

# University of Virginia

## Obtaining Computing for Sustainable Water Project Output Files

The Computing for Sustainable Water Project executed 19,131,876 experiments. This document describes the structure of those experimental runs and how one might request the output - either in its entirety or specific runs described below.

These data files, as executed on World Community Grid members' devices and collected by IBM, are presently stored on 2TB external storage devices at the University of Virginia.

Each simulation experiment consists of a set of Best Management Practices (BMPs - polices) that are assumed to be in effect in the Chesapeake Bay Watershed, and settings for other parameters. The BMPs are:

<b>BMP</b>	<b>BMP NAME</b>
1	Agricultural Waste Management System-Livestock
2	Agricultural Waste Management System-Poultry
3	Barnyard Runoff Control
4	Conservation Tillage
5	Continuous No-Till
6	Cover Crops (Spring and Winter Planting)
7	Dry Detention Ponds
8	Erosion and Sediment Control
9	Dry Extended Detention Ponds
10	Filtering Practices
11	Riparian Grass Buffers-Non-Point Source
12	Riparian Grass Buffers-Point Source
13	Riparian Forest Buffers-Point Source
14	Riparian Forest Buffers-Non-Point Source
15	Infiltration Practices
16	Loafing Lot Management
17	Mortality Composters
18	Off-Stream Watering without fencing
19	Precision Grazing
20	Upland Precision Grazing
21	Urban Nutrient Management
22	Wetland Restoration
23	Wet Ponds and Wetlands

The other parameters are:

fert/acre	pounds of fertilizer applied to each acre
housing stdev	standard deviation f housing size
lawn %	percent of lawn coverage
bad buffer ratio	ratio of degraded riparian buffers

All of the experimental runs were organized into four "batches." The set of BMPs and parameters for each batch are given below:

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## Batch 1 (covering 1990 through 2019)

Runs labelled from 0000\_A00000000 to 4782\_A04782968

Run parameters are:

fert/acre	three separate levels - 45.6, 47.6, 49.6
housing stddev	three separate levels - 0.5, 0.75, 1.0
lawn %	three separate levels - 0.015, 0.020, 0.025
bad buffer ratio	three separate levels - 0.015, 0.020, 0.025
BMP1,2,3,17	three levels - 0.9, 1.0, 1.1 (i.e., 90%, 100%, 110%)
BMP4	same
BMP5	same
BMP6	same
BMP7,9,22,23	same
BMP8	same
BMP10,15	same
BMP11	same
BMP12	same
BMP13	same

## Batch 2 (covering 1990 through 2009)

Runs labelled from 4783\_B04783000 to 9565\_B09565968

Run parameters are:

BMP1	three levels - 0.9, 1.0, 1.1 (i.e., 90%, 100%, 110%)
BMP2	same
BMP3	same
BMP14	same
BMP19	same
BMP20	same
BMP21	same
BMP18	same
BMP10	same
BMP15	same
BMP16	same
BMP17	same
BMP22	same
BMP23	same

## Batch 3 (covering 2010 through 2019)

Runs from 9566\_C09566000 to 14348\_C14348968 (starting from 2010)

Run parameters are:

BMP1	three levels - 0.9, 1.0, 1.1 (i.e., 90%, 100%, 110%)
BMP2	same
BMP3	same
BMP14	same
BMP19	same
BMP20	same
BMP21	same
BMP18	same
BMP10	same

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BMP15 same  
BMP16 same  
BMP17 same  
BMP22 same  
BMP23 same

## Batch 4 (covering 2010 through 2019)

Runs from 14349\_D14349000 to 19131\_D19131968 (starting from 2010)

Run parameters are:

fert/acre three separate levels - 45.6, 47.6, 49.6  
housing stddev three separate levels - 0.5, 0.75, 1.0  
lawn % three separate levels - 0.015, 0.020, 0.025  
bad buffer ratio three separate levels - 0.015, 0.020, 0.025  
BMP1,2,3,17 three levels - 0.9, 1.0, 1.1 (i.e., 90%, 100%, 110%)  
BMP4 same  
BMP5 same  
BMP6 same  
BMP7,9,22,23 same  
BMP8 same  
BMP10,15 same  
BMP11 same  
BMP12 same  
BMP13 same

## Directory

The directory structure on the external disk drive consists of five folders described as follows.

