

**ADDENDUM TO  
TIMBER SUPPLY ANALYSIS  
FOR TREE FARM LICENSE 8**

**Pope & Talbot Ltd.  
Boundary Timber Division  
Management Plan No. 10**



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## 1. INTRODUCTION

This addendum has been prepared to provide additional information regarding the Timber Supply Analysis report for TFL 8, in response to the questions and comments raised by the Ministry of Forests' (MoF) timber supply analyst.

### 1.1 Old seral retention

#### 1.1.1 Base case analyses

In *Timber Supply Analysis Information Package for Tree Farm License 8 (IP)*, Table 10.8 was provided to illustrate one possible trajectory of old seral retention levels from the initial target levels (that allow for 2/3 draw down in low biodiversity emphasis option (BEO) areas) to the final objective of full old seral retention levels by year 240 of the planning horizon. The table was not intended to reflect how old seral retention was actually modelled in the analysis, as was discussed in the text of the Information Package. Nonetheless, Table 10.8 has proven to be misleading, so Table 1.1 is provided for clarification. The first four columns are unchanged from Table 10.8 of the IP. Under the heading of "Old Seral Retention", the column on the left indicates the retention targets that were actually applied in the base case analysis throughout the full planning horizon and the column on the right indicates the old seral retention levels that are desired by year 240 of the simulation.

**Table 1.1 Seral Retention Requirements**

BEO	NDT	BEC Zone	Mature+Old Retention %	Old Seral Retention	
				Modelled target % (0 - 250 years)	Full target % (year 240)
Low	2	ICH	> 15	> 3	> 9
		ESSF	> 14	> 4.7	> 14
	4	ICH	> 14	> 4.7	> 14
		MS	> 14	> 4.7	> 14
		IDF	> 17	> 4.3	> 13
Intermediate	3	ICH	> 23	> 14	> 14
		MS	> 26	> 14	> 14
	4	IDF	> 34	> 13	> 13
High	3	ICH	> 34	> 21	> 21
		MS	> 34	> 21	> 21
	4	IDF	> 51	> 19	> 19

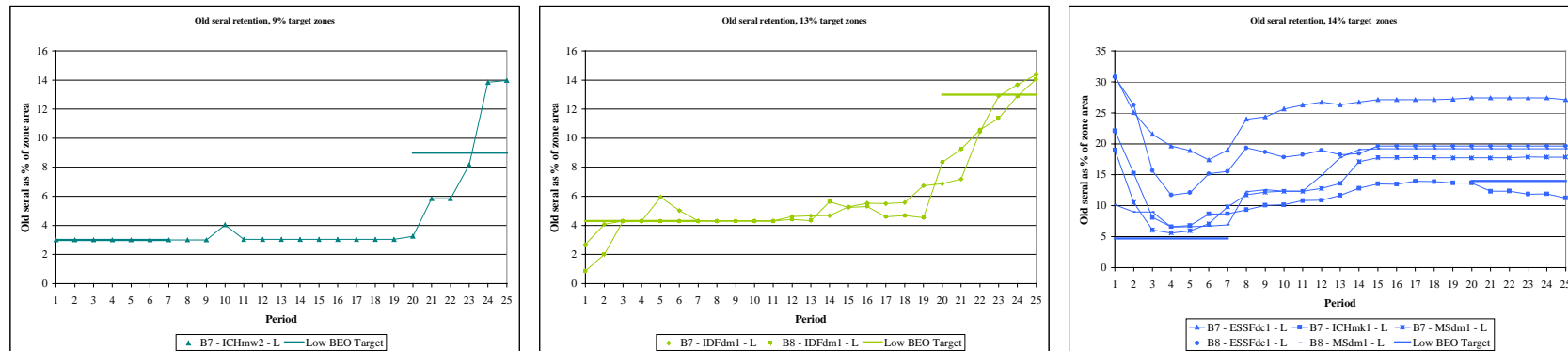
The targets applied in the model are intended to take advantage of the harvest scheduling flexibility permitted by the reduction of old seral targets within areas of low biodiversity emphasis. Compliance with full old seral requirements in the long term generally occurs as a result of natural aging processes within the non-contributing portion of the productive forested landbase. However, it was found during the base case analysis for TFL 8 that compliance with full old seral targets was met within the required time frame in all seral zones except one (the ICHmk1 portion of landscape unit B7). In fact, the desired full seral target was met within this zone by decade 17 and was maintained in decades 18 to 20, but fell below the desired level for

the remainder of the planning horizon. Thus, in order to force compliance in this zone, a supplementary analysis was conducted in which full old seral requirements were enforced by the model *for the entire planning horizon*. The results of this run were presented in Table 6.2 of *Timber Supply Analysis for Tree Farm License 8 (AR)*. However, nothing was presented in the AR for the seral retention achievements of the base case analysis itself. Thus, Table 1.2 has been prepared to provide this information. The old seral targets shown in column 6 of the table are the full old seral requirements as dictated by Objective #2 of the Kootenay Boundary Higher Level Plan Order. The shaded cells within Table 1.2 identify zones of non-compliance with the targets in the long term era of the planning horizon. Figure 1.1 is provided to compliment the information in the table, and to clearly show that all seral zones in low BEO areas are in compliance by year 240 except the ICHmk1 portion of landscape unit B7.

**Table 1.2 Old seral retention, base case**

Landscape unit	BEC variant	NDT	BEO	Base area ha	Old (% > age)	Achieved % (Old)					
						Year 0	Year 50	Year 100	Year 150	Year 200	Year 250
B1	ICH mk 1	3	I	2	14 > 140	89	22	22	22	22	22
	IDF dm 1	4	H	2,870	19 > 250	4	19	37	46	50	50
	IDF dm 1	4	I	1,630	13 > 250	0	13	19	26	34	34
	MS dm 1	3	H	165	21 > 140	36	32	30	34	34	34
	MS dm 1	3	I	1,754	14 > 140	42	22	24	26	26	26
B7	ESSFdc 1	3	L	6,724	14 > 140	47	19	26	27	27	27
	ICH mk 1	3	L	5,450	14 > 140	30	7	10	14	14	11
	ICH mw 2	2	L	307	9 > 250	4	4	4	3	3	14
	IDF dm 1	4	L	6,598	13 > 250	3	6	4	5	7	14
	MS dm 1	3	L	16,021	14 > 140	28	6	12	18	18	18
B8	ESSFdc 1	3	L	3,602	14 > 140	44	12	18	20	20	20
	IDF dm 1	4	L	9,789	13 > 250	1	5	4	5	8	14
	MS dm 1	3	L	18,264	14 > 140	15	7	12	19	19	19

Note: Shaded cells indicate zones of non-compliance in the long term



**Figure 1.1 Old seral retention, base case**

### *1.1.2 Sensitivity analyses*

The AR for TFL 8 did not address old seral retention achievements in any of the sensitivity analyses. At the request of the MoF timber supply analysis branch, this section presents detailed seral retention statistics for each of the sensitivity analyses documented in the AR.

Figure 1.2 through Figure 1.33 illustrates the seral retention dynamics for each sensitivity analysis, determined at the base case harvest flow. Of all the sensitivity analyses shown, only the following resulted in a significant degradation of the base case old seral retention dynamics: timber harvesting landbase increased by 10% (Figure 1.2); natural stand yields increased by 10% (Figure 1.4); managed stand yields increased by 10% (Figure 1.6); managed stand yields decreased by 10% (Figure 1.7); inventory site index applied to managed stand yield tables (MSYTs) in the ESSF biogeoclimatic zone (Figure 1.14); and mature-plus-old seral targets decreased by 5% (Figure 1.29). All other cases resulted in equivalent or better old seral retention than the base case, so no further analyses were warranted.

For the six cases demonstrating inadequate seral retention, a supplementary analysis was conducted using full old growth requirements for the full planning horizon. The results of these six extra runs, shown in Figure 1.34 to Figure 1.39, demonstrate that in each case it was possible to achieve the full old growth requirement throughout the planning horizon without adjusting the harvest flow. Even though the simulations were conducted with full old seral requirements enforced over the entire planning horizon, the figures still show the 2/3 draw-down target level in the short term, and the full target level in the long-term since these levels represent the actual retention requirements in those eras.



