

EAST LOCH SHIEL DEER MANAGEMENT GROUP

Appendix 15

POPULATION MODELS AND TARGETS

2021/22

ELS 21 Population model 2021

POPULATION MODELS: - June 2021 update.

Introduction: -

The 'Populations Model and Targets' is Appendix 15 to the Action Plan – Working Document.

It must be understood from the outset that a forecast is an estimate of what might happen given certain parameters and making certain assumptions. The forward-looking Population Models will need updating annually with input of up-to-date figures and information with revised assumptions, targets, etc.

Our Population Models calculate the deer density from the 2009/10 deer census/counts with further inputs from the 2016 and 2019 counts also including cull figures, migration, recruitment and mortality assessment data allowing us to understand our population dynamics, to confirm, and calibrate our forward-looking Population Models.

To produce the East Loch Shiel DMG population model, it is necessary to show the relationship between the Western Working Group (WWG) and Eastern Working Group (EWG) areas with their own models.

The Population Models below which project forward from the January 2019 helicopter count shows our projected population to Spring 2026. Our models are adaptive and reactive with regular updates and re-setting of population and cull targets as appropriate.

Deer Density: -

The SNH 10th of January 2019 aerial count shows the ELSDMG density of 10 deer/km² over the whole group, which is at the lower end of the SNH medium rated category of 8 to 15 deer/km². FLS advise the 2009 census of their woodlands established a density of 7.5 deer/km². FLS advise they have carried out a deer density assessment during 2020 although no figures have yet been presented to the DMG.

Mortality and recruitment: -

Mortality assessment and recruitment counts. At the 12/11/2019 meeting SNH advises that for adult deer mortality we use the SNH standard of 2% with variation, if applicable, based on the observations of the stalkers. For calves, carry out sample recruitment counts late

spring by which time the winter mortality will have occurred. This then gives the actual 'post-winter mortality' recruitment figure with no need to calculate further. These figures can then be applied to the Population Model.

In the Western Working Group area FLS advise they have higher recruitment levels of 45% of all hinds or 65% of sexually mature hinds due to the better feed and shelter in their woodland areas. As both the offered calving figures give a virtually equal calving rate for the whole consort the figure of 45% of all hinds is used for ease of calculation. FLS advise they operate a shoot the calves first policy which will mean a higher proportion of calves: hinds culled than the actual population ratio. The figures in the historic culls do not demonstrate a higher calving rate than the 45% for all hinds we have used. The 5-year average calf/ hind cull ratio to the 2019/20 season for the WWG area shows a nett 41% calf/hind cull rate.

Open range sample recruitment counts were carried out late spring 2021 suggest an open range, post mortality, recruitment rate of 34% for 2020/21. Mortality is assessed as at 'normal' levels.

Migration: -

FLS say their higher recruitment levels explain the sustained high level of culls achieved in their woodlands. (See Mortality and Recruitment above.)

Using the SNH model to calculate the population required to sustain the FLS average cull a density of ≈ 27 deer/km² would be necessary in their woodlands, i.e., 3.6 times higher than the 7.5 deer/km² stated. OR to sustain a cull at the last two years level a density of over 30 deer /km² is needed, i.e., 4 times higher than that stated.

The population models, evidence on the ground e.g., porous fences, tracking through the fences, stalkers/consultants' observations, etc. all confirm migration is occurring. Since the 2019/10 deer census the FLS grounds have accounted for around 1450 deer culled more than their calculated recruitment whilst over the same period a similar number cannot be accounted for on the open range. In the absence of later data, a deer density of 7.5 /km² is used as the spring population estimate in the FLS woodlands.