**Folder: Lookup** (113.2MB) (contains 4 .gz files)

fullfractional1.txt.gz  
fullfractional2.txt.gz  
fullfractional3.txt.gz  
fullfractional4.txt.gz

When the .gz files are unpacked, each .txt file provides the parameter settings for each of the 4,782,969 experiments corresponding to each of the four main "batches." Below is a snapshot of the contents of fullfractional1.txt

db name	fert/acre	housing stddev	lawn %	bad buffer ratio	BMP1,2,3,17	BMP4	BMP5	BMP6	BMP7,9,22,23	BMP8	BMP10,15	BMP11	BMP12	BMP13
fullfractional/0000/A00000000.sql	45.6	0.50	0.015	0.015	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
fullfractional/0000/A00000001.sql	45.6	0.50	0.015	0.015	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0
fullfractional/0000/A00000002.sql	45.6	0.50	0.015	0.015	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
fullfractional/4782/A04782966.sql	49.6	1.00	0.025	0.025	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.9
fullfractional/4782/A04782967.sql	49.6	1.00	0.025	0.025	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0
fullfractional/4782/A04782968.sql	49.6	1.00	0.025	0.025	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

fullfractional2.txt = parameter settings for Batch 2.

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fullfractional3.txt = parameter settings for Batch 3.  
fullfractional4.txt = parameter settings for Batch 4.

### Folder: Batches (~1.08GB)

This folder contains 19,133 .tgz files numbered as:

```
CFSW_00000.tgz
. . . .
. . . .
CFSW_19133.tgz
```

Each .tgz file, when unpacked, contains the .sql code used to set up the corresponding batch of 1,000 experiments.

### Folder: Tracking

Contains ~19,133 files with file names cfsw\_00000.done.wcg through cfsw\_19133.claimed\_wcgrid (some files have "done" while others have "claimed\_wcgrid")

The contents of this folder are merely for "bookkeeping" onlt and can be ignored.

### Folder: Expanded (~27GB)

This directory contains sub-folders:

```
cfsw_0000_00000000 through cfsw_0899_00899709
```

Each sub-folder contains a file with the corresponding file name:

```
cfsw_0000_00000000.out.gz
```

When expanded, the .gz file contains the output of the corresponding run, for example:

```
run seed: 645814388
# turn nutrientid source value
EOT 0 OrgN 8.05595e+06 (pop 13421045)
EOT 0 OrgP 771678 (pop 13421045)
EOT 0 NH3N 1.91839e+06 (pop 13421045)
EOT 0 NO3N 288926 (pop 13421045)
EOT 0 PO4P 797892 (pop 13421045)
EOT 0 Sediment 0 (pop 13421045)
0 OrgN Ag 2.68507e+06
0 OrgN Human 2.82453e+06
0 OrgN Animal 2.54635e+06
0 OrgP Ag 376796
0 OrgP Animal 394882
0 NH3N Ag 1.59922e+06
0 NH3N Animal 319173
0 NO3N Ag 288926
0 PO4P Ag 396917
0 PO4P Animal 400975
EOT 1 OrgN 7.66528e+06 (pop 13400436)
```

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```
EOT 1 OrgP 777674 (pop 13400436)
EOT 1 NH3N 3.91635e+06 (pop 13400436)
EOT 1 NO3N 925555 (pop 13400436)
EOT 1 PO4P 949665 (pop 13400436)
EOT 1 Sediment 0 (pop 13400436)
1 OrgN Ag 2.66889e+06
1 OrgN Human 2.82016e+06
1 OrgN Animal 2.17623e+06
1 OrgP Ag 424392
1 OrgP Animal 353282
1 NH3N Ag 3.633e+06
1 NH3N Animal 283354
1 NO3N Ag 925555
1 PO4P Ag 585286
1 PO4P Animal 364379
. . . . .
. . . . .
. . . . .
. . . . .
```

## Folder: Results (~664.69GB)

There are six sub-folders in Results one for each of the six months from May 2012 through October 2012 when all these experiments were executed on the World Community Grid.

The sub-folder for May 2012, for example, contains files from cfsw\_0000\_results.tgz through cfsw\_19059.results.tgz (each file is 30.3MB)

When opened, the results files correspond to the same named file in **Expanded**.

## Requesting output

To request any or all of the output described above, please contact Professor Gerard P. Learmonth Sr. via email at: [CFSW@virginia.edu](mailto:CFSW@virginia.edu)

If you would like the complete results contained on the external drive as described above, we would ask you to send an external storage device with at least 1TB capacity. We would copy the entire output to that device and return it to you.

If you would like the results of particular experiment(s), please indicate the run(s) you are interested in and send the run identifiers as described in the **Lookup** files. These are labeled:

0000\_A00000000 through 19131\_D19131968

We will provide the corresponding file output via a shared folder in Dropbox, Box, or on a Google Drive.