

## BenMAP-CE Release Notes

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**Release Version**

**BenMAP-CE 1.3.5**

**Release Date**

**2017.04.18**

### **Main Improvements**

1. Updated preloaded datasets for the United States setup as follows:
  - a. Monitor: Updated PM2.5 and Ozone monitor data for years 2000-2013.
  - b. Incidence: Updated existing death rates (2000-2050) with cause and age-specific mortality rates (2015-2060). Replaced hospitalization and ER visit dataset (Other Incidence 2007) with updated 2014 rates. Made 2007 dataset available on EPA BenMAP-CE website: <https://www.epa.gov/benmap/benmap-community-edition>
  - c. Valuation: Updated existing "EPA Standard Valuation Functions" with Willingness to Pay and Cost of Illness functions re-indexed to a 2015 baseline year.
  - d. Variable: Updated "median\_income" and "natl\_median\_income" in "EPA Standard Variables" with new county-level median income data for the year 2015.
  - e. Income Growth Adjustments: Updated existing "EPA Standard Income Growth" (1990 to 2024) with new income growth adjustment factors (1990 to 2026).
  - f. Health Impact Functions: Replaced existing ozone functions in "EPA Standard Health Functions" with 14 new functions used by EPA for the 2013 ozone NAAQS Regulatory Impact Analysis. Merged the "PM NAAQS Final 2012 Additional Functions" into "EPA Standard Health Functions".
  - g. Inflation: Updated "EPA Standard Inflators" (1980-2010) with new sector-specific inflation data (1980-2015).
  - h. Replaced Woods and Poole population growth estimates to extend values through 2050.
2. Modified GBD Air Quality Rollback Tool. Updated underlying datasets and modified tool to evaluate the Krewski function for each air quality grid cell (0.1 degree resolution) using population and incidence data stratified by gender and age for 4 separate mortality health endpoints. Results are then summed to produce results for total mortality. Updated datasets include:
  - a. Air Quality Data: Updated PM2.5 concentrations using 2015 GBD Study. Negative concentrations were adjusted to zero.
  - b. Population Data: Updated population data using 2015 census data from the United Nations, Socioeconomic Data and Applications Center (SEDAC) Gridded Population of the World (GQW) v4. Introduced populations stratified by gender and age (replacing use of population totals). Aggregated population data for age groups 80TO84, 85TO89, 90TO94, 95TO99, and 100UP into an 80UP age group to align with incidence rates.
  - c. Incidence Rates: Replaced "all-cause mortality" rates with mortality rates from the 2013 GBD Study for 4 health endpoints: COPD, cerebrovascular disease, ischemic heart disease, and lung cancer. Incidence rates were stratified by gender and age ranges. Combined neonatal ("0 to 0") and "1 to 4" age groups into a "0 to 4" age group to align with population data.
  - d. Removed country-level GBD data from "My BenMAP-CE Files\Country Shapefiles" including shapefiles, PM2.5 concentrations, incidence rates, and population estimates. These data are now available for download at <https://www.epa.gov/benmap/benmap-community-edition>.

3. Implemented several usability improvements to the Incidence Pooling and Aggregation window.
4. Revised the Monitor Rollback dialog to improve flow. Improved performance when selecting all cells. Added ability to select multiple cells by clicking and dragging.
5. Added ability to export shape files and CSV files Tools/Database Export as an alternative to the native BenMAP-CE format.
6. Updated integrated GIS component to include new features and fixes.
7. Improved performance and reliability when generating crosswalks between grid definitions.
8. Updated BenMAP-CE User's Manual and Appendices to reflect program updates.

#### **Known Issues (for future updates)**

1. There are known issues with users' international settings causing problems with import and export of data from/to CSV and text formats. Some of these issues are inherent in text-based formats (e.g. 7/4/2015 could be either July 4 in the US or April 7 in Europe). Please refer to the "Ben-MAP-CE Regional Formats" document for information about data conventions and computer settings.
2. There are known issues with the DotSpatial library which may cause a null reference exception or cause the program to crash when attempting to edit the legend text or color (for an individual category) on the GIS map. These issues have been reported to the DotSpatialCodePlex.
3. When BenMAP-CE is maximized the scroll bar for the legend disappears and some of the GIS layers become inaccessible.
4. Once a result has been drawn to the GIS Map the user can no longer re-organize the GIS layers.
5. There is an issue on the GIS map displayed when adding monitor data for baseline or control layers. Using the identify tool on the map causes an out of memory exception. This identify tool is currently disabled to avoid the error.
6. There is no mechanism to allow the user to modify the default administrative layer in the BenMAP-CE GIS window.
7. When importing shapefiles, users should be able to select the columns they want to designate as COL and ROW index, even if the columns of the attribute table are not labeled as such.
8. In the monitor dataset import, the import code does not allow the first value to be missing. Users have had to alter the dataset (e.g., substitute a "0" for the "." if it is the first value) to get it to import. Also, modeled data often includes "-9" as missing data code. BenMAP-CE has no way of interpreting alternate missing value codes.
9. Under "Manage Population Datasets", there is currently no option for an "Output Sample File".
10. An audit trail should summarize the details of the BenMAP-CE analysis at the time it was run. It should not include details from the current database.
11. Some errors have been noted in the Import/Export features (under the Tools menu). This will require additional investigation to resolve.
12. Population caching (implemented in v1.3.3) has been temporarily disabled due to some known defects.

