mr. Mike Powell (Rhodes) and Dr. Brian Rieves (ECPTA).

It is clear that Powell, Marais and Erlank share a commitment to Rooihoek as initiators and governmental representatives of the SCB project, yet Dr. Marais opened the consideration of altering the SCB contract in the manner described above. Sigwela, Rieves and Cowling are of the opinion that continued reliance on the conditions at Rooihoek is not hopeful for carbon offset units in a reasonable timeframe, while they are adamant that experimentation with enhanced biodiversity as part of the restoration is critical to South Africa's carbon trading ambitions. The combination of field observations, discussions with experts and results to date at SCB's planting site demonstrate that our continued involvement should include such a biodiversity element, but also that the economic responsibility for carbon sequestration cannot rely on Rooihoek alone.

5 Recommendations for Strategy Selection

The researchers of the Eastern Cape Succulent Thicket Biome produced a series of maps that reflect restoration potential throughout the range of spekboom habitat (Figure 15). After visiting most of the sites designated as having a high potential, it seems that there are choices for SCB in terms of updating its contract with ECPTA. The position of the participants in the

conference/call on July 16 concurred that SCB should accept the offer of another tract of 28 hectares to which the pending payment would be made and from which the carbon offset credits would be taken. However, it was also agreed that SCB's level of commitment to Rooihoek to date is important to conservation initiatives in South Africa and should remain designated as part of SCB's project. As for the specific designation of additional lands to be used for SCB's carbon units, a copy of the carbon stock baseline for candidate areas in Addo National Park has been requested so that the contract amendment can be prepared with quantitative specifications.

6 Acknowledgements

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Figure 2: Map of Rooihoek SCB Sit.



Figure 3: Rooihoek SCB Site, view to Kouga River.



Figure 4: Rooihoek SCB Site, southern half.



Figure 5: Kudu grazing in thicket.



Figure 6: Access is challenging.

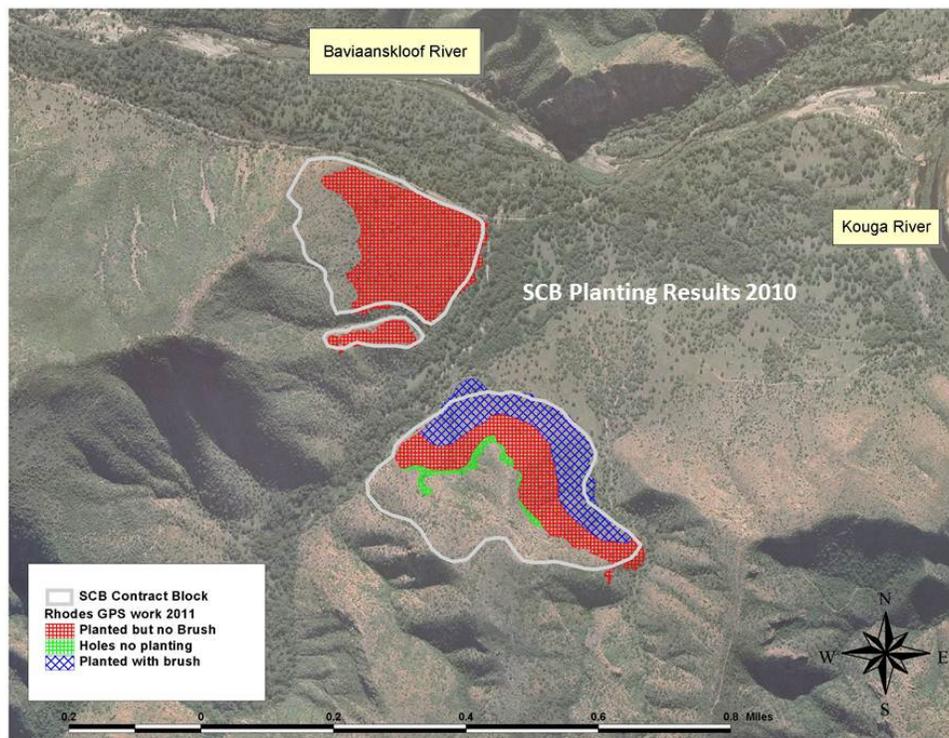


Figure 7: SCB planting results from 2010.



Figure 8: Spekboom stubbie at Rooihoek.



Figure 9: Native subtropical succulent thicket: restoration objective.



Figure 10: Rooihoek SCB Site, 2012, grasses cover.



Figure 11: New Spekboom plantings, Addo National Park.



Figure 12: Contract crew planting Spekboom, Addo National Park.



Figure 13: Spekboom Restoration Site, Fish River.



Figure 14: Spekboom cuttings ready for planting.

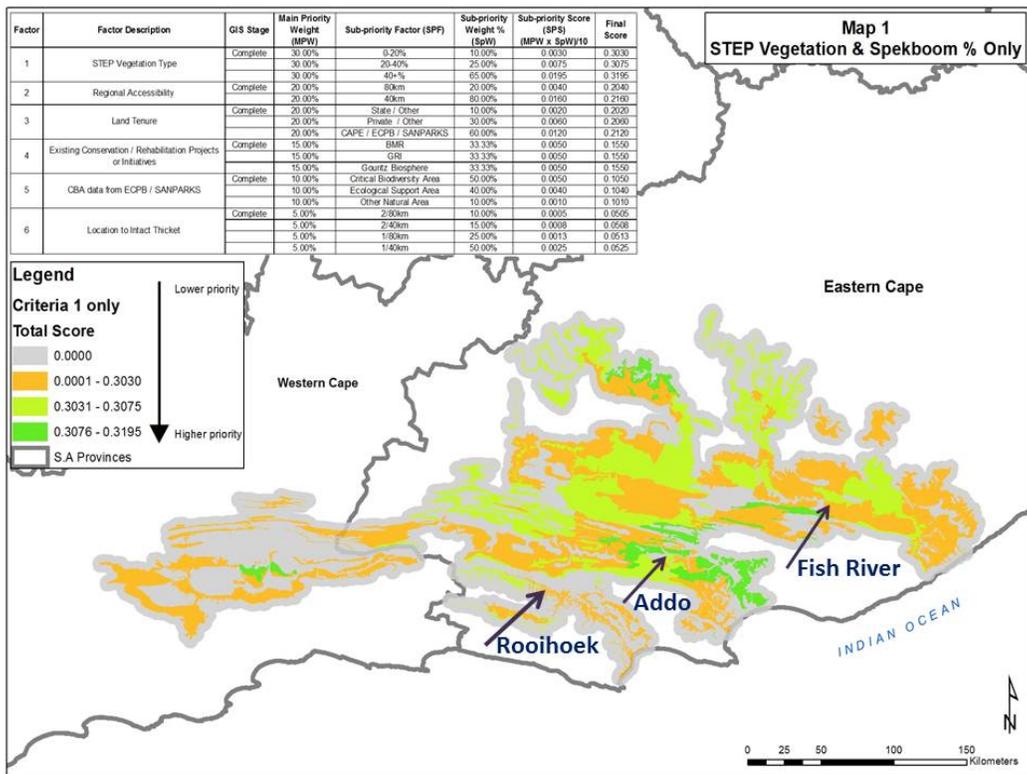


Figure 15: RRG compilation of spekboom potential.