

Drought Generator Extension (v1.0)

User Guide

LANDIS-II Extension

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Last Revised: April 22, 2011

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1 Introduction

This document describes the **Drought Generator Extension** for use with the LANDIS-II model. For information about the model and its core concepts, see the *LANDIS-II Conceptual Model Description*.

1.1 Version 1.0

Version 1.0 is compatible with LANDIS-II v6.0.

1.2 Extension Description

1.2.1 Overview

This extension generates a site-level variable representing the number of years of mild drought per decade. The variable is made available for other extensions to use. The original intent of this extension is to provide information used by the Drought Disturbance Extension.

1.2.2 Drought Years

The extension generates a predicted value of the number of drought years per decade using a lognormal distribution. The user must provide Mu and Sigma values that define the lognormal distribution.

For each timestep, a number of drought years per decade is stochastically drawn from the lognormal distribution. The predicted number of drought years is multiplied by 100 (to preserve precision) and recorded as a site variable that is available to all other extensions.

1.3 References

1.4 Acknowledgments

2 Parameter Input File

The input parameters for this extension are specified in one input file. This text file must comply with the general format requirements described in section 3.1 *Text Input Files* in the *LANDIS-II Model User Guide*.

2.1 LandisData

This parameter's value must be "Drought Generator".

2.2 Timestep

This parameter is the extension's timestep. Value: integer > 0. Units: years.

2.3 Mu

This parameter defines the Mu parameter of the lognormal distribution of drought years per decade.

2.4 Sigma

This parameter defines the Sigma parameter of the lognormal distribution of drought years per decade.

2.5 MapName

This file parameter is the template for the names of the drought years output map. The parameter value must include the variable "**timestep**" to ensure that the maps have unique names (see section 3.1.8.1 *Variables* in the *LANDIS-II Model User Guide*). The user must indicate the file extension. The user must also include sub-directory name(s) as needed.

2.6 LogFile

The file parameter is the name of the extension's event log file (see section 3.2).

3 Output Files

The drought generator extension generates two types of output files: a) a map of number of drought years per decade for each time step, and b) a log of drought years for the entire scenario.

3.1 Drought Years per Decade Maps

The map of drought years per decade represents the number of drought years per decade, with values multiplied by 100. To get the actual number per decade, mapped values should be divided by 100. Non-active sites have a value of 0 in all maps. A map is produced for each drought generator time step.

3.2 Drought Generator Log

The log is a text file that contains information about the predicted number of drought years for each timestep over the course of the scenario. The information is stored as comma-separated values (CSV).

4 Example File

```
LandisData "Drought Generator"
```

```
Timestep 10
```

```
Mu 1.0
```

```
Sigma 0.6
```

```
MapName "drought/DY-{timestep}.img"
```

```
LogFile "drought/droughtgen-log.txt"
```