

Scaling Skyrim – a case study on the population of Solstheim

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Abstract

The later instalments of the *Elder Scrolls* series feature worlds of a significantly smaller scale than the previous games and of that suggested in the lore. This paper aims to discuss the population dynamics of the island of Solstheim at the 'true' scale. This will be done through the use of a relatively simple model based upon the extrapolation of population changes of the island that occur in the 207 years between the settings of the *Bloodmoon* and *Dragonborn* expansions. It was determined that if the observed trends were to continue, Dunmer would come to dominate Solstheim, with most other races dwindling out over time.

Introduction

The *Elder Scrolls* is a series of action role-playing open world fantasy video games. Solstheim is an island to the north of Morrowind, a province of Tamriel, which is a continent of the planet of Nirn in the fictional universe of the *Elder Scrolls* series. Tamriel is made up of 9 distinct provinces, and is home to 10 major races. Solstheim features in two installments of the series: '*The Elder Scrolls III: Morrowind*' and '*The Elder Scrolls V: Skyrim*', both as downloadable content (*Bloodmoon* and *Dragonborn* respectively). As Solstheim has been visited twice in the series, with a separation in time of 207 years, it offers an opportunity to study the change in demographic of the populations of Tamriel [1, 2].

The island features extremely small populations in both instalments, just 114 and 88 in *Bloodmoon* and *Dragonborn* respectively [3]. While these are very small populations, it is assumed that the number of individuals seen in game (as well as the game world itself) is not representative of the 'true' population in terms of the lore. '*The Elder Scrolls II: Daggerfall*' features a huge in-game world (consisting of the provinces of High rock and Hammerfell) that rivals Great Britain in size [4]. However, in-universe maps depict Morrowind to be a similar size to High Rock and Hammerfell together. Further to this, the in-game book 'Pocket Guide to the Empire (PGE), 1st Edition' states that the distance between the Morrowind landmarks of Red Mountain and

Mournhold is 250 miles [5]. Using the in-game map size in *Daggerfall*, coupled with this scale provided by the PGE and the map of Tamriel, the size of the province of Skyrim has been shown to be 121,000 mi², roughly the same size as Poland, and 8500 times larger than the traversable map in-game. [6, 7].

Presuming the population density remains the same upon scaling up the land, and that Solstheim is scaled down in the same way (having featured most recently in '*The Elder Scrolls V: Skyrim*'), table 1 displays the estimated number of individuals living in Solstheim [3].

Population growth can be modelled using the equation:

$$N = N_0 e^{rt}, \quad (1)$$

where N is the new number of individuals, N_0 is the initial number of individuals, r is the growth rate of the population in years s⁻¹ and t is the time in years. Setting initial number of individuals to 1:

$$\begin{aligned} N(t) &= e^{rt} \\ \ln(N(t)) &= rt \\ r &= \frac{d \ln(N)}{dt}. \end{aligned} \quad (2)$$

Race	Relative Number of Individuals		Estimated Number of Individuals	
	<i>Bloodmoon</i>	<i>Dragonborn</i>	<i>Bloodmoon</i>	<i>Dragonborn</i>
Altmer	1	1	8500	8500
Argonian	6	1	51000	8500
Bosmer	2	1	17000	8500
Breton	4	2	34000	17000
Dunmer	14	40	119000	340000
Imperial	26	1	221000	8500
Khajiit	2	0	17000	0
Nord	53	39	450500	331500
Orc	2	1	17000	8500
Redguard	4	2	34000	17000
Total	114	88	969000	748000

Table 1 – Relative and estimated number of individuals on Solstheim by race.

Using equation (2), a specific growth rate can be assigned to each race, this can then be substituted into equation (1) to estimate the decline in the number of each race over time (figure 1):

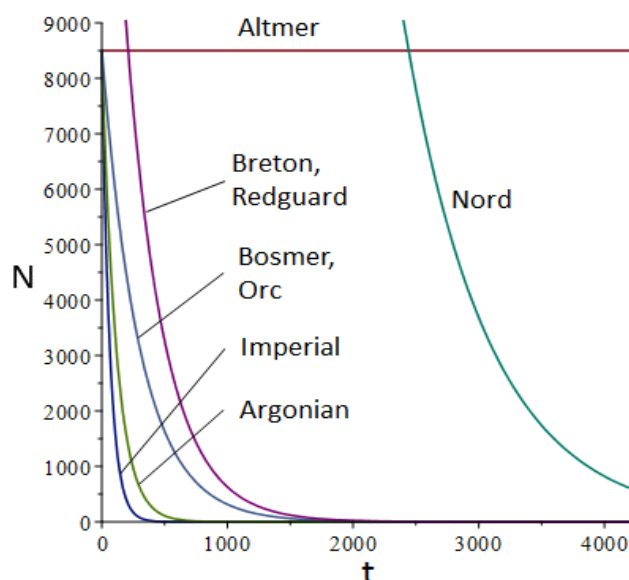


Figure 1 - Estimated change in number of each race (N) over time (t) in years

Khajiit and Dunmer are not on this graph, as Khajiit are already extinct on the island of Solstheim by the

time of *Dragonborn*, and Dunmer are actually growing in number. While the minimum viable population is roughly 4000 [8], all of the races are capable of interbreeding. However, since the number of Dunmer increases (doubling in number roughly every 140 years), eventually the other populations would be swallowed by the Dunmer after only a few hundred years, especially as they have long lifespans compared to these other races (except for the Bosmer). It appears that, over time, the demographic would shift until all individuals were Dunmer. The Altmer population remains the same size, though will soon be dwarfed by that of the Dunmer, and they too will be engulfed. The Nords will be somewhat immune to this, as they almost all reside in the isolated Skaal village to the Northeast. Their survival will presumably become difficult when their population drops to 4000 individuals, in the 3182nd year of the 4th era.

However, there are some limitations of this model. It treats all changes in population as natural processes, and so doesn't account for other processes. For example, the reason for the vast increase in Dunmer is the eruption of the Red Mountain, which destroyed their homeland and led to many seeking refuge in neighbouring Solstheim [9]. This sharp increase would be averaged out over the whole timeframe by the model. A similar problem also occurs concerning the Imperial population, which should see a sharp decline after the closing of Raven Rock Mine caused mass emigration due to lack of employment. It is also very unlikely that the Altmer population will stay as constant as the model suggests. This model also suffers as it only makes use of two data points for each race.

Conclusion

Through the scaling up of the population of Solstheim to its 'true' size, and the application of a simple population change model, it was determined that the Dunmer will become the modal race by a significant margin. The population of the Altmer is predicted to remain constant, and the Nords are expected to significantly outlast the rest of the other races, with the Imperials and Argonians being predicted to only last a few hundred years more. The population changes of Solstheim between *Bloodmoon* and *Dragonborn* predict a very significant shift in the demographics of the island over time.

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