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**Release Version**

**BenMAP-CE 1.3.4**

**Release Date**

**2016.08.03**

#### **Main Improvements**

1. Populated mean and standard deviation for GBD Integrated Exposure Response functions. These

values were calculated and visible in the custom distribution subform, but were not displayed properly in the main Health Impact Function Definition form. Added beta distribution types to the database for dropdown lists (replacing hard-coded list values).

2. Corrected issue with saving Regular Grid Definitions. Additional validation checks in v1.3.0 required opening a shape file to check ROW and COL. For regular grid creation, a shapefile is not yet created when the validation routine was called. The validation routine now includes a check for grid type to differentiate.
3. Modified Pollutant Definition screen to support a more standard mechanism for selecting pollutants (created Add/Remove buttons).
4. On the Main screen, changed “Output” button to “Export” button for Data and Audit Trail Report tabs.
5. Improved Advanced Settings under “Incidence Pooling and Aggregation” and “Select Valuation Methods, Pooling and Aggregation”. Created separate dialogs for “Advanced Pooling Settings” and “Advanced Valuation Settings”. Corrected issue with redisplay of modified data.
6. Modified “Monitor Rollback Settings” to help reinforce the order of steps the user should follow.
7. Modified messages in “Setup Variable Dataset Definition” for clarity.
8. Implemented several changes to the “Incidence Pooling and Aggregation” feature to facilitate user interaction. Added checkboxes to studies, implemented list builder pattern, pre-created pooling windows, added visual indicators to pooling method, improved ability to set user-defined weights, renamed tree nodes, and added preview functionality.

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**Release Version****BenMAP-CE 1.3.3****Release Date****2016.07.12****Main Improvements**

1. Fixed issue that overestimated incidence rates in cases when the incidence rate dataset had race, gender, or ethnicity information. Revised code now averages incidence rates for selected groups (previous code summed rates for all subgroups)."
2. Corrected a bug in the handling of age ranges within specific race-ethnicity-gender groups for processing Health Impact Functions. More specifically, if you ran multiple HIF's with the same race-ethnicity-gender but with the second function having both a lower start age AND a higher end age than the other, the setting of the higher end age would overwrite the setting of the lower start age. Thus, the age range across all functions would be the lower age of the first function to the higher age of the second function. This bug has been corrected; the program will now correctly use the lowest start age and highest end age across all functions to get the full age range. Note: Because the population data for the preloaded U.S. and China datasets did not have overlapping age ranges, this bug was not previously detected.
3. Added Monitor Data Conversion tool to the Tools menu. The tool converts daily monitor values (one value per row) into a format that can be used to import Monitor Datasets under the Modify Datasets menu.
4. BenMAP-CE now caches calculated population data by race-ethnicity-gender and age range. This improves efficiency of the health impact functions by avoiding population recalculation if the desired population data has already been retrieved.
5. Modified Health Impact Function Definition form to populate the mean and standard deviation into the Beta and Beta Parameter 1 fields using the imported data from “Custom” distributions.

6. Fixed issue in data import validation code. Previously, code failed to distinguish between warnings and errors (all failures were classified as errors). Code has been fixed to report warnings separately.
7. Fixed bug with "Show All" checkbox on Manage Grid Definitions screen to avoid inadvertently saving a disabled selection.
8. Modified labels in the Pollutant Definition window for clarity. Changed the button "Advanced Pollutant Options" to "Define Seasons for All Pollutant Metrics" and changed the label "Seasonal Metrics" to "Manage Seasons for Individual Pollutant Metrics".
9. Fixed minor typographical error in the monitor rollback window. The abbreviation for air quality grid should be "AQGX" and not "AGQ."
10. Updated link to EPA's BenMAP-CE website on the BenMAP-CE About page.

