

# LANDIS-II Cohort Statistics v4 Extension User Guide

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Last Revised: June 15, 2024

# Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>2</b>
1.1	Types of Statistics Available .....	2
1.2	Species Age Statistics .....	2
1.3	Site Age Statistics .....	2
1.4	Site and Species Statistics .....	2
1.5	Major Versions .....	3
1.5.1	<i>Version 4.0 (August 2024)</i> .....	3
1.5.2	<i>Version 3.0 (August 2018)</i> .....	3
1.5.3	<i>Version 2.2 (June 2017)</i> .....	3
1.5.4	<i>Version 2.1</i> .....	3
1.5.5	<i>Version 2.0 (June 2012)</i> .....	3
1.6	Acknowledgements .....	3
<b>2</b>	<b>INPUT FILE .....</b>	<b>4</b>
2.1	LandisData .....	4
2.2	Timestep .....	4
2.3	SpeciesAgeStats .....	4
2.3.1	<i>MapNames</i> .....	4
2.3.2	<i>Statistic List for Species</i> .....	4
2.4	SiteAgeStats .....	4
2.4.1	<i>MapNames</i> .....	4
2.4.2	<i>Statistic List for Sites</i> .....	4
2.5	SiteSpeciesStats .....	5
2.5.1	<i>MapNames</i> .....	5
2.5.2	<i>Statistic List for Sites</i> .....	5
<b>3</b>	<b>EXAMPLE FILE .....</b>	<b>6</b>

# 1 Introduction

This document describes the **Age Cohort Statistics** extension for the LANDIS-II model. For information about the model and its core concepts, see the *LANDIS-II Conceptual Model Description*.

This extension produces a variety of output maps that are specific to age cohorts. Biomass cohort data can be summarized via other extensions. This extension produces maps of values as indicated by the user.

## 1.1 Types of Statistics Available

The following statistics are available (abbreviation in parentheses):

Maximum (MAX)

Median (MED)

Average (AVG)

Standard Deviation (SD)

Richness (RICH) – the number of unique items.

Count (COUNT) – the number of items.

Evenness (EVEN) – a measure of the evenness of the items, based on the Shannon index of diversity ( $H'$ ).

## 1.2 Species Age Statistics

The user can list which statistic(s) to calculate for individual species.

Richness and evenness are not options for species age statistics.

## 1.3 Site Age Statistics

The chosen statistics are calculated based on *all species* present at a site..

## 1.4 Site and Species Statistics

To date, only the **Richness** (the number of species at each site) statistic is an option..

## 1.5 Major Versions

### 1.5.1 Version 4.0 (August 2024)

Updated to be compatible with Core v8.0.

### 1.5.2 Version 3.0 (August 2018)

The Age Cohorts Statistics extension is compatible with Core v7.0.

### 1.5.3 Version 2.2 (June 2017)

Added compatibility with the Metadata library. The Metadata Library outputs metadata for all model outputs, allowing compatibility with visualization tools.

### 1.5.4 Version 2.1

The site-age statistic richness reports the number of unique age classes at each site. The new COUNT statistic reports the total number of cohorts at a site.

### 1.5.5 Version 2.0 (June 2012)

The Age Cohorts Statistics extension is compatible with Core v6.0.

## 1.6 Acknowledgements

Funding for the development of LANDIS-II has been provided by the Northern Research Station (Rhinelander, Wisconsin) of the U.S. Forest Service. Valuable contributions to the development of the model and extensions were made by Brian R. Sturtevant, Eric J. Gustafson, and David J. Mladenoff.

## 2 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 "Output Cohort Statistics".

### 2.2 Timestep

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

### 2.3 SpeciesAgeStats

#### 2.3.1 MapNames

This file parameter is the template for the names of the age output maps. The parameter value must include the **three** variables "**species**", "**statistic**" and "**timestep**" to ensure that the maps have unique names (see section 3.1.8.1 *Variables* in the *LANDIS-II Model User Guide*).

#### 2.3.2 Statistic List for Species

Each statistic (keywords: MAX, MIN, AVG, MED, SD) must be followed by a list of one or more species for which the extension will create age statistic output maps. The species names must follow the parameter name on the same line.

### 2.4 SiteAgeStats

#### 2.4.1 MapNames

This file parameter is the template for the names of the age output maps. The parameter value must include the **two** variables "**statistic**" and "**timestep**" to ensure that the maps have unique names (see section 3.1.8.1 *Variables* in the *LANDIS-II Model User Guide*).

#### 2.4.2 Statistic List for Sites

Each statistic (keywords: MAX, MIN, AVG, MED, SD, RICH, EVEN, COUNT) must be listed on a separate line.

## 2.5 SiteSpeciesStats

### 2.5.1 MapNames

This file parameter is the template for the names of the age output maps. The parameter value must include the **two** variables “**statistic**” and “**timestep**” to ensure that the maps have unique names (see section 3.1.8.1 *Variables* in the *LANDIS-II Model User Guide*).

### 2.5.2 Statistic List for Sites

Each statistic (keywords: RICH) must be listed on a separate line.

### 3 Example File

```
LandisData  "Output Cohort Statistics"

Timestep    10

SpeciesAgeStats

MapNames    output/cohort-stats/{species}-{statistic}-{timestep}.img

MAX         querrubr pinustro << maximum age for each species

SiteAgeStats

MapNames    output/cohort-stats/AGE-{statistic}-{timestep}.img

MAX         << maximum age across all species on site
MED         << median age across all species on site
SD          << standard deviation age for all spp on site
RICH        <<count of cohorts
EVEN        <<evenness

SiteSpeciesStats

MapNames    output/cohort-stats/SPP-{statistic}-{timestep}.img

RICH        <<count of species
```