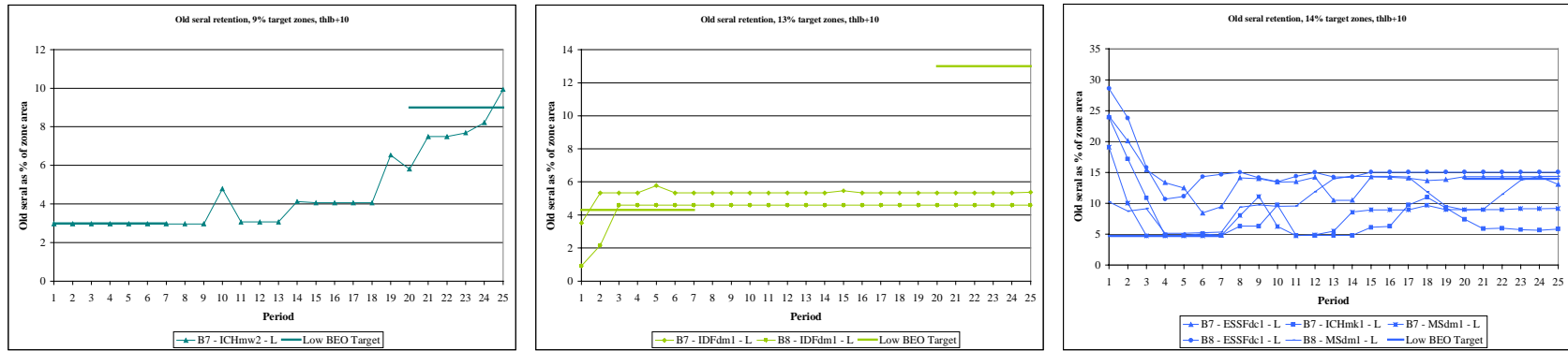


Figure 1.2 Old seral retention, thlb + 10%

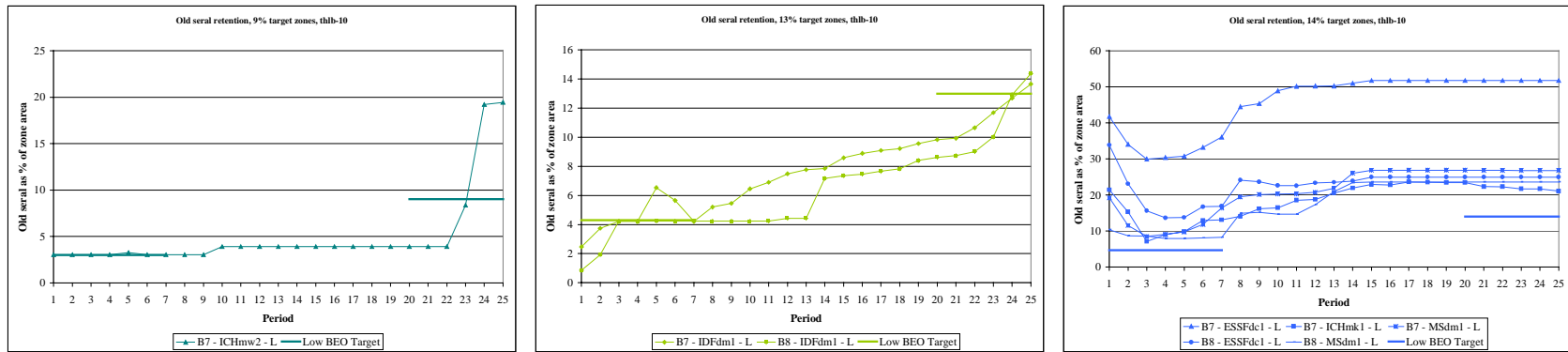


Figure 1.3 Old seral retention, thlb - 10%

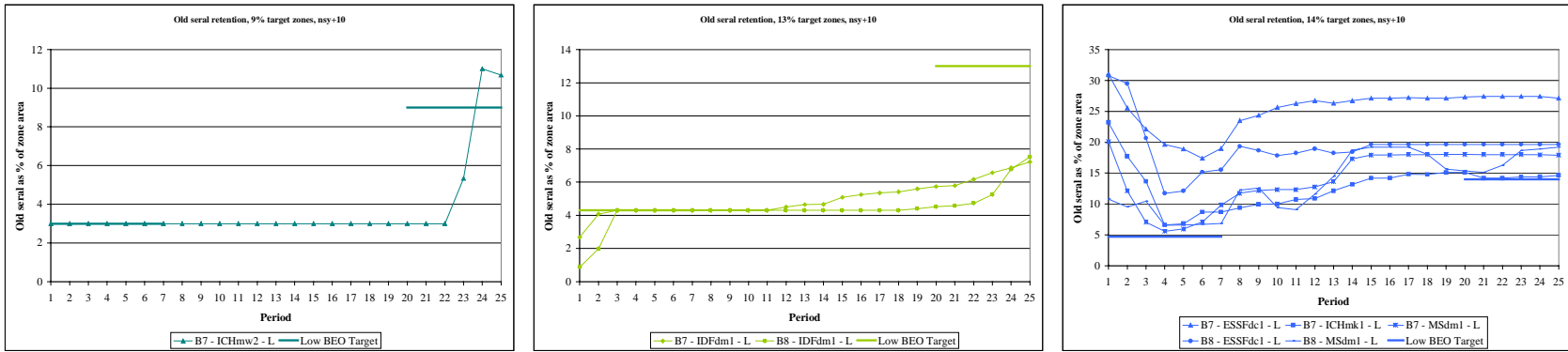


Figure 1.4 Old seral retention, natural stand yields + 10%

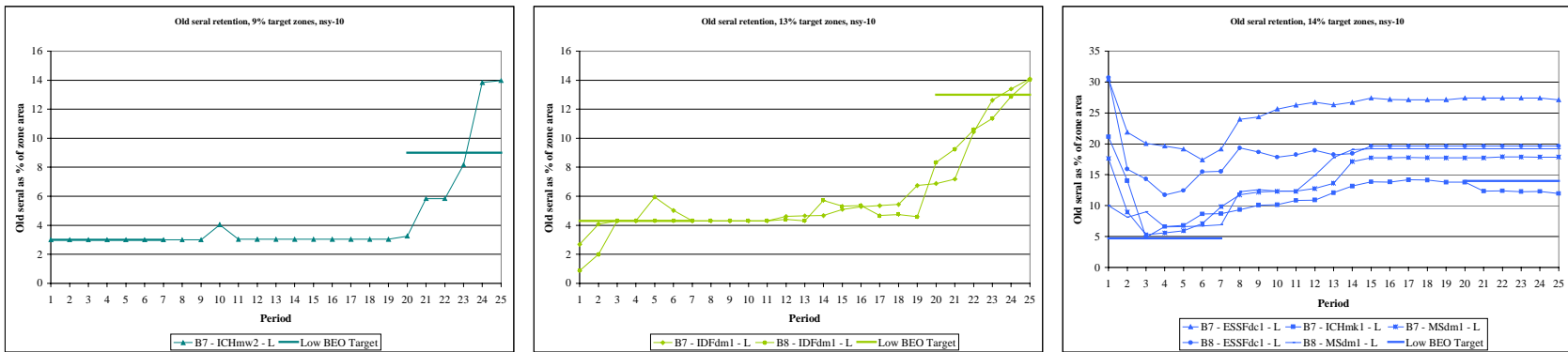


Figure 1.5 Old seral retention, natural stand yields - 10%



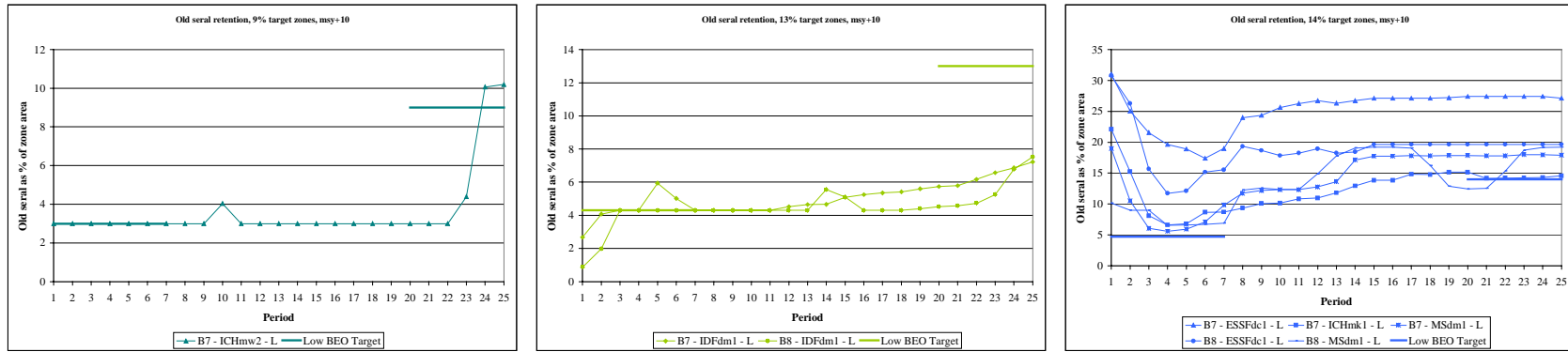


Figure 1.6 Old seral retention, managed stand yields + 10%

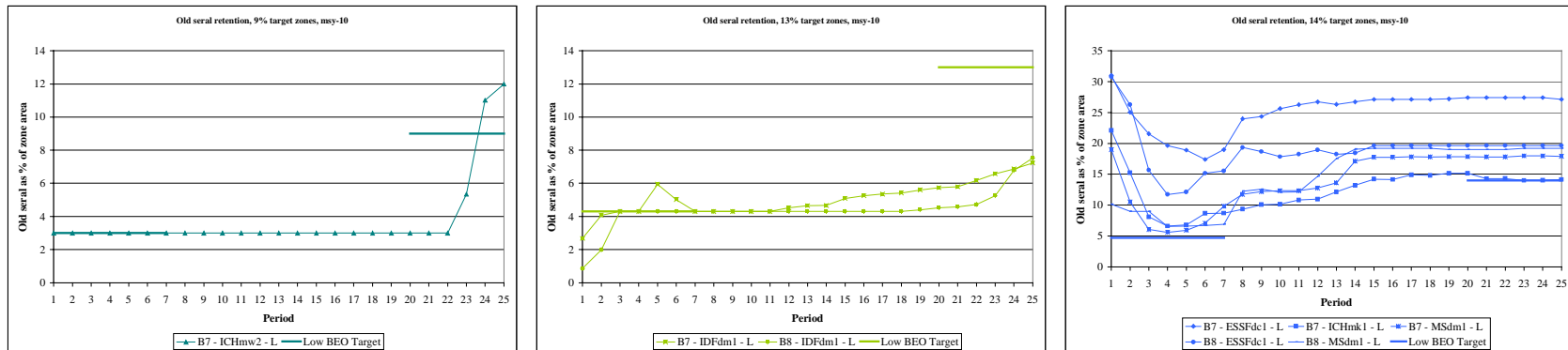


Figure 1.7 Old seral retention, managed stand yields - 10%

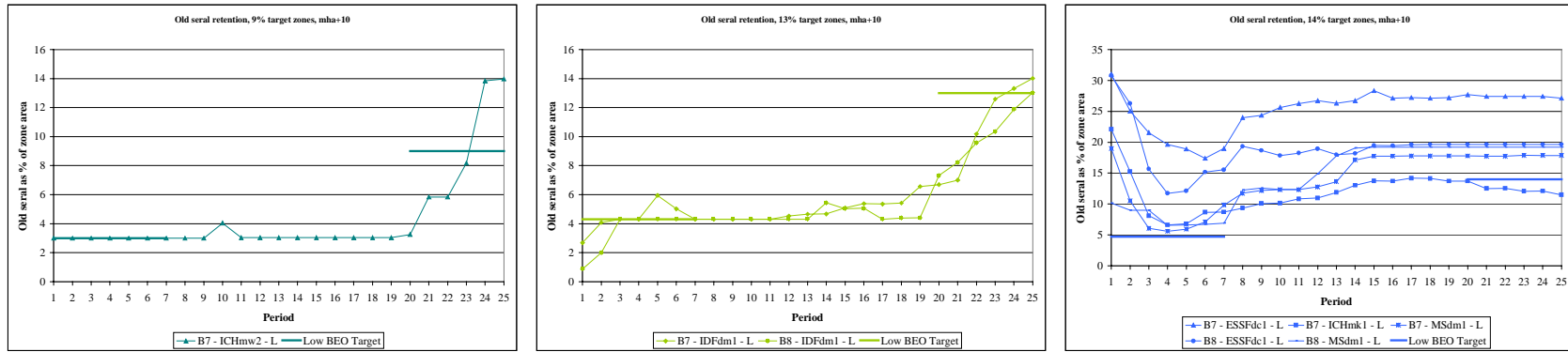


Figure 1.8 Old seral retention, minimum harvest age + 10 years

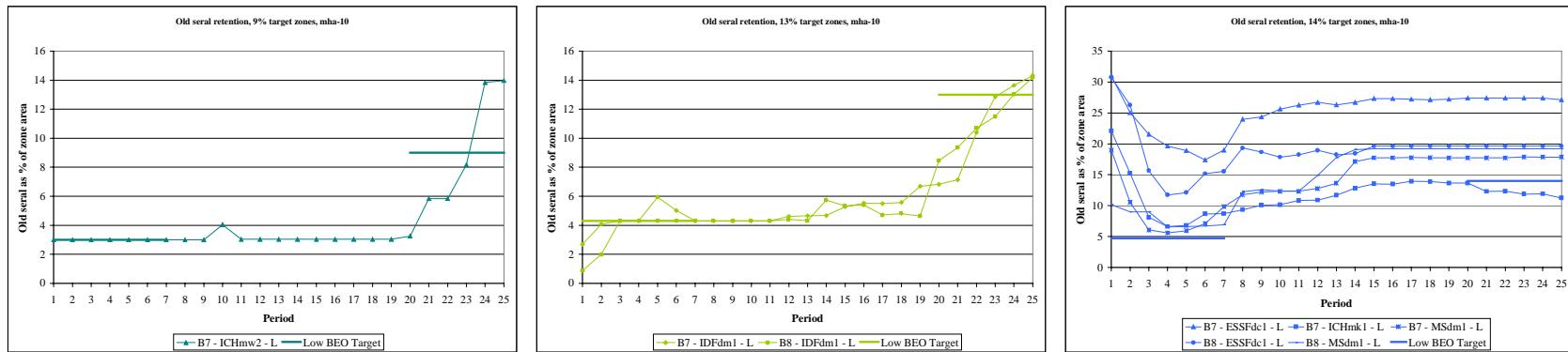


Figure 1.9 Old seral retention, minimum harvest age - 10 years

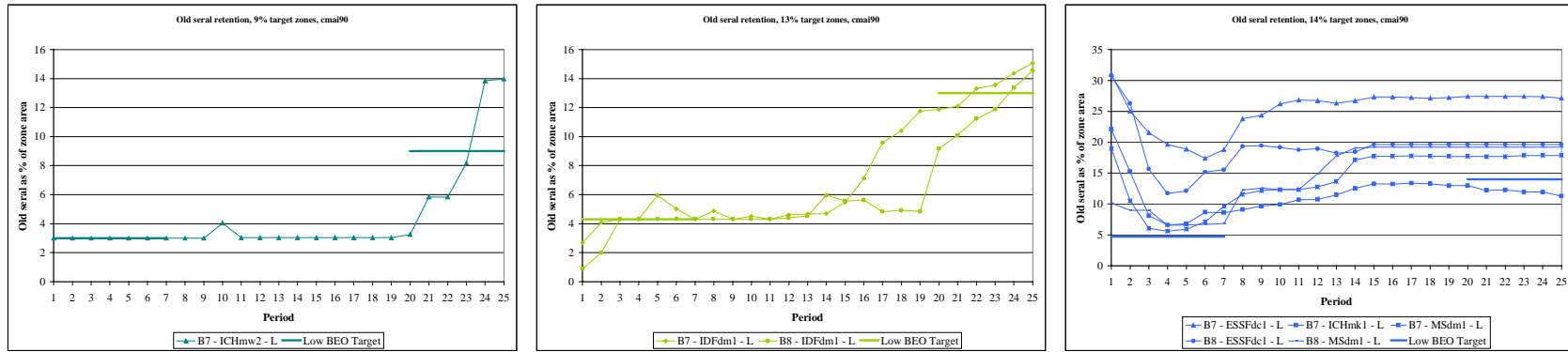


Figure 1.10 Old seral retention, 90% of culmination mai