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**Release Version****BenMAP-CE 1.3.2****Release Date****2016.03.24****Main Improvements**

1. Adds PopSim under the BenMAP-CE Tools menu. PopSim is a dynamic population simulation that incorporates the cumulative effects of air pollution on different age groups over time. This is a beta version that only includes U.S. Data.
2. Updates Chart tab to remove ZedGraph utility and switch to OxyPlot. Added "Deselect All" feature (previously only had "Select All").
3. Added dynamic charts for beta distributions for Normal and Triangular distributions. These can be accessed through the Health Impact Function editor when you click on the distribution type.
4. Added Online Database Export and Online Database Import to the Tools menu. These will provide accessibility to EPRI's online database.

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**Release Version****BenMAP-CE 1.3.0****Release Date****2015.11.17****Main Improvements**

1. To ensure consistent GIS projections throughout BenMAP-CE, a default coordinate system will be set to World Geodetic System 1984 (WGS84). When adding shapefiles to a new setup, the user will need to specify a local GIS projection. A shortened list of recommended projections (Albers Equal Area Conic projections) is provided to choose from. However, if the user wants to use a different projection, he/she can click "Show All" to select from all available DotSpatial projections. This local projection will be used by BenMAP-CE when performing any area-based or distance-based calculations.
2. For files that are not already in WGS84 format, software will automatically reproject on import. Imported file will be renamed to reflect reprojection. Metadata will document the reprojected file.
3. The GIS toolbar has been modified to toggle between WGS84 and the setup's local projection.
4. When importing shapefiles for air quality grids (under Manage Datasets), software will add ROW and COL fields with user confirmation if they are missing. Software will also check for duplicate ROW/COL pairs and warn the user if any are found.

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**Release Version****BenMAP-CE 1.1.7****Release Date****2015.9.30**

## Main Improvements

1. Added parameterized GBD Integrated Exposure Response (IER) functions. These are spline functions for PM2.5 1 to 1,000 ug/m3 range with custom beta distributions. Includes 20 segments for CEV function, and 11 segments each for COPD, IHD, and LC functions.
2. Added Country Shapefiles (from GBD Rollback Tool) and Python program to perform percentage rollback to the BenMAP-CE installer (files under 'My BenMAP-CE Files\Country Shapefiles').
3. Performed thorough review of data import forms and resolved several issues within "Modify Datasets" dialog, including: 1) resolve issues with loading and display of metadata, 2) correct minor issue with automatic load of data after validation (without user clicking "OK" to proceed), and 3) ensure that when the user clicks "Delete" the selected record is highlighted and the user receives a confirmation message prior to delete.
4. Added validation check for incidence datasets (warning will be issued if value outside of range 0 to 1).
5. Changed About page to display internal build number (4th digit in the BenMAP-CE version number (used by software developer to track internal test versions).

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### Release Version

**BenMAP-CE 1.1.6**

### Release Date

**2015.8.31**

## Main Improvements

1. Resolved issue with Health Impact Function Editor not importing correctly (issue identified while testing import of custom spline functions).
2. Resolved issue with BenMAP-CE throwing a database exception error when attempting to load a population dataset. The database was incorrectly trying to open a connection that was already open.
3. "Unlocked" the EPA-provided (preloaded) datasets. The locking mechanism was intended to protect preloaded datasets from being modified by the user without also modifying the associated metadata. Until development work to improve management of datasets (including a cloning feature) is complete, the preloaded datasets will remain unlocked.
4. Added metadata descriptions for preloaded datasets.

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### Release Version

**BenMAP-CE 1.1.5**

### Release Date

**2015.8.10**

## Main Improvements

1. Fixed an issue that prevented images for Beta Distributions to not appear within the Health Impact Function Editor (pop-up form on click of distribution type).

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### Release Version

**BenMAP-CE 1.1.4**

### Release Date

**2015.8.7**

## Main Improvements

1. Fixed an issue with having to click "Run" twice to run health impact functions.
  2. Fixed an issue that prevented the aggregation of Detroit data.
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**Release Version** **BenMAP-CE 1.1.3**

**Release Date** **2015.7.30**

**Main Improvements**

1. Added Mortality Incidence data for the Detroit setup.
2. Fixed an issue that prevented Grid Definitions from being created.

