ARDVAR ESTATE HABITAT IMPACT ASSESSMENT 2019

The Habitat Impact Assessment (HIA) field survey of 68 of the 70 survey plots out with fenced exclosures on Ardvar was undertaken between the 2nd to the 9th May 2019 by Carol Robertson MCIEEM, MICFor, for Ardvar Estate. Two plots, numbers 10 & 11, were not surveyed due to lack of time. Both plots 10 & 11 were assessed as Medium in the 2018 HIA survey.

The surveyed plots were 25m in radius (0.2ha), with all the plot centres marked with a wooden peg in 2016 which was relocated using a handheld GPS (Garmin map 60CSx).

The HIA methodology followed that detailed in Armstrong, H. *et. al.*, 2014 and the FCS Grazing Toolbox with a focus on current herbivore impacts on two browsing indicators:

- Seedling/ Sapling Impacts on the previous year's growth The definition of a seedling and saplings was taken as any tree species < 5 m tall and with a DBH (Diameter at breast height 1.3m) of <7cm.
- 2. Preferentially Browsed Species Impacts (excluding trees & bracken) Based on the Herbivore Impact Assessment Field Guide Table 4 Preferentially browsed or grazed plants (excluding trees) this included:
 - Blaeberry
 - Hard & Lemon scented ferns
 - Buckler ferns
 - Bog Myrtle
 - Meadowsweet
 - Valerian
 - Honeysuckle
 - Ivy
 - Dog Rose
 - Angelica
 - Greater woodrush
 - Bramble

In addition, other obvious signs of herbivore presence e.g. deer sightings, fraying, and ground disturbance were noted.

This assessment is the third on Ardvar Estate following previous survey assessments in 2016 & 2018 commissioned by Scottish Natural Heritage of the Ardvar Woodlands SSSI/ SAC.

With the aim of understanding the annual seedling/ saplings growth over a season the following methodology was also undertaken in the 2019 survey.

Within each plot the length of the longest shoot of the previous year's growth was measured to the nearest 0.5cm on a maximum of 10 seedlings/ saplings visible above vegetation height. The longest shoot was determined by a quick visual assessment of the plant. In addition, the species of each seedling/ sapling measured was noted and if the previous year's growth on the measured shoot had been browsed.

HIA Results:

In accordance with the methodology the current herbivore impact levels were recorded as either:

VH = Very High, H = High, M = Medium, L = Low, N = No detectable grazing pressure or N/A = Not Applicable if the feature was not present in the plot.

Two Plots were recorded as not applicable (N/A) for each of the indicators:

- Plot 21 preferentially browsed species (other than trees) absent.
- Plot 43 seedling and saplings absent.
- 1. Seedling/ Sapling Impacts on the previous year's growth

Table 1: Summary of number of plots and percentages for 2019:

Current						
Herbivore	VH	Н	М	L	Ν	N/A
Impact						
Number of plots	0	8	58	1	0	1
Percentage	0%	11.8%	85.3%	1.5%	0%	1.5%

The majority of the 68 plots were recorded as having Moderate herbivore impacts in 2019.

See Appendix 1: Map 1 – Seedling/ Sapling Impacts 2019.

2. Preferentially Browsed Species Impacts (excluding trees & bracken)

Table 2: Summary of number of plots and percentages for 2019:

Current Herbivore Impact	VH	Н	М	L	Ν	N/A
Number of plots	0	2	58	7	0	1
Percentage	0%	2.9%	85.3%	10.3%	0%	1.5%

The majority of the 68 plots were recorded as having Moderate herbivore impacts in 2019.

See Appendix 2: Map 2 – Preferentially Browsed Species Impacts 2019.

Overall/ Combined Browsing Impact

The overall browsing impact for each survey plot was calculated by using the highest of the two impact scores for the two browsing categories recorded. The 2018 data has been added to Table 3 for comparison.

Table 3: Summary of number of plots and percentages for 2019 & 2018*:

Current Herbivore Impact	VH	Н	Μ	L	Ν	N/A
Number of plots 2019	0	9	58	1	0	0
Percentage 2019	0%	13.2%	85.3%	1.5%	0%	0.0%
Number of plots 2018 (total of 73 plots out with exclosures	0	18	50	5	0	No information
Percentage 2018 (total 73 plots out with exclosures)	0%	25%	68.42%	6.58%	0%	No information

*Ardvar Estate figures reported in *Heaton, S. Haycock and Jay Associates Ltd. 2018. Ardvar Woodlands SSSI/SAC Herbivore Impact Assessment 2018. *Scottish Natural Heritage Commissioned Report No.* 2018 results based on a total of 73 plots surveyed out with exclosures. It is understood that 3 of these plots have subsequently been enclosed within a deer fence.



Figure 1: Overall current browsing impacts 2019 & 2018:

The majority of the 68 plots (85%) were recorded as having Moderate herbivore impacts in 2019.