The emigration of deer from the open range through porous forestry fences is detrimental to the open range sporting interests in regard to Sections 5, 10, 11, and 13 of the 'Benchmark' and Sections 2, 3, 5, 6, 8, 9, 10, 11, 12 and 14 of the 'Public Interest'. Whilst at the same time being detrimental to the enclosed woodlands interests in regard to Sections 5, 10 and 11 of the 'Benchmark' and Sections 2, 3, 5, 6, 8, 10, 11 and 12 of the 'Public Interest'. The losses to the sporting members are detrimental to capital values, capital utilisation, revenue, primary and secondary employment, training prospects, housing prospects, increased impacts on habitats & etc. At the same time the costs of deer control, crop damage, increased impacts on habitats, capital values & etc. are detrimental to the mainly publicly owned forestry business interests.

Herbivore impacts: -

Refer to the ELS Appendix 13 HIA Log Revision 3 – 2021 which shows overall deer impacts to be within the DMG target.

Deer Condition: -

The condition of the deer was reported as good to very good.

Availability of Forage and Shelter: -

There have been no significant changes in availability of Forage and Shelter availability since the last season (2020/21) Population Model. Heather is showing mainly low or medium browsing impacts indicating the deer are not struggling to find winter forage.

Socio-economic benefits: -

Deer management in the open range areas provides for both primary and secondary employment with deer stalking being a key source of revenue and employment. As well as the obvious primary income and employment derived from the commercial stalking on the open range sporting estates there are many other often less tangible but no less important economic and social benefits both for the local communities and the wider public including estate investment, estate project investment, employee and community housing, social well-being, sense of community, mental and physical well-being, & etc.

Local Economy: -

Many local businesses, enterprises and people are reliant on the income, employment and the diverse benefits generated from and around deer management.

The constraints imposed by the loss of deer from the open range via migration diminishes the local economy, local employment and housing prospects, as well as the broad spectrum of benefits shown above. Local employment is covered in more detail in section 12 of the ELSDMG DMP Background Information and identifies 8 full time and 9 seasonal or part time jobs plus opportunity for a full time HNC/HND trainee. A further 7 full time and 32 part time people are engaged with and reliant on secondary employment relating to the open range sporting deer management.

The non-targeted emigration of deer from the open range is having a negative effect on both the local and broader economy. Despite there being a strong demand for deer stalking for sport our open range sporting members are unable to meet the full demand and capacity, often having to turn away stalking guests and their parties due to the lack of sporting stags and hinds/calf's available, leading to a loss for both the local and the broader economy.

Meanwhile, the nett cost of FLS culling operations is significant with a major part of their costs incurred culling deer that have migrated onto the FLS estate, the bill for this being picked up by the taxpayer. The FLS deer management team provide 1.6 FTE jobs in East Loch Shiel. There is little opportunity for additional secondary employment.

Venison production will be the same whichever side of the fence the deer are culled.

Broader Economy: -

In the broader economy, employment and earnings from the open range landholdings deer management continue to multiply with e.g. contractor and professional services, equipment suppliers, trade associations, gun shops, garages, trophy preparation, transport, tourism, and so on, all benefiting. Direct taxation is generated for the exchequer by way of Income Tax, National Insurance, VAT, Property/ Business Rates & etc.

Primary objectives: -

The primary objectives for the individual landholdings are set out in the ELSDMP Background Information Section 7.

The primary commercial objective for most of the open range landholdings is for sustainable deer stalking enterprises in balance with the environment with, in some cases agricultural interests, thus providing for the broad spectrum of benefits shown above and satisfying the public interest.

In the enclosed commercial woodlands, the primary objective is for timber production.

Population Targets: -

Taking all the above factors into consideration: -

The open range population is to remain at a sufficient density to deliver the collective objectives of the DMG members as well as the public interest.

The Western Working Group Area Sporting Stag target is for 20 to 25 stags per annum. The SNH model spreadsheet suggests a deer density of 7.5 to 9.5 deer/km² will provide for this.

No target is given for the FLS population or cull, simply they aim to keep deer impacts to an acceptable minimum in their commercial woodlands, although the DMG was advised that FLS is being tasked to further increase their cull nationally by 10%. In the absence of later data, the FLS population is assumed to be maintained at the density of their last assessment in 2009 with migration to maintain this figure..