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**Release Version** **BenMAP-CE 1.1.2**

**Release Date** **2015.7.24**

**Main Improvements**

1. Added a setup for Detroit using the BenMAP-CE Quick Start Guide data files (dated November 2014).

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**Release Version** **BenMAP-CE 1.1.1**

**Release Date** **2015.3.31**

**Main Improvements (minor bug fixes to public release version 1.1.0)**

1. Fixed bug which prohibited Regular Grid creation from saving (under Modify Datasets/Grid Definitions).

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**Release Version** **BenMAP-CE 1.1.0**

**Release Date** **2015.2.16**

**Main Improvements**

1. Software published for public release. 64-bit and 32-bit versions available.
2. Added index to population entries table to speed up processing which use age range and race information.
3. Corrected issues related to database import tool (using .bdbx files).
4. Created default folder location for database export tool. File save location defaults to 'My BenMAP-CE Files\Exports'.

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**Release Version** **BenMAP-CE 1.0.18.11**

**Release Date** **2015.1.16**

**Main Improvements**

1. To address installation issues related to UAC settings and VirtualStore (encountered on computers running Windows versions newer than XP, such as Windows Vista and Windows 7), changed installation location of software and added manifest file which requires administrative privileges to install.
  2. Replaced Microsoft Interop libraries with OpenXML SDK 2.5 libraries that allow for greater support of open source office solutions and allow user to export .xlsx file while using the GBD Rollback tool.
  3. BenMAP-CE now allows users to add new endpoint groups and endpoints when importing Health Impact Functions (using .csv files).
  4. Modified GBD tool to clear check boxes on the 'select by country' tab if the user elects to run consecutive analyses; previously the selection list failed to clear.
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**Release Version****BenMAP-CE 1.0.18-10****Release Date****2014.12.30****Main Improvements**

1. Added the ability for the user to export a csv file from the GBD RollBack Tool.
2. Resolved an issue that prevented some of the buttons from being accessible on smaller screen resolutions. Now all large forms are resizable (i.e., GBD Rollback tool).

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**Release Version****BenMAP-CE 1.0.18-9 (no Office Installer)****Release Date****2014.12.30****Main Improvements**

1. Removed Microsoft Interop libraries that caused program instability on machines that previously had differing versions of Microsoft Office Installed.

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**Release Version****BenMAP-CE 1.0.18-8****Release Date****2014.11.14****Known Issues (for future updates)**

1. When opening a saved .projx file that has been completed through step 3 (Pooling and Aggregation) the green “stop lights” turn to red for the Health Impact Functions, Pooling, and Valuation method lights.
2. There is an issue where attempting to edit the legend on the GIS map causes a null reference exception. This has been reported as a DotSpatial bug.
3. There is an issue on the GIS map displayed when adding monitor data for baseline or control layers. Using the identify tool on the map causes an out of memory exception. This tool has currently been disabled.

**Main Improvements**

1. Re-enabled automated error reporting for unhandled exceptions that cause the system to crash.
2. The user is now able to deselect their current selection by right clicking on the layer that the selected item is in and choosing the “unselect all” button under “selection”.
3. Included EPAStandardVariableVariable dataset into the default database.
4. Users are now allowed to import quarterly and monthly monitor datasets.
5. On Uninstall BenMAP-CE removes all application data directories from the users’ machine.
6. Fixed an issue that prevented the user from manually entering Health Impact and Valuation functions.
7. Fixed a problem that caused “Source of Air Quality Data” to disappear from workflow.
8. Fixed a multiple issues that caused BenMAP-CE to hang upon close.
9. Fixed a problem that caused Health Impact Functions input files to fail validation.
10. Replaced “new” China Health Impact Functions in the China setup. The short term functions had the multiplier “A” missing in the Baseline Function formulas.
11. Removed “Year” column from Incidence data set example file (extra column caused failure of validation checks).

12. Fixed an issue with Validation causing input files with “\$” and “%” characters to fail.
13. Fixed an issue that caused duplicate entries upon loading a valuation dataset.
14. Fixed an issue that prevented the user from importing a Variable dataset with more than 1 column.
15. Fixed multiple issues regarding Output Example Files.
16. Fixed an issue that prevented the user from selecting .aqgx files in the browse dialog for Baseline and Control under Source of Air Quality Data.
17. Fixed multiple issues related to the GDB rollback tool, specifically issues that caused scenario execution errors, unhandled exceptions, and incorrect results.
18. Fixed issue with missing health impact function configuration in reloading saved project (.projx) files. The health impact function configuration (.cfgrx) data was not being saved correctly within the project file.

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**Release Version****BenMAP-CE 1.0.17****Release Date****2014.09.010****Main Improvements**

4. Fixed a problem that prevented the user from redisplaying the GIS map table of contents after being hidden.
5. Fixed an issue that prevented the user from adding a new Health Impact Function manually to the Setup.
6. Fixed a problem that prevented the drawing of the GIS map for China.
7. Fixed a data import issue for China that caused a longitude error.
8. Fixed an issue that caused duplicate Pooled Valuation Layer.