See Appendix 3: Map 3 – Overall Browsing Impacts 2019.

Deer Sightings:

4/5/19 – Plot 100: 2 young stags 5/5/19 – Plot 73: 2 stags and 1 hind; 3 hinds 7/5/19 – surveyor travelling to Plot 42: 8 hinds with followers 8/5/19 - Plot 33: 2 hinds

Fraying:

Recent fraying was noted in the following plots:

- Plots 106, 120, 115 a number saplings had recent as well as older past fraying damage.
- Plots 104 & 111 single sapling with recent fraying damage.

Ground disturbance:

• Plot 101 near deer feeding area also with strong tracking.

HIA Conclusions:

- Building on the 2018 results, the 2019 survey shows a continuing reduction in overall herbivore browsing impacts on Ardvar Estate.
- The majority i.e. 58 of the 68 plots (85%) were recorded as having overall current herbivore impacts as Moderate in 2019 compared to 68% i.e. 50 of the 73 plots surveyed in 2018.

- There has been a reduction in the number of plots and percentage at High overall herbivore impact levels from 18 of the 73 plots (25%) in 2018 to 9 of the 68 plots (13%) in 2019. This equated to a total reduction of 9 of the unenclosed plots in 2019 from High to Moderate impacts, (Plot Numbers 109, 22, 46, 110, 89, 70, 40, 115, 103 & 51).
- There has been a reduction in the number of plots and percentage at Low overall herbivore impact levels from 5 of the 73 plots (6.58%) in 2018 to 1 of the 68 plots (1.5%) in 2019. This equates to a total of two of the unenclosed plots assessed in 2019 from low to medium impacts, (Plot Numbers 43 due to the presence of bog myrtle & 108 due to the level of browsing on the holly).
- It has proved difficult to draw direct comparison with the 2018 survey figures for the individual browsing indicators as there is no confirmation of plot numbers as well as no N/A and therefore it is not clear if N = Absent is for grazing or the feature is absent from the plot.

However it would appear that:

• For preferentially browsed species there has been a reduction in the number of plots assessed as low in the 2019 assessment.

This assessment was based on the levels of browsing recorded principally on blaeberry which was moderate during the previous winter. Hard and lemon scented ferns as well as buckler ferns were found to occur frequently in plots and were another useful indicator of browsing levels. Hard fern in particular was found to have moderate to low browsed tips on the previous year's growth. In wetter areas bog myrtle was often the most abundant species to assess.

When comparing the increased levels of browsing on preferentially browsed species with a decrease in seedling/ sapling browsing may suggest a degree of surveyor bias in recording this particular element.

• For Seedlings/ saplings the increase in the overall current herbivore impacts assessed as Moderate in 2019 is due to a combination of a reduction in the number of plots assessed as High is as well as a reduction in the number of plots assessed as Low.

In the latter case of the low plots assessed as moderate, these plots tended to have a greater abundance of rowan, a more palatable species overall compared to birch. It should also be noted that only 7.7% of seedlings/ saplings visible above vegetation height (see results detailed below) were recorded as browsed on the previous year's growth.

References:

Armstrong, H., Black, B., Holl, K. and Thompson, R. 2014. *Assessing Herbivore Impact in Woodlands: A Subjective Method*. Available at: http:/Scotland.forestry.gov.uk/images/corporate/pdf/herbivore-impact-assessment-method.doc

Seedlings/ saplings visible above vegetation height within each plot Results:

Out of a total 68 plots surveyed:

- 11 plots (16%) had no seedlings/ saplings recorded above vegetation height.
- 33 plots (49%) had less than 10 seedlings/ saplings recorded above vegetation height.
- 24 plots (35%) had 10 seedlings/ saplings recorded above vegetation height.

See Appendix 4: Map 4 Seedling/ Sapling Increment for the location of the plots

A total of 366 seedling were measured with 28 measured seedlings (7.7%) previous year's growth on the longest shoot having been browsed.

Previous years increment (cm)	0.5-5	5.5-10	10.5-15	15.5-20	20.5 +
Total Number Seedlings/ saplings	113	121	79	43	10
Percentage (%)	31	33	21	12	3

Table 4: Seedling/ Sapling Increment 2019



Birch (82%) was the most common species recorded followed by rowan (12%). Minor species recorded included Holly (4.5%), Eared/ grey willow (1.5%) and Hazel (0.5%).

Discussion:

The methodology was quick to complete in each plot, requiring a tape measure and knowledge of recognising last season's growth from previous year's growth.

Despite this being the first year of completing the methodology, the survey has revealed the extent (both maximum and minimum) of the previous season's growth, as well as the location of plots with regeneration visible above vegetation height as well as without any regeneration.





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APPENDIX 2



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APPENDIX 4