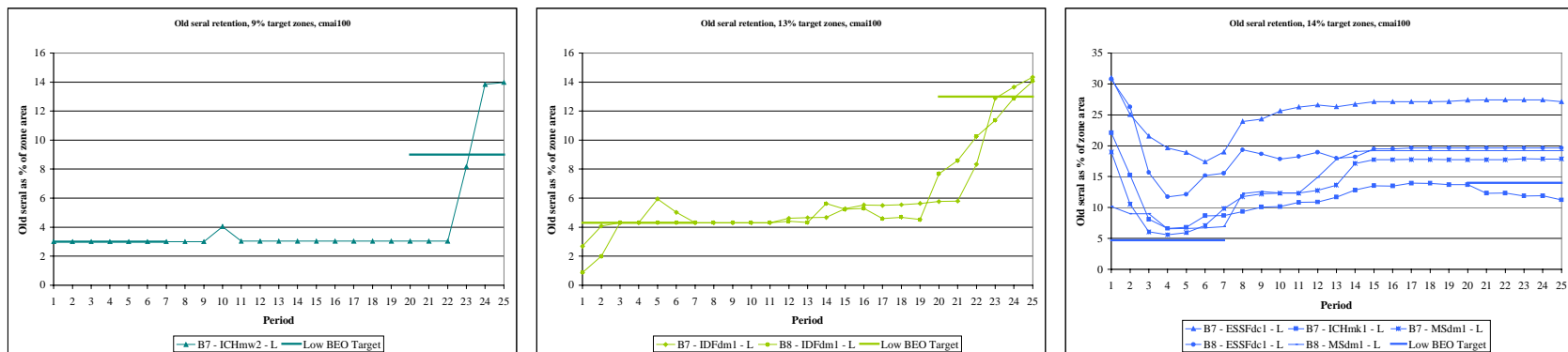


Figure 1.11 Old seral retention, 100% of culmination mai

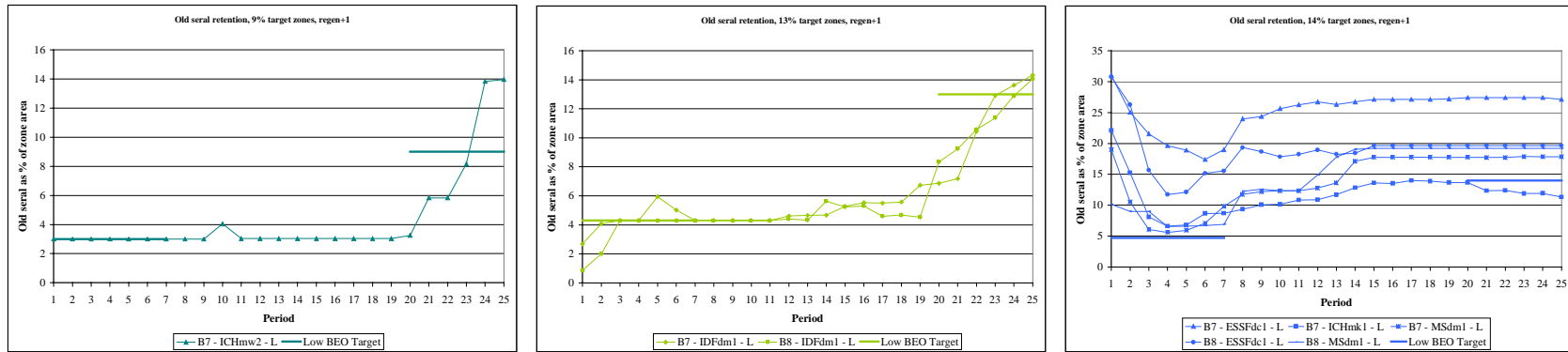


Figure 1.12 Old seral retention, regen delay + 1 year

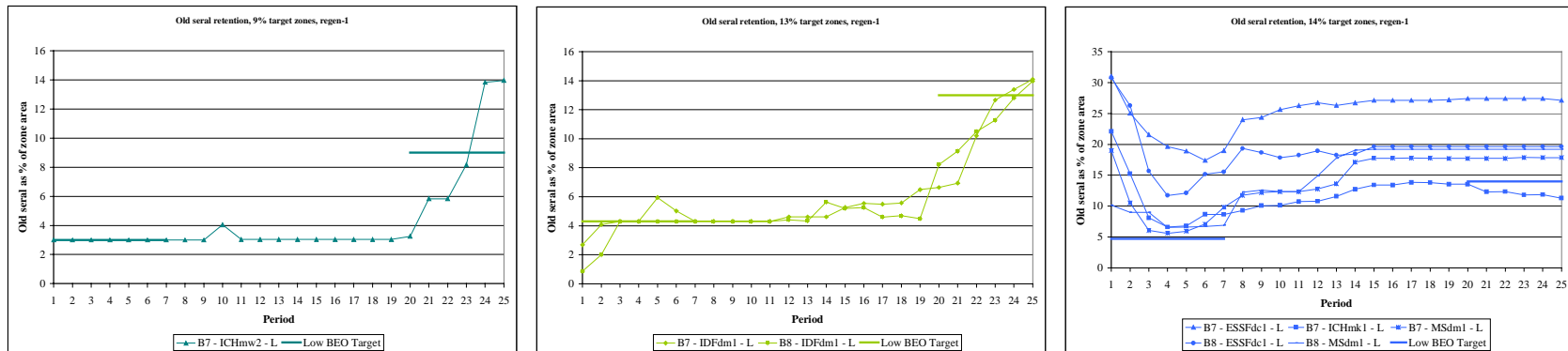


Figure 1.13 Old seral retention, regen delay - 1 year

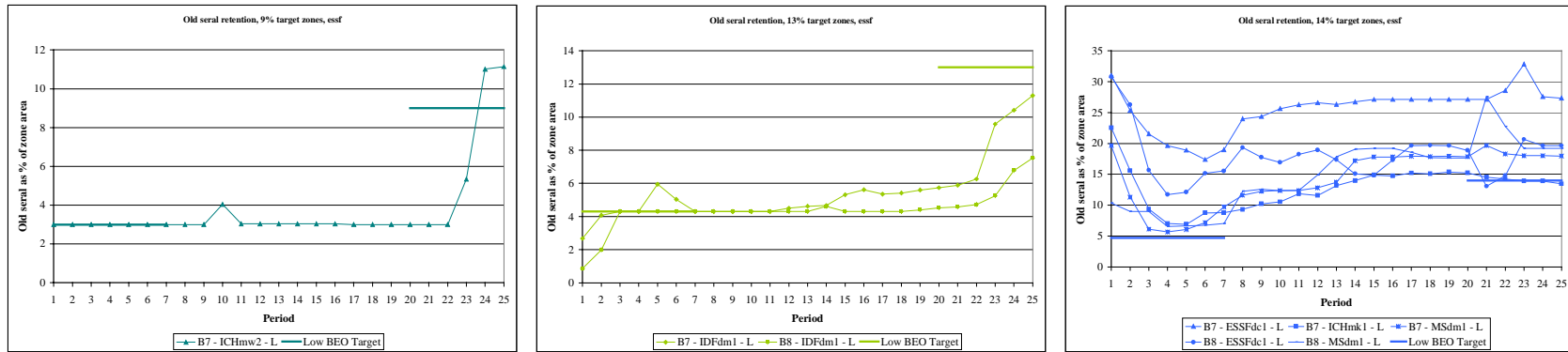


Figure 1.14 Old seral retention, inventory site index for MSYTs in ESSF

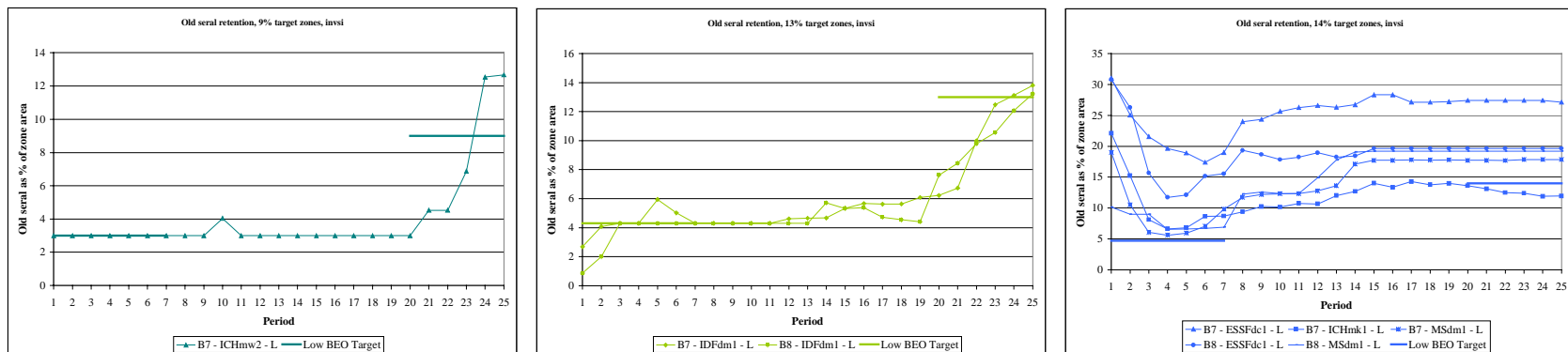


Figure 1.15 Old seral retention, inventory site index for all MSYTs

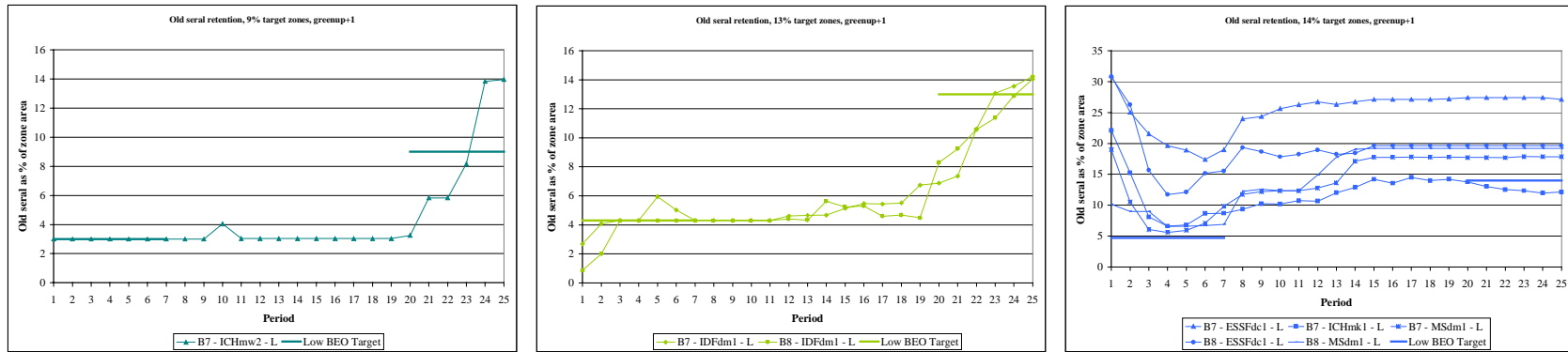


Figure 1.16 Old seral retention, green-up height + 1 metre

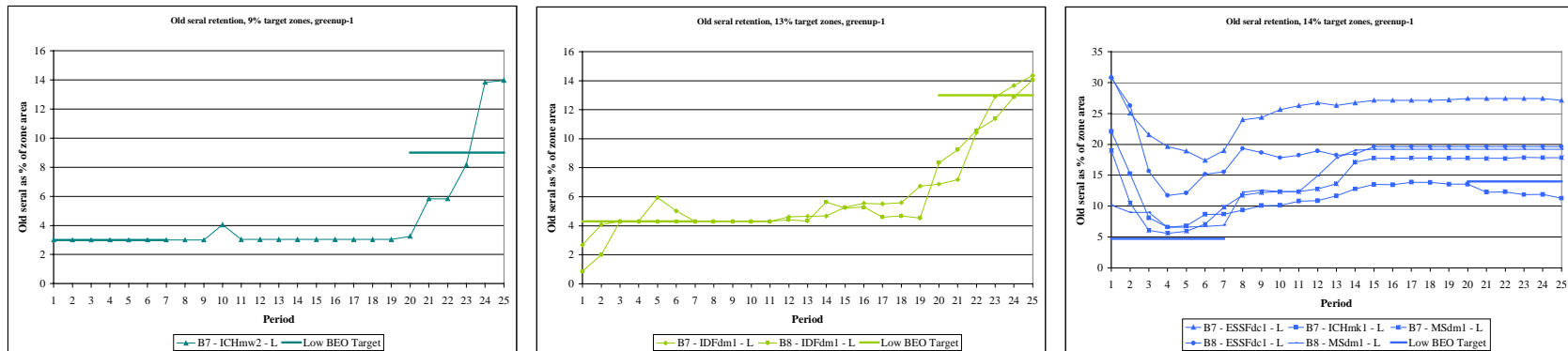


Figure 1.17 Old seral retention, green-up height - 1 metre



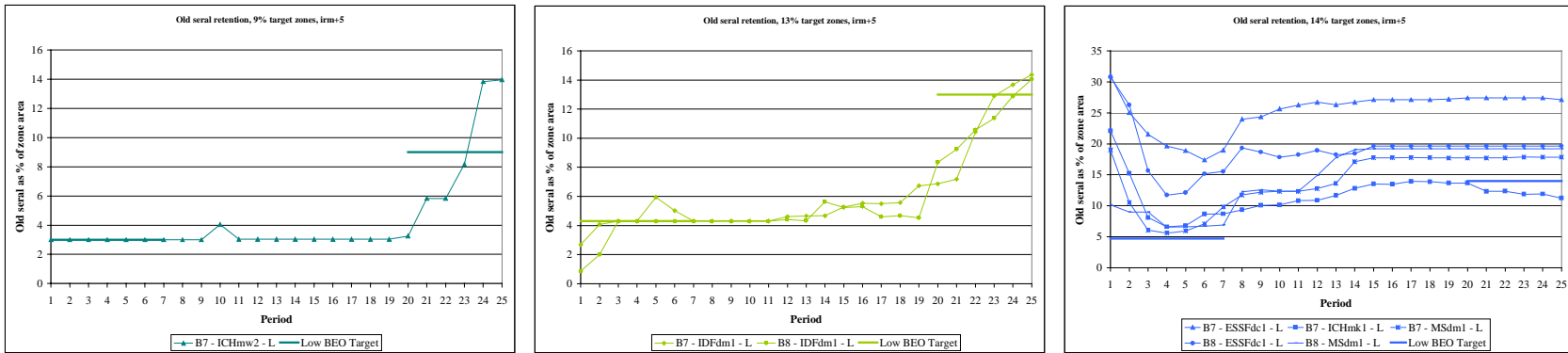


Figure 1.18 Old seral retention, IRM disturbance limit + 5%

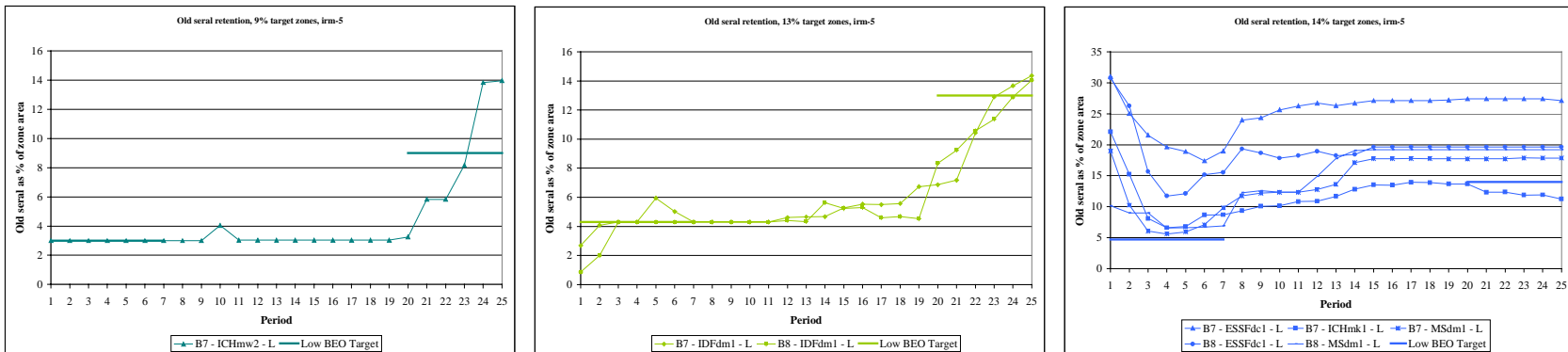


