ADJUSTING PERCENTAGES

There are times when you must adjust a group of percentages. Here is an example.

tree	Initial Net %	needed = Gross Vol	120 Net Vol
a	95%	50	47.5
b	70%	40	28.0
c	50%	30	15.0
d	40%	25	10.0
e	20%	10	2.0
f	5%	28	1.4
		183.0	103.9
	Overall % change =		15%

These volumes need to add up to **120** for some reason – by changing the Net Volume percentages. How should it be done? If you add or subtract from the initial percents, some of them might fall above 100% or below 0% – probably not appropriate.
In addition, the middle percents should probably change by more than the extremes.

One way to do this is to use a power. The current **net percent** raised to a **power** times **Gross Volume** will change the volumes, but not go below 0%, or above 100% for the new Net percentages. Here, we want a total of **120**, but it is currently **103.9**. We need to change the power to do that, which will produce a larger Net Volume, and a larger Net %.

tree	Initial Net %	needed = Gross Vol	120 Net Vol	Net % ^ power 1.000 New Net V	New Net %	change
a	95%	50	47.5	47.5	95.0%	0.0%
b	70%	40	28.0	28.0	70.0%	0.0%
c	50%	30	15.0	15.0	50.0%	0.0%
d	40%	25	10.0	10.0	40.0%	0.0%
e	20%	10	2.0	2.0	20.0%	0.0%
f	5%	28	1.4	1.4	5.0%	0.0%
		183.0	103.9	103.9		
	Overall % change =	15%				

New Net Percent = (Initial Net Percent)$^\mathbf{P}$. What power should you use ? You can let the computer decide. The EXCEL spreadsheet does it with a function called "Goal Seek", which uses a trial and error method to produce a desired result. With current EXCEL versions, this seems to reside in the "Data/ What If Analysis/ Goal Seek" choice along the top of the spreadsheet.

When you click on Goal Seek, you get a form like this with what cell to change, what you want it to be, and what cell of the spreadsheet to change to achieve that goal. Fill those in, and EXCEL will find a solution (in almost all cases).

Goal Seek

Set cell:	H12
To value:	120
By changing cell:	H4

OK   Cancel
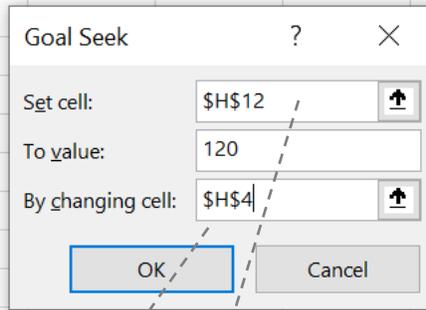
Click the "OK", and if you like the result it chooses, click "OK" to accept it and now the total balances correctly. Something like this.

tree	Initial Net %	needed = Gross Vol	120 Net Vol	Net % ^ power 0.659 New Net V	New Net %	change
a	95%	50	47.5	48.3	96.7%	1.7%
b	70%	40	28.0	31.6	79.1%	9.1%
c	50%	30	15.0	19.0	63.3%	13.3%
d	40%	25	10.0	13.7	54.7%	14.7%
e	20%	10	2.0	3.5	34.6%	14.6%
f	5%	28	1.4	3.9	13.9%	8.9%
		183.0	103.9	120.0		
	Overall % change =	15%				
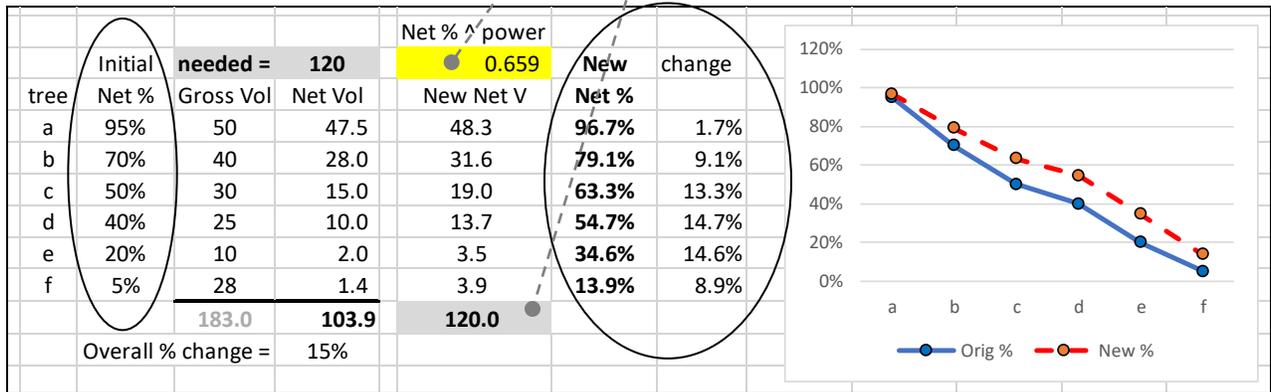
Now the Net Volumes add to **120** with new Net % amounts. Note that the change is mostly in the middle values of the Net percentages, and are bounded by 0% and 100%, as shown by the graph, as long as you do not go beyond the Gross Volume Total. It works as an adjustment even then, but seems a bit odd.

The same kind of adjustment will happen (below) if we need to decrease the total volume.

tree	Initial Net %	needed = Gross Vol	80 Net Vol	Net % ^ power 1.700 New Net V	New Net %	change
a	95%	50	47.5	45.8	91.6%	-3.4%
b	70%	40	28.0	21.8	54.5%	-15.5%
c	50%	30	15.0	9.2	30.8%	-19.2%
d	40%	25	10.0	5.3	21.1%	-18.9%
e	20%	10	2.0	0.6	6.5%	-13.5%
f	5%	28	1.4	0.2	0.6%	-4.4%
		183.0	103.9	83.0		
	Overall % change =	-23%				
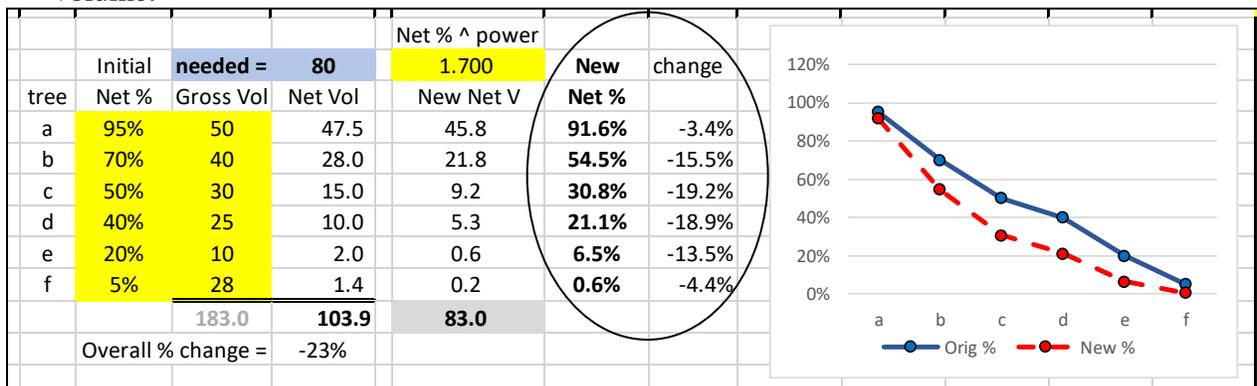
There are, of course, lots of other ways to do this sort of thing, but this is a very *simple* one that has several uses in adjusting percentage information in forestry. If you have a better idea, let us know.

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