

Rounding your Plot Radius Factor (PRF)

I recently was calibrating a 20 BAF prism, using the **STAR_BAR** program from the John Bell Newsletter. 20 is a fairly small BAF on the West Coast, for young trees or thinner stands. It's about right for basal areas of around 120 square feet/acre (giving an average tree count of about 6 trees/plot). Part "5e" of the spreadsheet is for calibrating a prism or other angle gauge in "English" or "Imperial" units used in the USA (the same issue occurs with Metric units, of course). It also calculates many other relevant factors for that angle gauge.

The Plot Radius Factor (**PRF**) for this *exact* BAF is **1.94454** to the center of the tree in units of "feet/inch of diameter". That allows borderline trees to be checked *exactly*, regardless of small errors in grinding the prism. The counting of trees is critical in prism cruising. Any error in the count directly changes almost every total for the cruise.

It would be *so tempting*, and perhaps convenient to just round that PRF off for field work to **1.9** wouldn't it? On the other hand, some factors like this get *squared* when applied. The problem is that the Plot Radius Factor determines the Basal Area Factor (*not the reverse*) when you use it to check borderline trees. What this means is that the BAF of the instrument should be close, but need not be exact – because the tree count will be exactly right for that intended BAF when you check borderline trees with the correct PRF. The PRF used with that prism should therefore be as exact as possible.

Section 5e of the spreadsheet can do this. Here, the **BAF** changes – from **20.0** to **20.949** with a *rounded* PRF of 1.90. That is **almost a 5% difference in BAF**, (about half a foot in distance when you are checking a 12 inch tree). This is just from rounding a factor that *seems* like a trivial matter. That difference is the same as the sampling error for some inventories. When there is a simple way to check these things, perhaps you should do so.

35		ENGLISH (or "Imperial") UNITS			
36		Programs to compute BAF and other constants			
37	To calibrate an angle gauge				BAF = 20.000
38	Width of target =	8.50	8.50	8.50	inches
39	Distance to target =	19.00	19.00	19.00	feet
40	BAF =	15.135	15.135	15.135	ft ² /ac
41	Enter 1 if target is flat	0			
42	or 0 if target is cylinder				
43	Enter PRF	1.90000	IF PRFctr	IF PRFface	Plot Radius Factor, ctr : 1.94454 ft. per inch Diameter
44	calculate ==>	BAF English	20.949	20.059	Plot Radius Factor, face : 1.94454 ft. per inch Diameter
45			104.7%	99.7%	Enter Diameter = 12.00 Inches
					borderline at 23.33 feet, from tree center
					borderline at 22.83 feet, from tree face

Once again in life – *rounding is a tool of the devil*. Do it carefully. In the past, checking these math issues was a tedious business, and people often guessed about the consequences that might occur – and sometimes made mistakes. With modern spreadsheets or other tools, it is easy to be more careful. Often these factors get put into computers or data recorders and nobody ever checks them again. Data recorders *should* use very exact values.

I wonder – what PRF values are stated in your manuals when the calculations are done by hand, or in your data recorders, for checking borderline trees? As in all such things, when you check the math, you can verify that things are close enough for practical work – or adjust them when they are not.

Perhaps you have already checked this.