Figure 1.19 Old seral retention, IRM disturbance limit - 5%

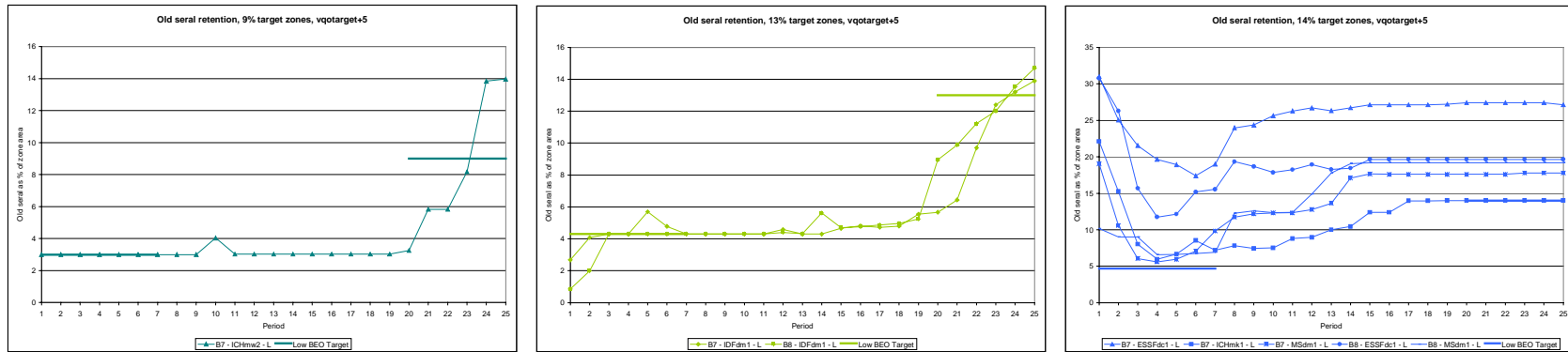


Figure 1.20 Old seral retention, VQC disturbance limit + 5%

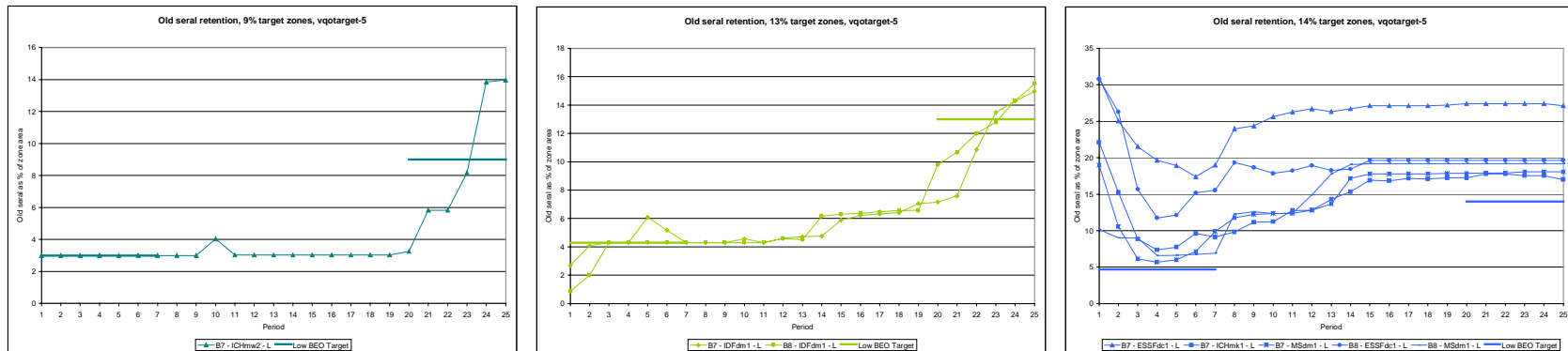


Figure 1.21 Old seral retention, VQC disturbance limit - 5%

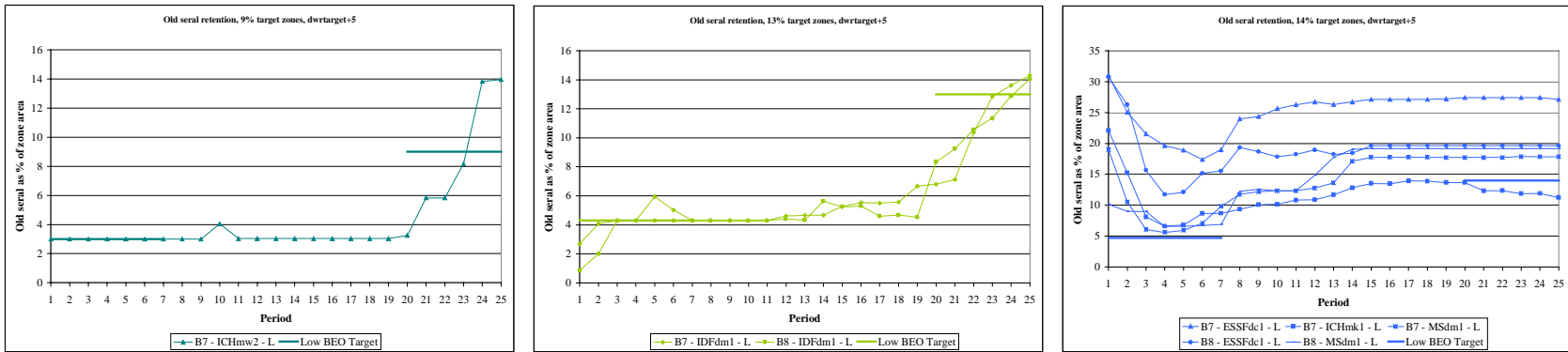


Figure 1.22 Old seral retention, DWR disturbance limit + 5%

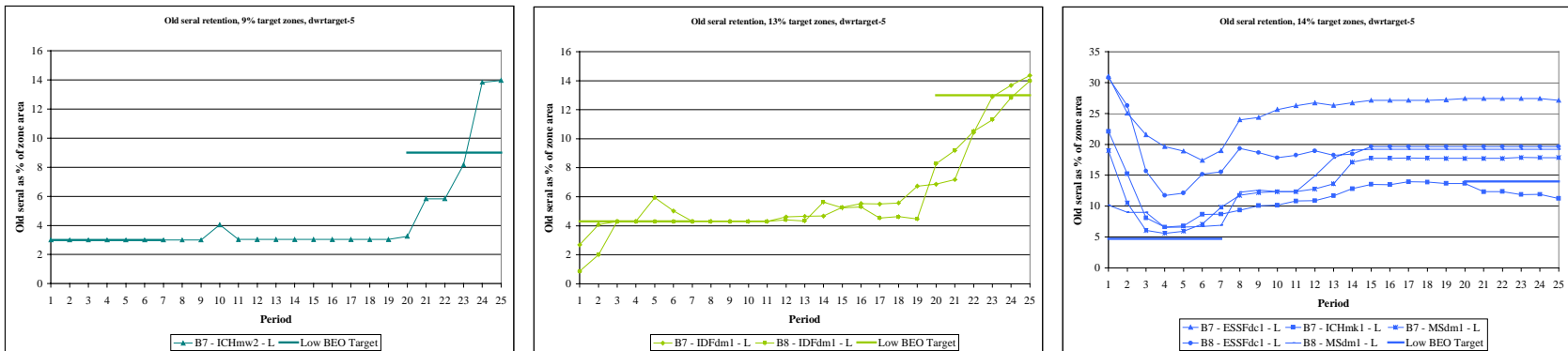


Figure 1.23 Old seral retention, DWR disturbance limit - 5%

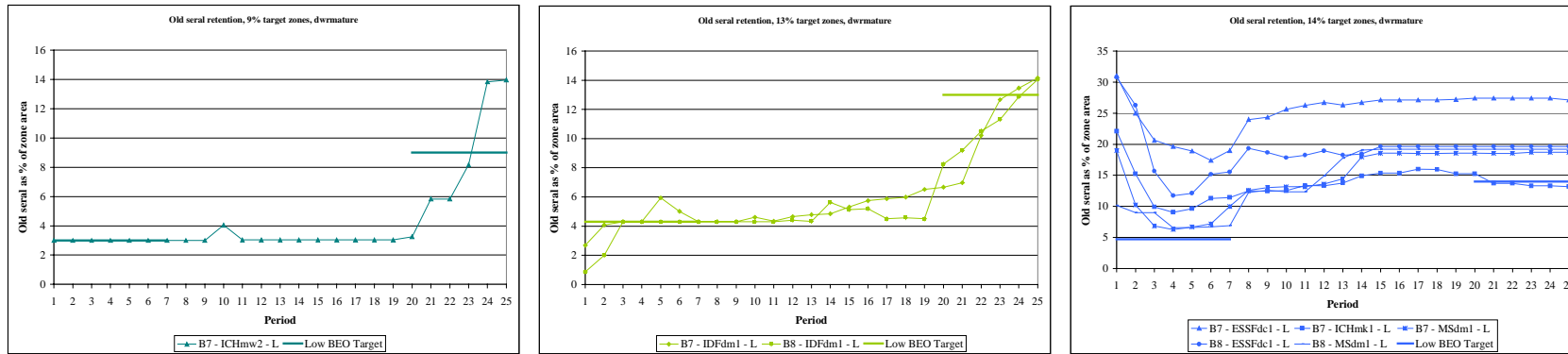


Figure 1.24 Old seral retention, mature cover in DWR

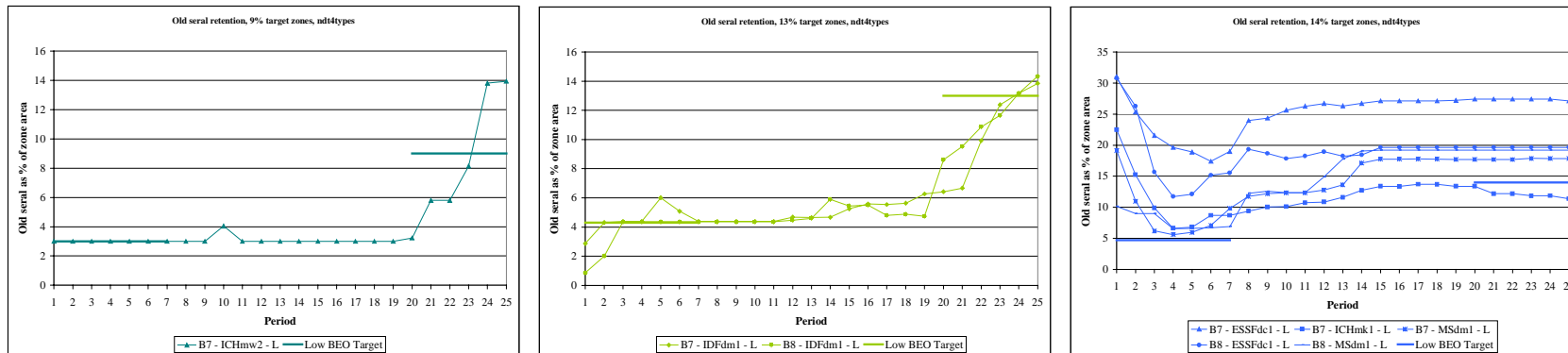


Figure 1.25 Old seral retention, NDT4 open forest management

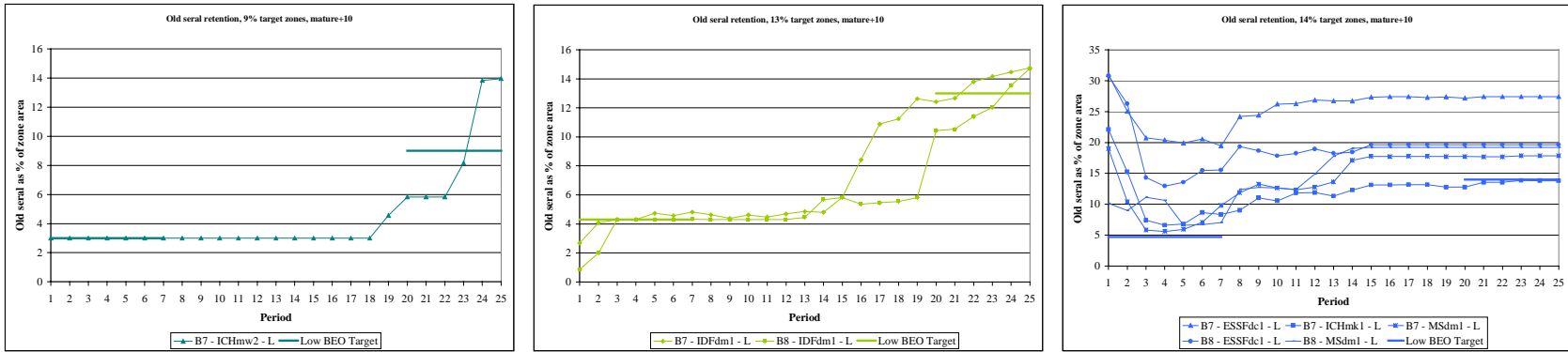


Figure 1.26 Old seral retention, mature seral age + 10 years

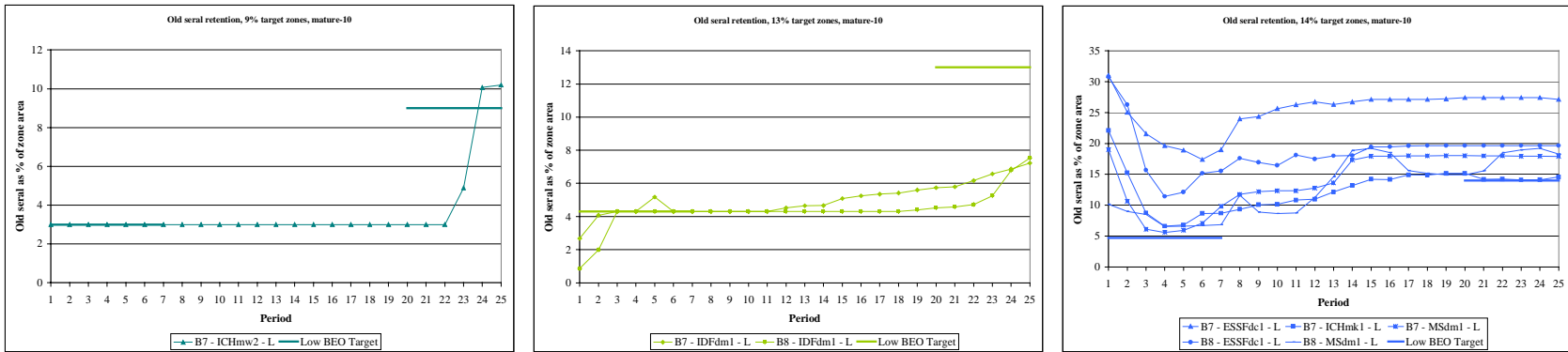


Figure 1.27 Old seral retention, mature seral age - 10 years

