

HARTENBOS GARDEN ESTATE

FIRE MANAGEMENT PLAN FOR THE BUTTERFLY RESERVE

1) Location of the butterfly reserve and extent of the planned burn

- The butterfly reserve area is less than 5 ha, and the planned burn area is shown in the first figure below.

2) Ecological effects of fire on butterflies

- The fire ecology of butterflies differs from plants, and depends on the life history and behaviour of each butterfly genus and in some cases species.
- Fire can be beneficial for *Aloeides* butterflies, which do better in habitats with less plant cover. They are adapted to survive fires that do not come during their breeding season and are not too intense. Their larvae and pupae are relatively safe from fires in the nests of their host ants during the period from May to August.
- The host plants of the larvae of *Aloeides* butterflies (*Hermannia* species) are resprouters, which recover rapidly after fire. Butterfly adult emergence is delayed immediately after the fire until host plants and ants are present. The delay can be as much as several months or even more than a year (e.g. *Aloeides thyra orientis* at Brenton-on-Sea after a severe fire).
- Their host ants (*Lepisiota* species) (Slingsby, 2017) are adapted to warmer microclimates and nest under stones on bare patches, which make good incubators during the day for their larvae and ova (as well as the larvae of the *Aloeides* butterflies, which feed at night). The ants can detect approach of fire (from the smoke) and take their brood (and the butterfly larvae) deeper into the nests where they are safer from the fire. In the case of a very hot fire mortalities can happen, but with the entrance to the ant nests being under stones on bare patches the localised lack of fuel reduces the temperature.
- The area where the butterflies are breeding (Edge, 2021) has not been burnt since 2011 and the high fuel load means that measures should be adopted to minimise the intensity of the fire.

3) Overall fire management plan for the area

- Based on Nick Helme's fire management plan for the area produced for the Mossel Bay Municipality (MBM), part of his overall environmental plan for the area, including erven 1852, 1853, Portion 59 of erf 217 and erf 3122 (Appendix 1).
- Took account of the burn scar of the 2011 fire, which burnt the entire 370ha property (see Fig. 8 of Appendix 1).
- Split the MBM property into 11 management blocks (excluding erf 3122) (see Fig. 9 of Appendix 1).
- Helme says the best time to do an ecological burn is July/ August (from a plant perspective).
- Helme's plan recommended that block burns should have started in 2018. However the fire in January 2019 burnt most of his blocks 1, 2, 3 and 4. Block 5 is only due for burning in 2022.
- Burning of the butterfly reserve area during 2021 would basically fit into Helme's overall plan.

4) Fire behaviour and specific risks in the area

- Detailed in Pool & van Zyl (2021) fire scoping report, as revised in March 2021.
- Most fires tend to be driven by strong, dry north-westerly berg winds.
- Berg winds more often prevalent during the mid-June to late August period.
- Pool & van Zyl (2021) recommended a 30m fire break around the parts of the development facing north or north-west (section 8.7). This would include the area of the butterfly reserve, which would therefore enhance the protection from fires approaching from these directions, particularly if the fuel load was managed by regular ecological burns. Helme

recommended a 10–15 year rotation period for Renosterveld and Fynbos, with no burning necessary for thicket patches in the kloofs.

- The burn scar from the January 2019 fire is shown in the “Figures” section below to inform the planning of the proposed ecological burn for the butterflies.

5) Consideration of the presence of alien plants

- The prevalent alien plants in the north-west corner of erf 3122 (around the reservoir) are rooikrans (*Acacia cyclops*). This added fuel load enhances the overall risk to the proposed property development.
- The presence of these alien plants would also make it more difficult to accomplish a cooler and controllable fire (section 7.3 of Pool & van Zyl, 2021).
- It is therefore essential that these alien plants be removed urgently if a burn of the butterfly reserve area is to be carried out this year. Fortunately this is not a massive undertaking since the rooikrans trees occupy less than a hectare, although chain saws will be needed, since the trees are quite large.