The Eastern Working Group Area Sporting Stag target is for 160 stags per annum but is currently constrained to around 120 by apparent losses due to migration. The Eastern Working Group calculate that to support a 160-sporting stag target a population of 1200 stags, 1200 hinds and 360 calves is suggested, without migration losses, by the SNH model equivalent to a density of 8.2 deer/km², which would allow for a >22% reduction from the 2019 count.

The DMG Eastern Working Group population target is for an open range Spring 2021 deer density of 10.5 deer/km² +/- 5%, not wishing to increase the overall deer density but at the same time trying to support sustainable estate, deer stalking and secondary business enterprises, providing for the broad spectrum of benefits shown above and satisfying the public interest, albeit constrained by the non-targeted losses due to emigration.

Last Season (2019/20) Cull.

Cull Targets: -

The Group area cull target for the 2020/21 season was 271 Stags, 278 Hinds and 94 Calves to achieve the Group population target shown as group wide and for each sub-group.

The Cull Target was: -

Area	Stags	Hinds	Calves	Total
ELS Group	271	278	94	643
Western WG	146	123	55	324
Eastern WG	125	155	39	319

Achieved Cull 2020/21 Season

The Cull achieved was: -

Area	Stags	Hinds	Calves	Total
ELS Group	299	278	161	756
Western WG	210	163	98	471
Eastern WG	100	121	65	285

The difference to the target was: -

Area	Stags	Hinds	Calves	Total	
ELS Group	+39	+6	+69	+114	+15%
Western WG	+64	+40	+43	+147	+31%
Eastern WG	-25	-34	+26	-33	-11.5%

It is noted that the WWG cull is growing year on year with the 3year rolling average culls shown in the following table.

WWG 3yr Rolling Average Cull to	Stags	Hinds	Calves	Total	Annual Change %	Cumulative change %
2016/17	160	121	54	335		
2017/18	167	120	50	337		+0.6%
2018/19	175	139	59	373	+11%	+11.3%
2019/20	195	158	67	420	+13%	+25.4%
2020/21	194	178	74	426	+1.5%	+27.2%

The WWG nett recruitment is calculated from their figures as \approx 185 per year.

The 2021/22 season forward looking Population Models: -

Population Targets

The open range population is to remain at a sufficient density to deliver the collective objectives of the DMG members as well as public interest objectives.

The Western Working Group area Sporting Stag target is for 20 to 25 stags per annum from the open range estates.

No population target is given for the FLS population, simply they aim to keep deer impacts to a minimum in their commercial woodlands.

The Eastern Working Group area Sporting Stag target is for 160 stags per annum but is currently constrained to around 120 by apparent losses due to migration.

Until the migration issue is resolved the DMG Eastern Working Group population target is to maintain an open range Spring deer density sufficient to support the sustainable estate, deer stalking and secondary business enterprises, providing for the broad spectrum of benefits shown above and satisfying the public interest, albeit constrained by non-targeted losses due to emigration. This is currently calculated at 10.5 deer/km² +/- 5% with the cull targets set out below to achieve our density target.

Cull Targets

The total Group cull target for the 2021/22 season to achieve the population targets is: -

Area	Stags	Hinds	Calves	Total
ELS Group	270	278	100	648
Western WG	145	123	55	323
Eastern WG	125	155	45	325

Individual Estates/landholdings will target culls in their areas to address any specific local deer impacts or issues.

Current population model spreadsheets: -

The Whole Group Combined model spreadsheet (Page 7) is for the 2021/22 season with the whole East Loch Shiel DMG Area cull target set to maintain the deer density target.

The following Western (Page 8) and Eastern (Page 9) Working Group models calculate for the average migration between Working Group areas. Whilst migration is not targeted the model spreadsheets show an estimated cull apportionment allowing for average migration going forward.

The following forward-looking Population Model spreadsheets project forward to the 2026 Spring population.