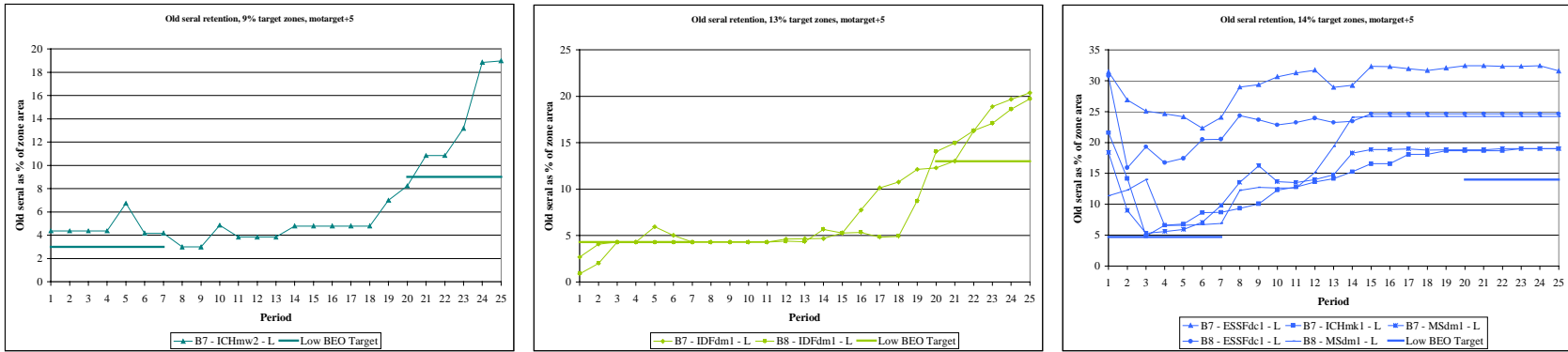


Figure 1.28 Old seral retention, mature plus old target + 5 %

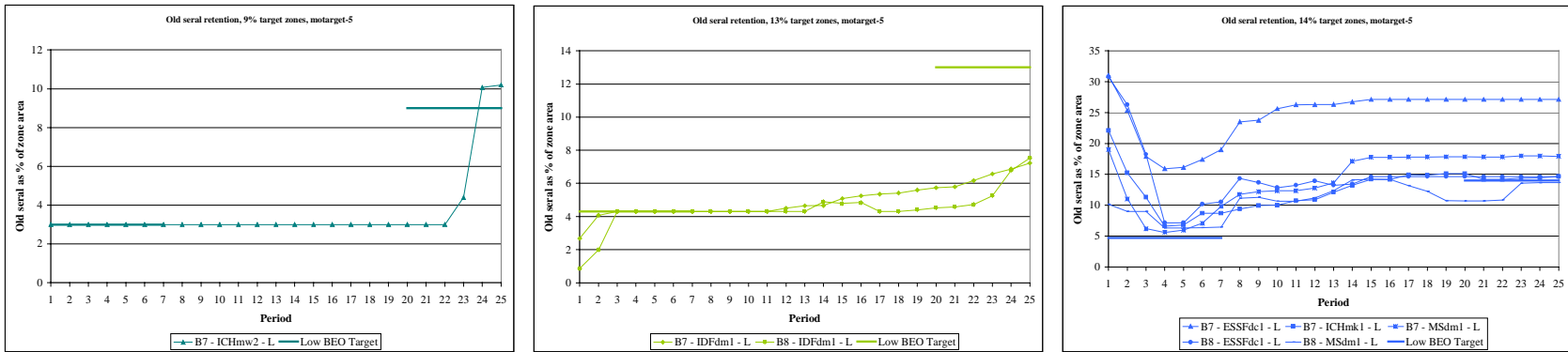


Figure 1.29 Old seral retention, mature plus old target - 5 %

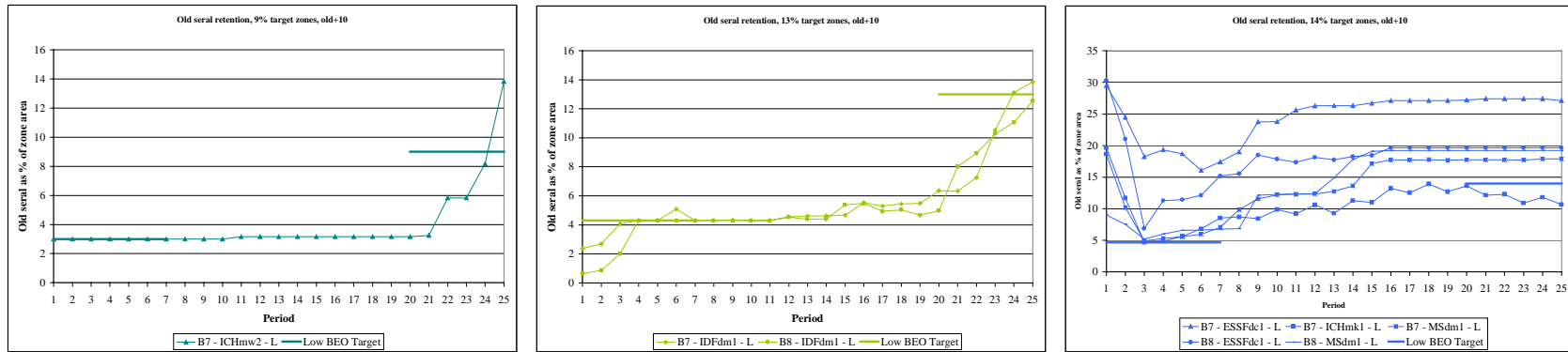


Figure 1.30 Old seral retention, old seral age + 10 years

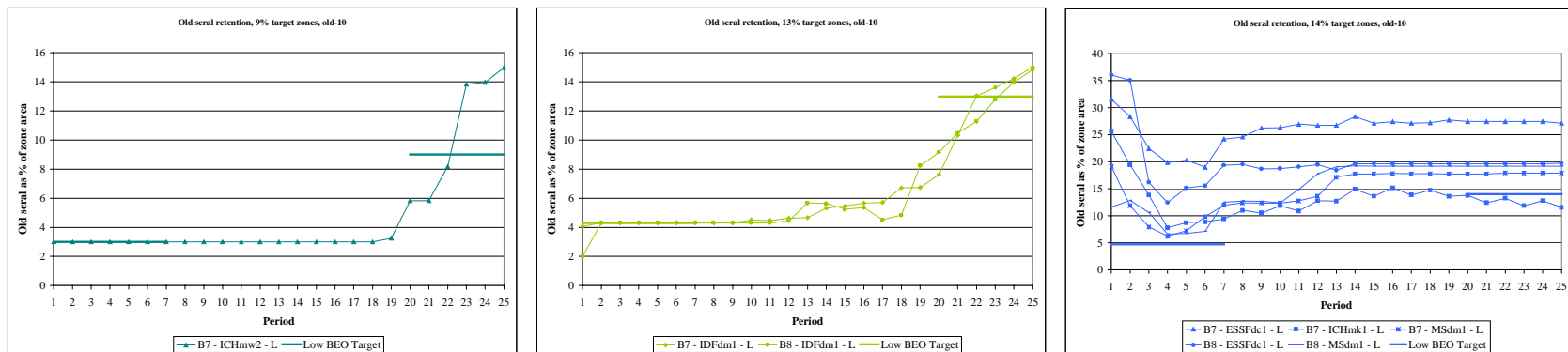


Figure 1.31 Old seral retention, old seral age - 10 years

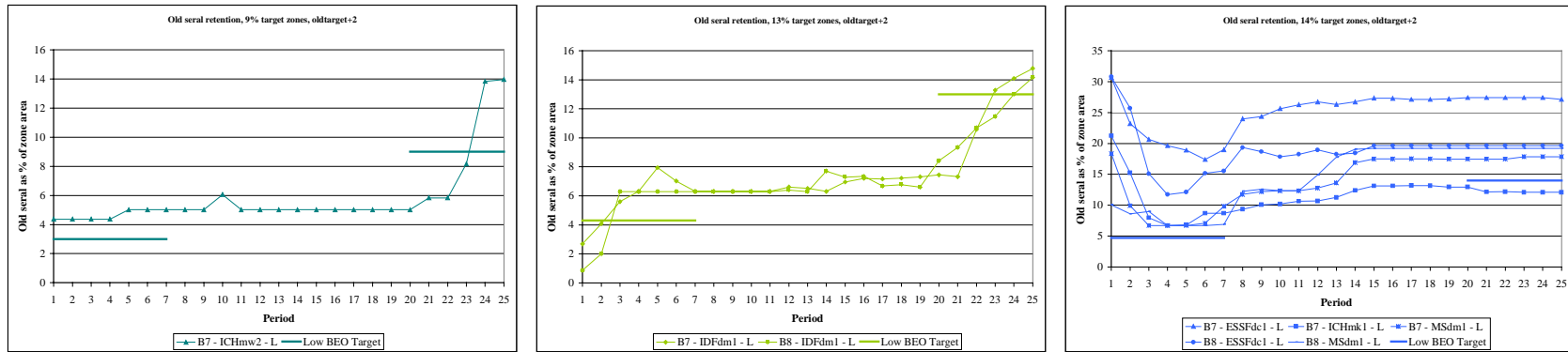


Figure 1.32 Old seral retention, old target + 2 %

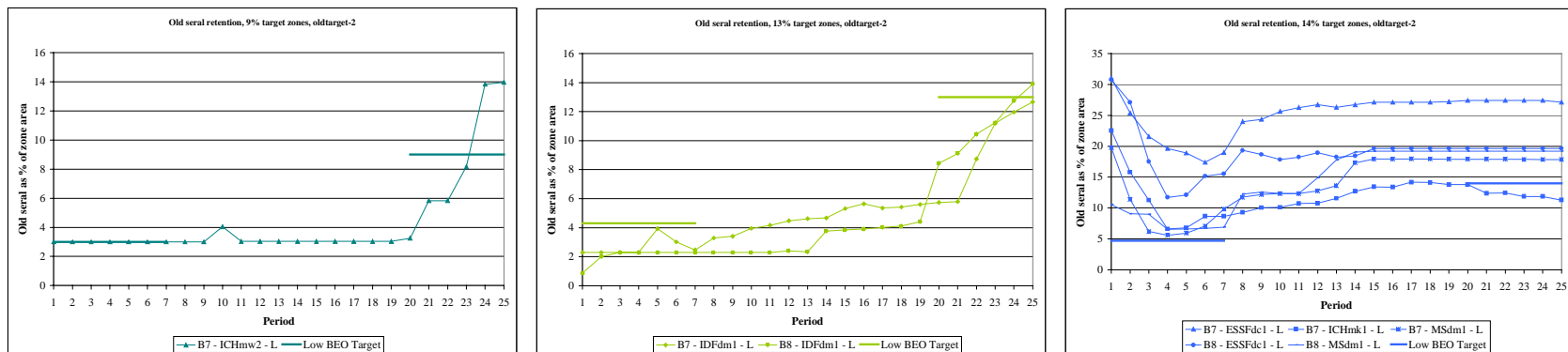


Figure 1.33 Old seral retention, old target - 2 %



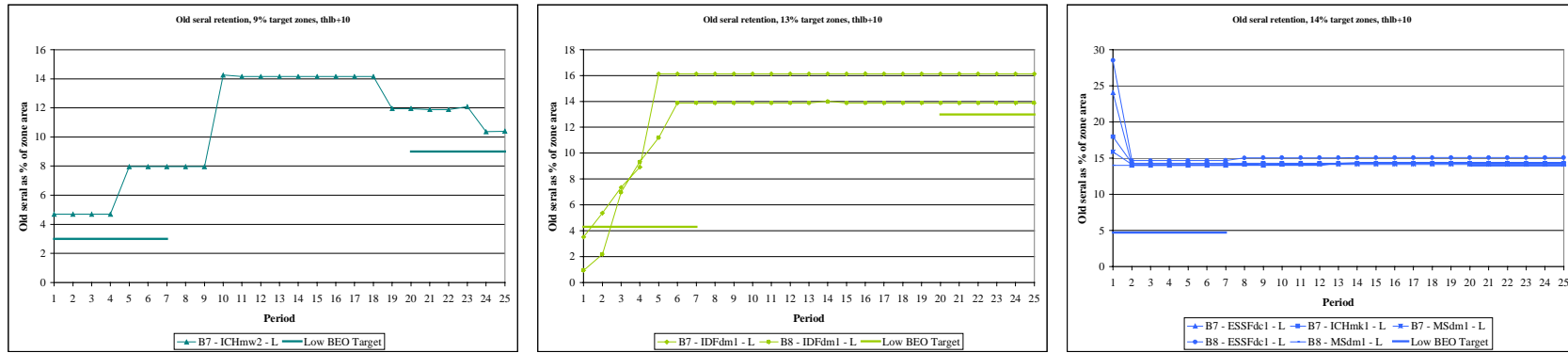


Figure 1.34 Old seral retention, thlb+10%, full targets

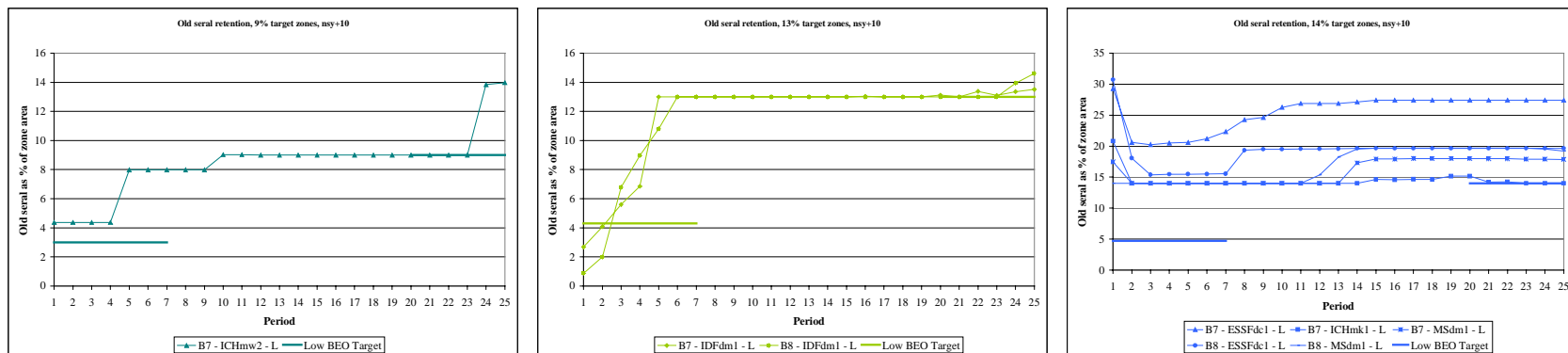


Figure 1.35 Old seral retention, nsy+10%, full targets

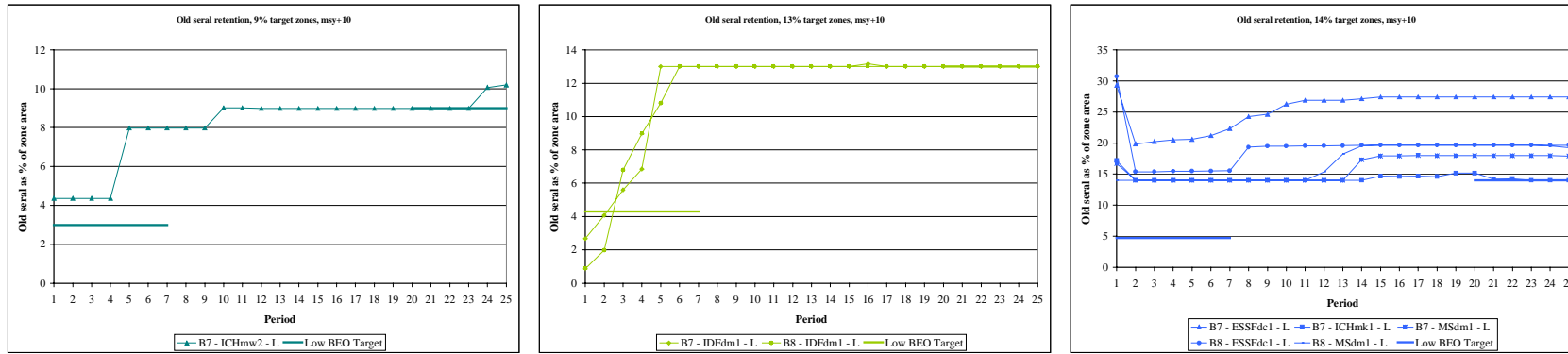


Figure 1.36 Old seral retention, msy+10%, full targets

