

Retail Store Allocation
User Guide for Excel Workbook “SS for allocating stores to counties”

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BOTEC Analysis Corp.
I-502 Project #430-Re
Final
June 28, 2013

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1. Introduction

This document is a user guide for the Excel Workbook, “SS for allocating stores to counties.” It describes that workbook’s utility and functionality. This user guide assumes the user has already read the BOTEK report “430-Re: Allocating Stores to Counties”. That report describes the input variables and discusses the pros and cons of the store allocation methods implemented in the Workbook. That material will not be repeated here.

This section describes the layout of the workbook. The remainder of this User Guide is organized by task:

Section 2: Determining the Total Number of Stores in the State

Section 3: Allocating Stores to Counties

Section 4: Choosing and Adjusting a Final Allocation

Section 5: Comparing Counties for Manual Adjustment

Section 6: Updating the Number of Past-Month Users in Each County

If Section 2 is completed, all of Section 3 must be completed as well. If there is no change in the total number of stores, the user may skip to Sections 4 and 5.

The Workbook consists of 10 worksheets (WS). The first five, green-tabbed worksheets are intended for the user with a general knowledge of Excel. The last five, yellow-tabbed worksheets should be utilized by an Excel “power-user”, specifically someone familiar with Excel’s Solver optimization functions. These sheets names and functionality are as follows:

1. “Compute # of Stores for State” – Computes a total number of stores for the entire state of Washington based on four input variables: total quantity consumed in the state, the market share captured by the 502 market, the revenue per gram marijuana, and the target average operating scale per store.
2. “Allocation Comparison Table” – Compares the number of stores allocated to each county by: the five methods, the number of LCB liquor stores in 2012, and the number of medical marijuana access points listed on legalmarijuanadispendary.com. It includes measures of variability across the methods and demographic and area information for each county.
3. “Plot, stores by users & area” – Provides graphs to compare counties by number of users, area and number of stores. Includes mean average distance to the closest store for each county.
4. “Plot, stores by pop & area” – Provides the same information as above using population instead of number of users.
5. “Correlations” – Displays the correlation between all pairs of allocation methods and between allocation methods and the chosen manual allocation.
6. “Allocation Rules” – Calculates allocations for 4 of the 5 methods.

7. “Min Avg D (continuous)” – Set up for a nonlinear, continuous optimization for the calculated number of stores statewide.
8. “Min Avg D, Manual Int” – Set up for fine tuning the continuous optimization to reach an optimal integer solution.
9. “Min Avg D, by # stores” – Table of the optimized number of stores for the initial number of users over a range of values.
10. “Population Data” – Table of parameters concerning Washington’s counties, including population, area, and number of users.

In general, cells which can be changed by the user are highlighted in yellow. The exceptions are: column F in “Min Avg D, Manual Int” for adjustment as explained in Section 3, pasting those values in column J of “Allocation Comparison Table” and the purple column M in “Allocation Comparison Table”, which holds the user’s chosen store allocation (described in Section 4).

2.0 Determining the Total Number of Stores in the State

WS: “Compute # of Stores for State”

1. Enter values for yellow cells A4, A5, A6, and A8.
2. Cell A9 contains computed number of stores.
3. Cell A9 auto-populates into cell A1 in WS “Allocation Comparison Table”, “Allocation Rules”, “Min Avg D (continuous)”, and “Min Avg D, adjustment”.

3.0 Allocating Stores to Counties

3.1 Allocating Stores by Simple Proration or Multifactor Rules

WS: “Allocation Rules”

1. Cell A1 auto-populates from task 2.0.
2. Store allocations rounded to integers and with a minimum of 1 store per county are highlighted in light blue for the following methods: “By Population”, “By Users”, “Linear Rule of Users and Area”, and “Linear Rule of Users and SQRT(Area)”. If you don’t see the blue rows, make sure you are in WS: “Allocation Rules,” not WS: “Allocation Comparison Table.”
3. Simple rounding without the minimum required one store per county and rounding up are both included alongside the corresponding blue columns.
4. The blue columns auto-populate columns F-I in WS “Allocation Comparison Table”.

3.2 Updating Optimized Users and Area Allocation for New Total Stores

WS: “Min Avg D, by # stores”

“Allocation Comparison Table”

More info: This or task 3.3 must be done following an update of the total number of stores. Use this step if you plan to round the calculated number of stores, from Section 2, to a multiple of 50. Also, this step is only valid with the original numbers of cannabis users by county that was set when this Workbook was delivered. If this is no longer true or to use a number not previously calculated, see task 3.3.