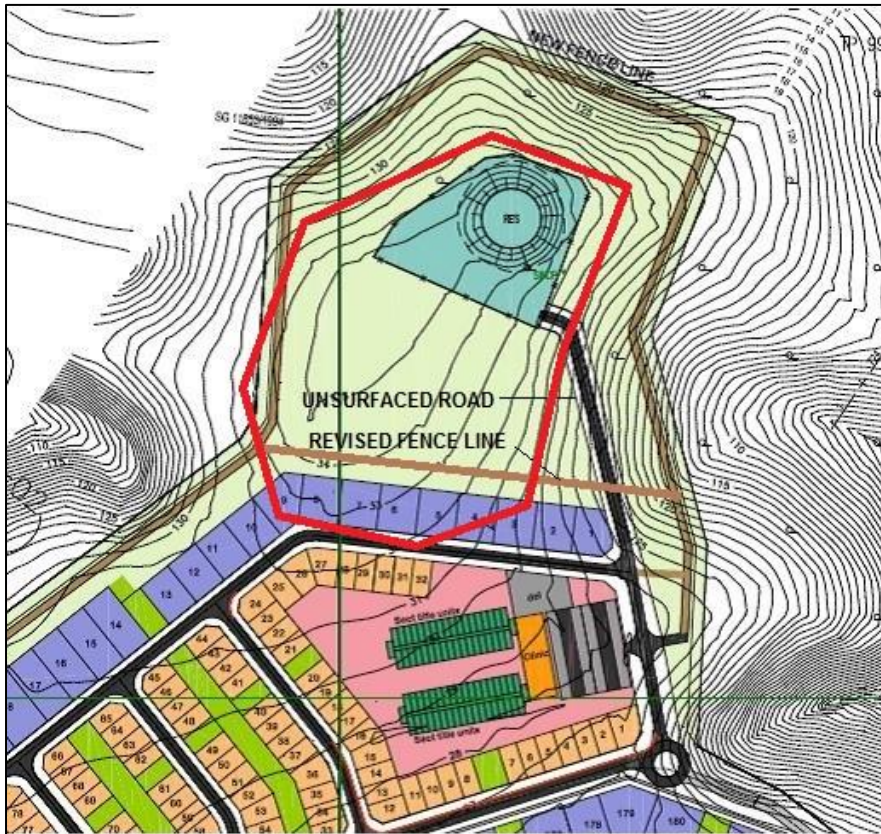
6) Municipal infrastructure to be protected

- Another important consideration when carrying out a burn of the butterfly reserve area safely and with minimal damage to property is the presence of the water reservoir, valves and pipelines, fencing and possibly electrical equipment.
- The MBM engineering and fire departments will therefore need to be consulted when planning this burn, and suitable fire breaks prepared beforehand.

REFERENCES

- EDGE, D.A. 2018. Butterfly scoping study – Hartenbos Heuwels, Erf 3122, Mossel Bay, Western Cape Province. Follow-up report. Unpublished report prepared for Cape EAPrac.
- EDGE, D.A. 2021. Revised scoping study – Butterflies – Hartenbos Garden Estate, Erf 3122, Mossel Bay, Western Cape Province. Unpublished report prepared for Cape EAPrac.
- HELME, N. 2021. Conservation Management Plan for Municipal land on Hartenbos Heuwels, Mossel Bay, Western Cape.
- POOL, C.F. & VAN ZYL, S.J. 2021. Hartenbos Garden Estate – Fire scoping report for development of Erf 3122, Hartenbos. Unpublished report prepared for Cape EAPrac.
- SLINGSBY, P. 2017. Ants of Southern Africa. Slingsby Maps, CapeTown.

FIGURES



Hartenbos Garden Estate – planned burn area (outlined in red) for July 2021 ecological burn of the butterfly reserve area between the development and the reservoir.



Burn Scar of the January 2019 fire

APPENDIX 1

EXTRACT FROM HELME (2021)

7.3 Fire Management

Once the previously discussed issues have been largely dealt with the primary ongoing management task will be fire management. As noted, all the vegetation units (Fynbos & Renosterveld) on site, other than the Thicket, are fire driven systems, meaning that they are adapted to regular fire, and require regular fire for optimal ecological functioning (Helme & Rebelo 2016, Helme & Rebelo 2016a). Optimal fire frequency in these sorts of Fynbos and Renosterveld systems is anywhere from once every 10 years to once every 15 years (Helme & Rebelo 2016, Helme & Rebelo 2016a). The last fire in most of the study area was in late 2010 or early 2011, so these areas do not need to burn again until after 2020. The 2011 fire is estimated to have covered about 90% of the core study area, and about 60% of the greater study area (see Figure 8). The only part of the core study area that did not burn in 2011, and which would benefit from a burn, is the northeast corner of Erf 1853. The pockets of Thicket vegetation in the western parts of Erf 1853 and Ptn 59 of 217 that did not burn in 2011 do not require fire for optimal ecological functioning, and thus do not need to burn.