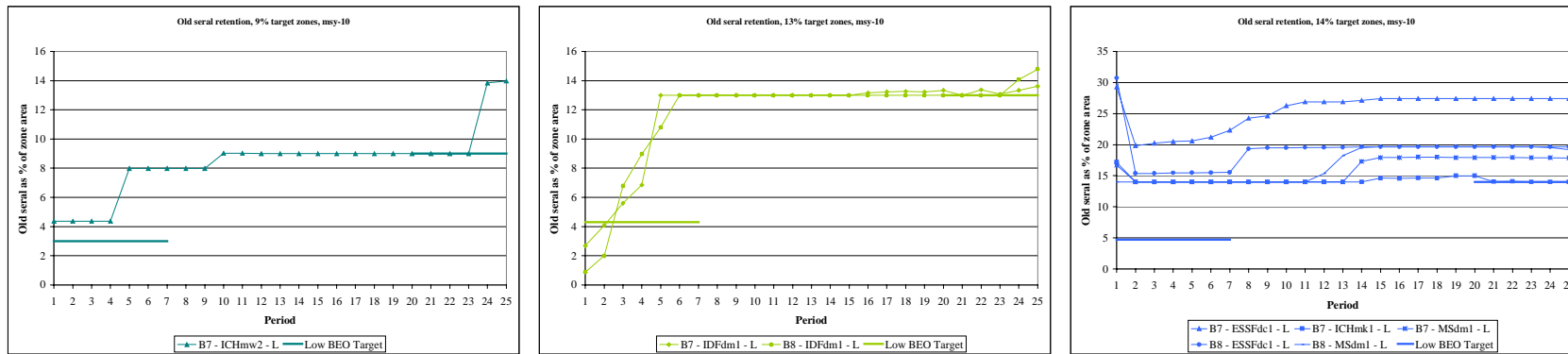


Figure 1.37 Old seral retention, msy-10%, full targets

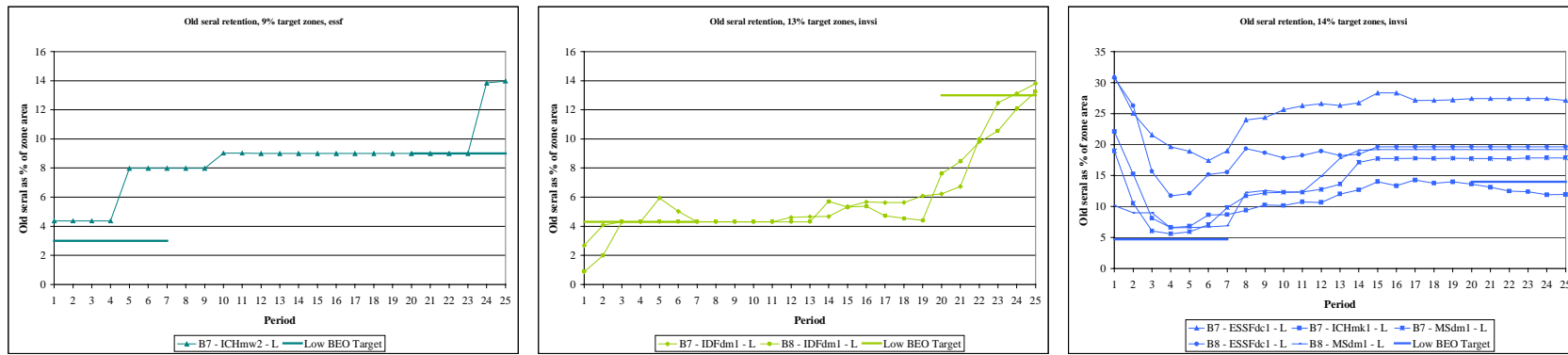


Figure 1.38 Old seral retention, inventory SI in ESSF, full targets

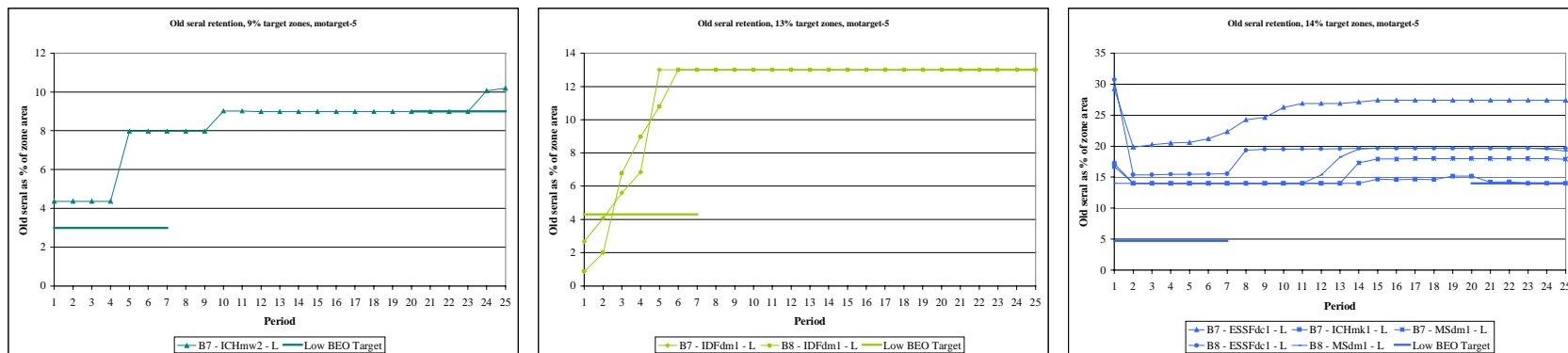


Figure 1.39 Old seral retention, mature plus old targets - 5%, full targets

## 1.2 Disturbance limits in known scenic areas

The analyst commented that disturbance constraints appear to be violated in certain periods within the VQO zones according to the post-harvest output reports generated by the CASH model. It has been confirmed that this is a model reporting anomaly related to the single tree selection stands. It has been assumed throughout the analysis that these stands always satisfy green-up requirements, and this assumption was implemented by assigning these stands a height that is taller than all green-up heights at all stand