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**Release Version****BenMAP-CE 1.0.16****Release Date****2014.08.19****Main Improvements**

1. Fixed issues with GIS display of air quality surfaces (Baseline/Control/Delta).
2. Added Deaths per 100,000 people, percentage of deaths attributable to pm2.5 levels, and 97.5 confidence intervals to the GDB Rollback export file.
3. Improved precision of GDB Rollback tool.

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**Release Version****BenMAP-CE 1.0.13-1.0.15****Release Date****2014.08.06****Main Improvements**

1. Fixed a problem that caused data validation to prevent the monitor rollback feature.
2. Resolved a database exception issue relating to the GDB Rollback tool.
3. When importing a shapefile to create a new grid, BenMAP now attempts to re-project the shapefile to GCS NAD 83 if the projection is not already this by default.



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| <b>Release Version</b> | <b>BenMAP-CE 1.0.12</b> |
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| <b>Release Date</b> | <b>2014.08.01</b> |
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**Main Improvements**

1. Implemented new Global Burden of Disease Rollback tool, available under the Tools menu.
2. Fixed a problem where the GIS menu bar status would not be maintained when a second pollutant was added.

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| <b>Release Version</b> | <b>BenMAP-CE 1.0.11</b> |
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| <b>Release Date</b> | <b>2014.07.22</b> |
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**Main Improvements**

1. Fixed bug associated with metadata save action.
2. Fixed a problem that prevented inflation datasets from importing correctly.

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| <b>Release Version</b> | <b>BenMAP-CE 1.0.10</b> |
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| <b>Release Date</b> | <b>2014.07.07</b> |
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**Main Improvements**

1. Automated error reporting feature was disabled due to a number of problems associated with error handling logic (to be addressed in future version). Manual “provide feedback” feature still enabled.

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| <b>Release Version</b> | <b>BenMAP-CE 1.0.9</b> |
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| <b>Release Date</b> | <b>2014.07.03</b> |
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**Main Improvements**

1. Fixed numerous data import issues.
2. Implemented numerous improvements to GIS map and tools.
3. Implemented new Error Reporting feature. Manual reporting of software bugs and requested improvements is available under the Help menu (“Provide Feedback”). Automated reporting feature captures error log and audit trail when the program crashes (user is prompted to submit data upon reopening BenMAP-CE).

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| <b>Release Version</b> | <b>BenMAP-CE 1.0.8</b> |
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| <b>Release Date</b> | <b>2014.04.28</b> |
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**Main Improvements**

1. Implemented new Data Validation features for data imports and added Metadata for user-supplied data.
2. Updated GIS DotSpatial from version 0.11.9.6 to version 1.6.
3. Fixed a problem with regular grids created by BenMAP-CE. Now these grids will begin with column and row values of 1 instead of 0.

4. When estimating health impact functions using daily modeled values, days with missing values will not be included in the results. Previously, these missing days were assigned the mean value, which led to incorrect results.
5. Fixed a problem that caused results calculated using county-level data to differ between BenMAP 4 and BenMAP-CE.

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**Release Version****BenMAP-CE 1.0.7****Release Date****2014.04.01****Main Improvements**

1. Fixed a major issue in BenMAP-CE that caused percentage crosswalks between grid definitions to be incorrect for user-added shapefiles.

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**Release Version****BenMAP-CE 1.0.6****Release Date****2014.03.06****Main Improvements**

1. Fixed a problem that prevented users from estimating health impacts in some cases.
2. Updated the Firebird database client and helper class.

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**Release Version****BenMAP-CE 1.0.5****Release Date****2014.02.28****Main Improvements**

1. Column and row variables saved as doubles in shapefile attribute tables will now be automatically converted to integers when imported into BenMAP-CE.
2. Audit trails can now be generated for files created in a BenMAP-CE setup that does not exist in a user's current list of setups.

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**Release Version****BenMAP-CE 1.0.4****Release Date****2013.12.06****Main Improvements**

1. Fixed a problem with incorrect delta maps being saved to .apvrx files generated using command line mode.

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**Release Version****BenMAP-CE 1.0.3****Release Date****2013.12.05****Main Improvements**

1. Fixed problem with command line mode that required user to confirm pooling weights for each run.
  2. Fixed problem with specifying fields to be saved when generating reports in command line mode.
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***Release Version***

**BenMAP-CE 1.0.2**

***Release Date***

**2013.12.02**

**Initial Public Milestone Release**

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