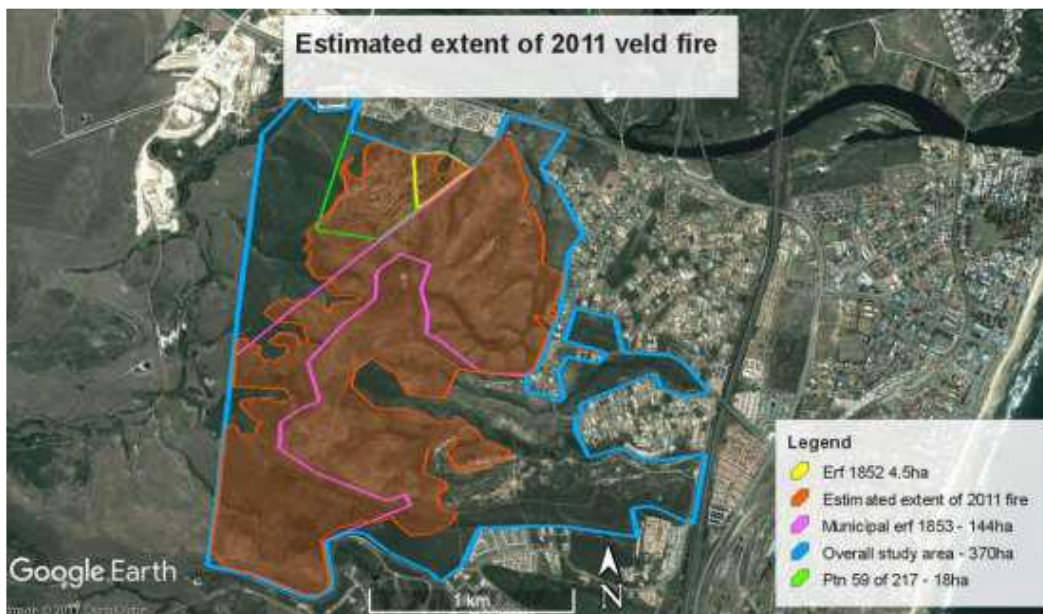


Figure 8 – Estimated burn scar from the 2011 fire

The Core Area has been divided up, for purposes of this plan, into eleven fire management zones (see Figure 9). The map includes the main Thicket patches, but it should be noted that these do not require fire, and no attempt should be made to burn them. The smallest of these zones is 10ha, and the largest is 26ha. Zones should not be less than 6 or 7 hectares in extent, as then seed dropped into the burnt area (some species drop their seed only after fire) can be badly impacted by rodents moving in from surrounding unburnt areas. The zones typically extend from a drainage line or valley up the slope to a ridgetop, and in some cases down into the next valley, or to the nearest access track. Fires usually burn fastest upslope, and may struggle to burn downslope in the absence of wind, and management fires are thus usually started in the valleys.

Before any controlled fires are undertaken on site the appropriate firebreaks should be prepared. Firebreaks should not be necessary everywhere and are most important in areas adjacent to existing development, and along ridge tops where there are fire management boundaries and/or access tracks. The proposed burning sequence would be to burn just one of the management units every year, starting with Unit 1, in 2019.



Figure 9 – Fire management zones at Hartenbos Heuwels

Target 5: Managed burning of all Fynbos and Renosterveld in the Core Area on a rotation of approximately 11 years duration.

Responsibility: Municipality (landowner), in conjunction with local FPA

Justification: Fynbos and Renosterveld vegetation units are adapted to regular fire and should be burnt once every 10-15 years for optimal ecological functioning, and to limit build-up of dry fuel load that could facilitate the spread of runaway wildfires.

Methodology: The Core Area has been divided up into 11 proposed fire management units. The demarcation of these units (and indeed this entire fire plan) is open to input from the local Fire Department and the local Fire Protection Association (FPS), of which the Municipality should be a signed-up member.

The Municipality should secure all relevant permission to undertake controlled burns on site on an annual basis, and should inform neighbouring landowners beforehand. They should also secure the help of the local Fire Department and the local Fire Protection Association (FPS) to actually undertake the controlled burning, perhaps assisted by CapeNature, if they have capacity.

Firebreaks at least 5m wide should be brushcut along the upper edges of the fire management units prior to any controlled burns in that unit, and especially where these border on developed areas. No firebreaks should be necessary along drainage lines, where these form the lower edge of the management units. Soil should not be disturbed in these operations, and hence firebreaks should not be ripped, skoffed or graded, as this will facilitate the spread of alien invasive plants. All woody alien invasive plants must be removed from areas to be burnt at least one year prior to any controlled burns, so that seed falls to the ground and is eaten by rodents prior to the fire, rather than germinating in the post-fire environment (which would be free of rodents for a while).

The season of the controlled burns is an important issue, and is a variable that can be controlled to achieve different outcomes. Vegetation recovery is usually best when the fire occurs at the end of the dry season, just before the rainy season – so as to minimise the time that seed lies around before germinating. This is a year round rainfall area, with peaks in March and October/November, and a good time to burn may thus be in mid to late winter (July – August), so that germination can begin with the early summer rainfall peak.

A suggested block burn sequence is as follows, with the corresponding years in which the block burn should take place (refer to Figure 9 for a map of the blocks):

Block 1 – 2018; Block 2 – 2019; Block 3 – 2020; Block 4 – 2021; Block 5 – 2022; Block 7 – 2023; Block 6 – 2024
Block 11 – 2025; Block 10 – 2026; Block 9 – 2027; Block 8 – 2028

There is a degree of flexibility in terms of which block should be burned in which year, but the above serves as a proposal. It is not essential that 100% of each block be burned whenever the controlled fire is undertaken, but at least 70% of each block should ideally be burned, although this percentage may be lower for those blocks that contain significant Thicket areas (such as blocks 6, 8, 9 and 10). If any of the proposed areas have burnt accidentally within the preceding 11 years then these areas need not be burnt again until most of the vegetation in the block is about 15 years old, at which point the block burning schedule will have to be recalculated, or in some cases the blocks themselves may have to be redrawn.

Timing: Annually, commencing in 2018, and thereafter on a similar 11 year cycle. Ideally to be undertaken in July or August, which are relatively dry, cool months.

Estimated Cost: Unknown, but should not be costly (<R20 000) as minimal material is required. Costs will be incurred primarily for firebreak clearing, and for staffing during the block burns.