1. Locate the closest value to the new number of total stores in WS “Min Avg D, by # stores”, row 3. For example, if the computed number of stores for the state is 390, then select column M.
2. Highlight and copy rows 7:45 from the column you selected in the step above.
3. Right click to Paste Options and paste “values” into cells J6:J44 in WS “Allocation Comparison Table”.

3.3 Minimizing A Proxy (D) for the Average Distance to the Closest Store

WS: “Min Avg D (continuous)”

“Min Avg D, Manual Int”

“Min Avg D, by # stores”

“Allocation Comparison Table”

1. Install Solver Add-In for Excel, if not previously installed.
2. In “Min Avg D (continuous)”, cell A1 auto-populates from task 2.0.
3. Open Solver under the Data tab in the ribbon or the tools tab above it. Do not make any changes to the equations in the “Solver Parameters” window.
4. Click the Solve button at the bottom of the window.
5. If the message states “Solver found a solution...”, click “Okay” and continue to step 7. If the message states “Solver found an error value...”, see step 6.
6. The starting values may be too far from the solution for Solver to optimize. Copy and paste a set of values close to your target number of total stores into cells G7:G45 from the worksheet “Min Avg D, by # stores” as in task 3.2. Repeat steps 3-5.
7. On WS “Min Avg D, Manual Int”, select cell F6 and copy its formula down the column through cell F44.
8. On WS “Min Avg D, Manual Int”, compare cell F3 to A1. If F3 is less than A1, go to step 9. If F3 is greater than A1, go to step 10. If F3 equals A1, skip to step 11.
9. Find the orange cell in column J. In the corresponding cell in column F, increase the number of stores by one. Do this by typing “+1” to the end of the formula in that cell or simply enter the next integer, then press enter. Note that after making an

adjustment in one row, the orange cell in column J will (usually) move to another row. Again, make the same adjustment to the corresponding cell in column F. Continue by increments of one until F3 equals A1.

10. Find the orange cell in column K. In the corresponding cell in column F, decrease the number of stores by one. Do this by typing “-1” at the end of the formula in that cell or simply enter the next lowest integer, then press enter. Note that after making an adjustment in one row, the orange cell in column K will (usually) move to another row. Make the second adjustment in that new row. Continue by increments of one until F3 equals A1.
11. Compare cells J3 and K3. If J3 is less than K3 (the benefit of shifting stores is less than the cost), skip to step 12.
12. Find the orange cell in column J. Adjust the corresponding cell in column F up one store. Find the orange cell in column K. Adjust the corresponding cell in column F down one store. Make these adjustments by typing “+1” or “-1” at the end of the formula in the cells or simply typing in the desired integer. Continue by increments of one, alternating between column J and K until cell J3 is less than K3.
13. Highlight and copy cells F6:F44.
14. Right click to Paste Options, or Paste Special...and paste “values” into cells J6:J44 in WS “Allocation Comparison Table”.

4.0 Choosing and Adjusting a Final Allocation

WS: “Allocation Comparison Table”
“Correlations”

1. Compare individual numbers across methods within counties in cells F6:J44 in WS “Allocation Comparison Table”.
2. Examine measures of variation across methods in cells N6:P44 in WS “Allocation Comparison Table”.
3. Examine correlation coefficients between methods in WS “Correlations”.
4. Copy rows 6:44 in the column for any allocation method column.
5. Right click to Paste Options and paste “values” into the purple cells M6:M44.
6. Manually adjust cells M6:M44 as desired.
7. Cells M6:M44 auto-populate cells G5:G43 in WS “Plot, stores by users & area” and “Plot, stores by pop & area”.

5.0 Comparing Counties for Manual Adjustment

WS: “Plot, stores by users & area”
“Plot, stores by pop & area”

1. Compare counties for average mean distance to the closest store by users or population, respectively, in cells F5:F43.
2. Compare number of stores for counties based on their number of users or population, respectively, and area on the graphs to the right of the table.
3. Adjust the axes on the lower graphs as desired for comparison. To do this, right click on the axis to be adjusted and select "Format Axis". Under "Axis Options", adjust the Fixed Maximum axis value down to the desired area of detail. (Do not adjust the fixed minimum value lower than zero or make it automatic.)

6.0 Updating the Number of Past-Month Users in Each County

WS: "Population Data"

Note: Once this step is completed, WS "Min Avg D, by # stores" is no longer valid.

1. A known number of users from new sources should be manually inserted into cells F2:F40 in WS "Population Data". (This can also be done for new population data.)