ELS Population Models and Targets 2021/22

		<u>ELSDMG POPULATION MODEL</u>			<u>Whole group combined</u>		<u>2021/22</u>	
	Target Spring Density	9.68						
	Management area Km2	454						
	Counted January 2019	Stags	Hinds	Calves	Total	Density	%Calving	
	Current Winter Population	1347	2428	778	4553	10.0	32.0	
Year	Population Model	Stags	Hinds	Calves	Total Cull	Density		
Datum	Datum count	1347	2428	778		10.0		
		1347	2428	778				
	Post count cull	46	130	46	222			
	Post count mortality	27	49	47				
	Post count migration 1/3 of ave	0	0	0				
2019/20	2019 Spring population	1274	2249	685	4209	9.3		
	Year 2 Summer population	1617	2592	832				
	Year 2 Cull achieved	306	331	132	769			
	Year 2 Mortality	32	52	0				
	Migration	0	0	0				
2020/21	2020 Spring population	1278	2209	635	4122	9.1		
	Year 3 Summer population	1596	2527	900				
	Year 3 Cull Achieved	310	284	163	757			
	Year 3 Mortality	32	51	54				
	Migration	0	0	0				
2021/22	2021 Spring population	1254	2192	683	4129	9.1		
	Year 4 Summer population	1595	2534	814				
	Year 4 Cull	270	278	100	648			
	Year 4 Mortality	32	51	49				
	Migration	0	0	0				
2022/23	2022 Spring population	1293	2205	665	4164	9.2		
	Year 5 Summer population	1626	2538	816				
	Year 5 Cull	272	274	99	645			
	Year 5 Mortality	33	51	49				
	Migration	0	0	0				
2023/24	2023 Spring population	1322	2213	669	4203	9.3		
	Year 6 Summer population	1656	2547	820				
	Year 6 Cull	274	271	97	642			
	Year 6 Mortality	33	51	49				
	Migration	0	0	0				
2024/25	2024 Spring population	1349	2225	674	4248	9.4		
	Year 7 Summer population	1686	2562	827				
	Year 7 Cull	277	267	95	640			
	Year 7 Mortality	34	51	50				
	Migration	0	0	0				
2025/26	2025 Spring population	1375	2244	682	4300	9.5		
	Year 8 Summer population	1716	2585	837				
	Year 8 Cull	280	264	0	544			
	Year 8 Mortality	34	52	50				
	Migration	0	0	0				
	2026 Spring population	1383	2245	727	4355	9.59		
	Target Population/Density	1500	2150	724	4374	9.63		
					-19			

ELS Population Models and Targets 2021/22

ELSDMG POPULATION MODEL				Western Working Group		2021/22	
Target Spring Density	7.5	NOTES: -					
Management area Km2	124	Starts 2019 using January count data less cull and mortality post count.					
Counted January 2019	Stags	Hinds	Calves	Total	Density	%Calving	
Current Winter Population	290	470	211	971	7.8	45.0	
Year	Population Model	Stags	Hinds	Calves	Total Cull	Factor +/-	Density
Datum	Datum count	290	470	211			7.8
		290	470	211		1	CR
	Post count cull	43	72	25	140		
	Post count mortality	6	9	13		1	M
	Post count migration 1/3 of ave	29	25	8			
2019/20	2019 Spring population	270	414	181	865		7.0
	Year 2 Summer population	361	504	227		1	CR
	Year 2 Cull achieved	196	160	64	420		
	Year 2 Mortality	7	10			1	M
	Migration	112	77	22			
2020/21	2020 Spring population	270	411	185	866	0.45	7.0
	Year 3 Summer population	362	504	227		1	CR
	Year 3 Cull Achieved	210	163	98	471		
	Year 3 Mortality	7	10	14		1	M
	Migration	125	80	70			
2021/22	2021 Spring population	270	411	185	866		7.0
	Year 4 Summer population	362	503	226		1	CR
	Year 4 Cull	145	123	55	323		
	Year 4 Mortality	7	10	14		1	M
	Migration	60	50	15			
2022/23	2022 Spring population	270	420	172	863		7.0
	Year 5 Summer population	356	506	228		1	CR
	Year 5 Cull	141	119	54	314		
	Year 5 Mortality	7	10	14		1	M
	Migration	60	50	15			
2023/24	2023 Spring population	269	427	175	871		7.0
	Year 6 Summer population	356	515	232		1	CR
	Year 6 Cull	136	116	52	304		
	Year 6 Mortality	7	10	14		1	M
	Migration	60	50	15			
2024/25	2024 Spring population	273	439	181	892		7.2
	Year 7 Summer population	363	529	238		1	CR
	Year 7 Cull	132	112	51	295		
	Year 7 Mortality	7	11	14		1	M
	Migration	60	50	15			
2025/26	2025 Spring population	284	456	188	928		7.5
	Year 8 Summer population	378	550	248		1	CR
	Year 8 Cull	128	109	0	237		
	Year 8 Mortality	8	11	15		1	M
	Migration	60	50	15			
	2026 Spring population	284	456	188	928	7.48	
	Target Population/Density	300	450	202	952	7.68	
				-24			