ages. This can be verified in the CASH input files. However, the model erroneously reports these stands as being in violation of visual green-up heights immediately after they are harvested.

## 1.3 Significant digits in CASH input files

The MoF analyst raised concerns regarding the number of significant digits appearing in some of the data values found in the volume table input files to the model. The source of the extra significant digits is a by-product of the manner in which the Informix database server stores floating point numbers. The following quote from the Informix manuals provides a detailed explanation.

“The FLOAT data type stores double-precision floating-point numbers with up to 16 significant digits. FLOAT corresponds to the double data type in C. ... A column with the FLOAT data type typically stores scientific numbers that can only be calculated approximately. Since floating-point numbers retain only their most significant digits, the number you enter in this type of column and the number the database server displays can differ slightly. This depends on how your computer stores floating point numbers internally. For example, you might enter a value of 1.1 into a FLOAT field and, after processing the SQL statement, the database server might display this value as 1.1000001.”<sup>1</sup>

The CASH model parses the input files assuming that any and all white space characters (i.e. spaces, tabs) delimit the individual fields on each line in the data file. Thus, the number of characters occupying a specific input field has no relevance to the model’s ability to read the file.

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<sup>1</sup> Informix Software, Inc., INFORMIX Guide to SQL: Reference. (Englewood Cliffs: Prentice Hall, 1995) p 3-10.