



DRAFT: GEF – Carbon Baseline field trial

TESTING DEGRADED AND INTACT CARBON SAMPLING METHODS

C.Bolus | Baviaanskloof | 03.10.2017

Intro

This is a brief report on the results and challenges encountered when testing the carbon sampling methodology for both Intact and degraded sites on Tchnuganoo and Dr Van der Watt's property. The methodologies are based on the ABFRP standard operating procedure (DEA 2011).

Changes to the ABFRP methodology included the following:

- Only sampling to 15cm for soil.
- Measure all species above ground in terms of height, width and length.
- Measure all deadwood along the 50m transects (not only spekboom)



Objectives of the trial were to:

- Sample a minimum of two plots in the Intact and 2 plots in the degraded spekboomveld.
- Train local field assistants.
- Document the time taken for defined segments of sampling.
- Document the challenges encountered.
- Document the problems with the methodology and possible solutions.
- Explore the possibility of circular plots, and larger 25m plots in the degraded.

What was achieved:

- 2 plots were sampled on the degraded areas of Tchnuganoo, for above ground and soils to 15cm depth.
- 3 plots were sampled on the intact spekboomveld areas of Dr Van der Watts land. Only 1 plot was sampled for soil as there was limited sand.
- Training of 4 local personnel for soil sampling, litter sampling and above ground woody species measurements.
- A herbarium collection and photography of all woody species measured above ground in the 10x10m plot was compiled.

Time taken for segments of the sampling

The time taken for various segments of the sampling will be shown in results still to come.

Roughly it took a half day for above and below ground sampling on degraded sites. For intact sites it took a day or more to do both above and below ground sampling as travel to

the site could add on a lot. For only above ground sampling for intact it took roughly just over half a day.

Having to go back to a plot if it is near the end of the day and the plot has not been completed, adds on travel time.



Photo: The above picture shows the steep valley behind Dr Van der Watts land. One of the intact plots was right at the bottom of the valley. Travelling with equipment through intact bush to a site like this is taxing and time consuming (especially if we are carrying sand).



Plot setup and GPS

This included:

- Setting up 10x10m
- Setting up deadwood transect
- Putting in pegs
- GPS pegs



Photo: Setting up plot boundaries with rope in dense thicket. One cannot usually see from one corner of the plot to the next.

Observations and challenges were:

- On degraded sites it is easy to setup a square plot and get straight lines.
- Intact is more difficult. We needed to use a compass to orientate towards the different corners.
- The diagonals could not be used in the intact as it was too thick.
- A circular plot would be even more difficult in intact because some of the trees are more than 3m in height. The edge of the circle would be difficult to define with rope.
- The easiest method seems to be to use a compass to get a direction and use a long pole like a needle attached to the rope to weave it through the thick bush. The rope then acts as the plot boundary.
- GPS positions were collected easily, except if there was lots of bush over a plot corner.
- Setting up the deadwood transect adds extra time in the intact. We could try do it on the plot boundary.
- The unevenness of the ground affects the accurate layout of the plot.

Below ground sampling

Below ground sampling involved:

- Soil sampling at 5 holes (10x10cm) to a depth of 15cm.

- Bulk density sampling at 1 hole to a depth of 15 cm.
- Warehouse processing of soil samples

Observations and challenges were:

- Only digging to 15cm saved time and energy.
- However when added to aboveground sampling this was taxing and took an intact plot almost a whole day.
- On the degraded areas sampling soils was quicker and easier because there was less bush to cut back, and less above ground woody species to measure.
- In intact, most soil samples require the removal of a 0.5 x 0.5 m area of the bush to be able to sample the litter and soils. This amounts to 6 x 0.5m² which totals 3m² of 100m², or 3%.



Photo: Example of a degraded site.

Above Ground sampling

Above ground sampling included:

- Litter sampling
- All woody species identification/coding and herbarium sample collection.
- All woody species height, canopy width and canopy length measurement.

- Dead wood measurement along transects (2x50m transect for degraded plots; 2x100m transects for intact plots).

LITTER SAMPLING



Photo: Litter sampling under intact thicket is difficult which means the bushes need to be cut back. This goes for the soil sampling too, which is below the litter quad. Intact density varies. This plot was less dense than other intact plots (note some open areas), however this is not always the case.





Photo: Collecting litter in dense thicket.

WOODY SPECIES ID

Woody species identification went well for the common species, but there were a few where we will need to verify them with a specialist botanist like Jan Vlok. We have pressed samples and taken photographs for all woody species measured.

WOODY SPECIES MEASUREMENTS

All woody species were measured for height and canopy dimensions (width and length).



Photo: An example of the dense thicket cover from the bottom of the valley. Taken from a large boulder.



Photo: Field assistants measure the height of woody trees with pvc pipe and measuring tape. These can easily be more than 3 meters in height.

Observations and challenges were:

- Many woody species can be multi-stemmed so we had to define what constituted the plant start and end. This can sometimes be difficult where multi stemmed plants overlap. Perhaps Marius Van der Vyver has recommendations on this from his experience and methodology.
- Woody species canopy cover which cross the 10m boundary **need to have a rule.** Either we measure the whole plant which can sometimes go more than 5meters outside the plot. Or we measure the canopy from the boundary edge. Or we exclude them.
- On degraded sites there were sometimes many little individual woody plants which needed to be measured (<25cm in height). This didn't add up much above ground carbon but a lot of measuring time. Could consider having a limit (eg only plants >25cm height).
- 25 meter plots would take at least 6 times the time in intact sites. On degraded sites this might be easier as there would be less above ground woody species to measure.



Photo: Mdoda with multi-stemmed spekboom in the background which crosses the plot boundary. Note how spekboom had to be removed to get to the ground to do soil and litter sampling.

DEADWOOD



Photo: The type of deadwood encountered was in varying degrees of decomposition.

Observations and challenges were:

- It is difficult setting up the transect in the intact, but manageable. To save time we could look at maybe doing deadwood along the plot boundary to not have to setup the ropes. Setting up ropes in intact is tricky.
- The SOP is for deadwood >5mm, which means there can sometimes be lots of small deadwood twigs. This takes a long time to measure.



Team training

The team responded well to the training. There are two older field assistants and two younger. They are used to physical work and therefore can deal with the difficult conditions. The two younger field assistants have matric. Most have experience with working for the DEA - NRM program and planting spekboom previously in the kloof.