ELS Population Models and Targets 2021/22

ELSDMG POPULATION MODEL		Eastern Working Group				2021/22	
Target Spring Density	10.5	NOTES:-					
Management area Km2	330	Starts 2019 using January count data less cull and mortality post count.					
		Assumes no change to 2019 fencing status, or FLS cull policy					
Counted January 2019	Stags	Hinds	Calves	Total	Density	%Calving	
Current Winter Population	1057	1958	567	3582	10.9	29.0	
Year	Population Model	Stags	Hinds	Calves	Total Cull	Factor +/-	Density
Datum	Datum count	1057	1958	567			10.9
		1057	1958	567		1	CR
	Post count cull	3	58	21	82		
	Post count mortality	21	39	34		1	M
	Post count migration 1/3 of ave	-29	-25	-8			
2019/20	2019 Spring population	1004	1836	504	3344		10.1
	Year 2 Summer population	1256	2088	605		1	CR
	Year 2 Cull achieved	110	171	68	349		
	Year 2 Mortality	25	42		Delete mort	1	M
	Migration	-112	-77	-22			
2020/21	2020 Spring population	1009	1798	450	3256	0.25	9.9
	Year 3 Summer population	1233	2023	674		1.15	CR
	Year 3 Cull Achieved	100	121	65	286		
	Year 3 Mortality	25	40	40		1	M
	Migration	-125	-80	-70			
2021/22	2021 Spring population	984	1781	498	3263		9.9
	Year 4 Summer population	1233	2030	588		1	CR
	Year 4 Cull	125	155	45	325		
	Year 4 Mortality	25	41	35		1	M
	Migration	-60	-50	-15			
2022/23	2022 Spring population	1023	1785	493	3301		10.0
	Year 5 Summer population	1270	2031	588		1	CR
	Year 5 Cull	131	155	45	331		
	Year 5 Mortality	25	41	35		1	M
	Migration	-60	-50	-15			
2023/24	2023 Spring population	1053	1786	493	3332		10.1
	Year 6 Summer population	1300	2032	588		1	CR
	Year 6 Cull	138	155	45	338		
	Year 6 Mortality	26	41	35		1	M
	Migration	-60	-50	-15			
2024/25	2024 Spring population	1076	1787	493	3356		10.2
	Year 7 Summer population	1322	2033	589		1	CR
	Year 7 Cull	145	155	45	345		
	Year 7 Mortality	26	41	35		1	M
	Migration	-60	-50	-15			
2025/26	2025 Spring population	1091	1788	494	3372		10.2
	Year 8 Summer population	1338	2034	589		1	CR
	Year 8 Cull	152	155	0	307		
	Year 8 Mortality	27	41	35		1	M
	Migration	-60	-50	-15			
	2026 Spring population	1099	1789	539	3427		10.4
	Target Population/Density	1200	1700	522	3422		10.4