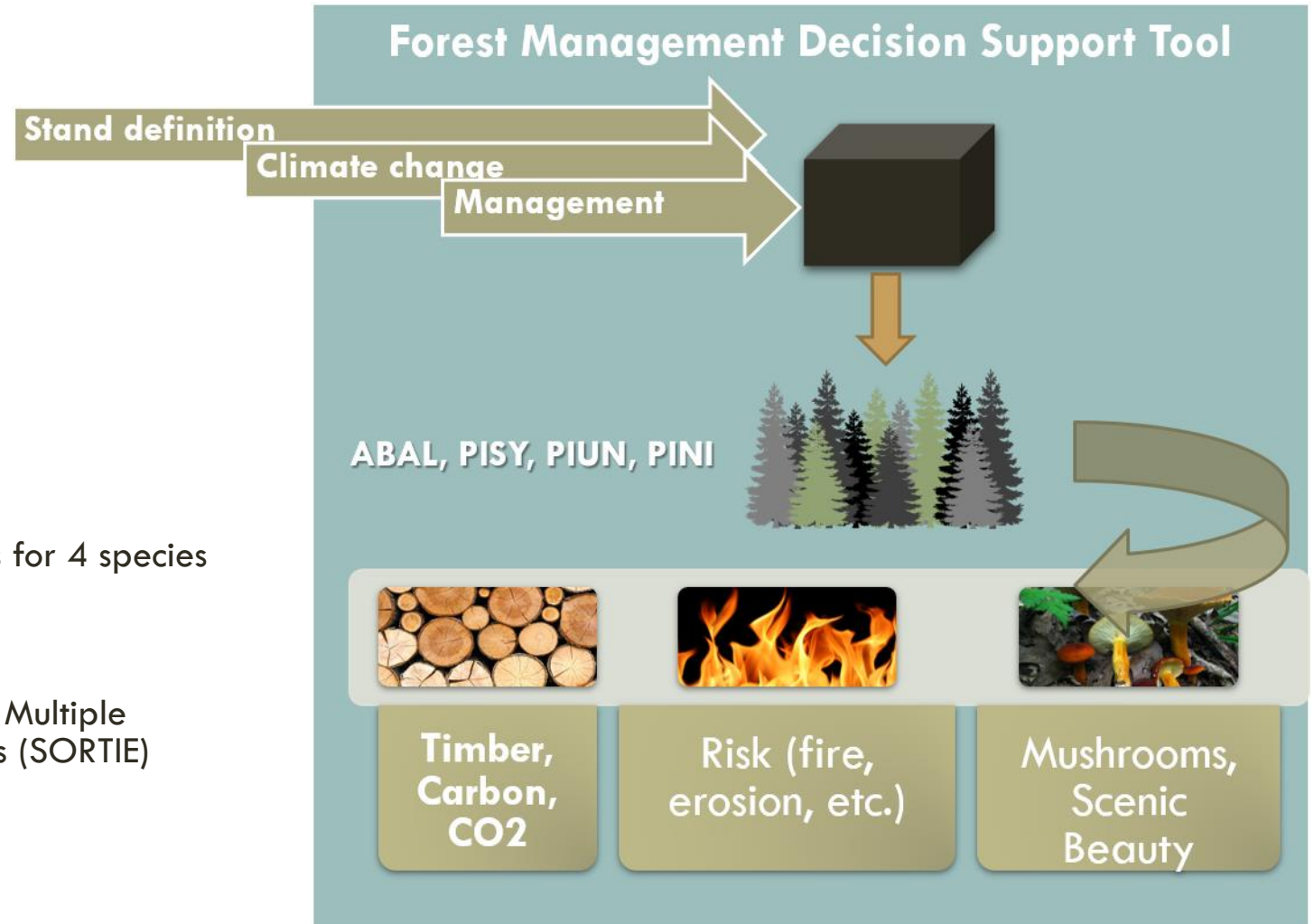
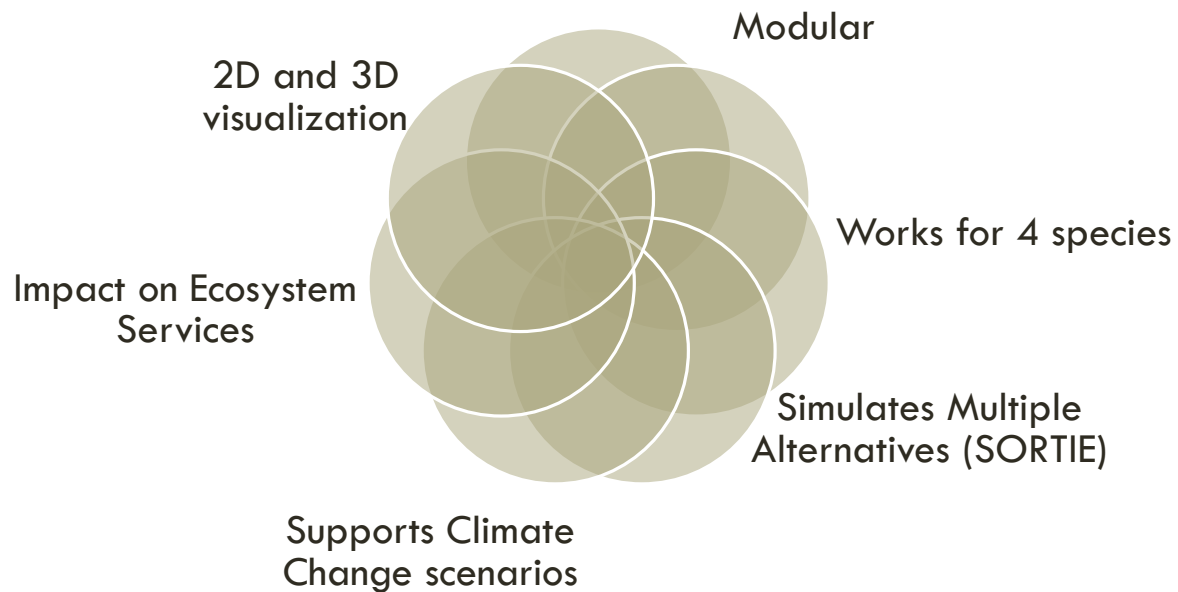
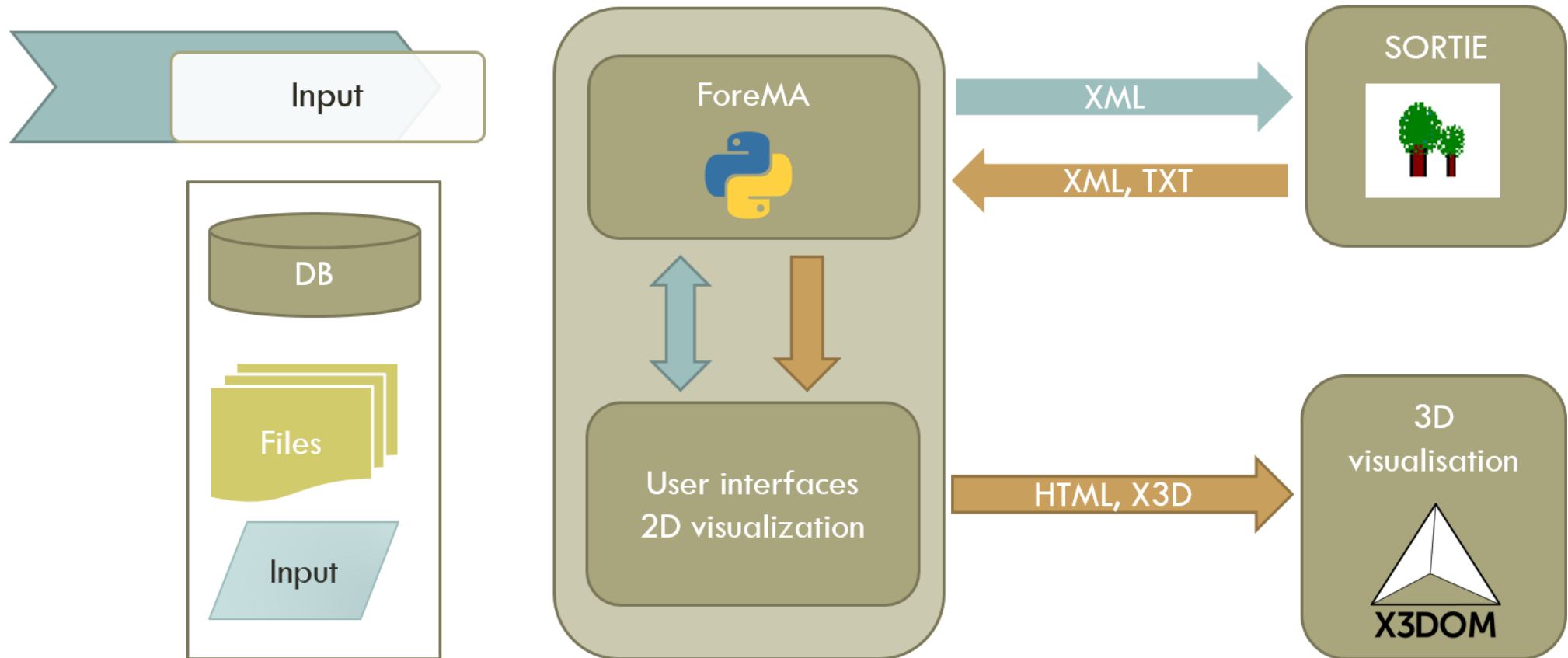




# WHAT IS FOREMA?



# ARCHITECTURE



# HOW IT WORKS?

1

## Input data

Initial stand conditions (trees per dbh class, site characteristics)  
Climate change parameters

2

## Generate Management Alternatives

Combination of thinning years and intensity

3

## Simulate

4

## Visualize

Graphs, tables, 2d interactive maps, 3d scenes

# STAND DEFINITION

The screenshot displays the 'Stand Definition' software interface. The 'Create Stand' dialog is open, showing a list of stand parameters on the left and their values on the right. A red circle highlights the 'road\_distance' parameter in the list. Another red circle highlights the 'dbh class: 15-20' entry in the 'trees distribution graph' section. A third red circle highlights the 'Simulation Horizon (years): 100' field at the bottom right. A 'Change dbh' modal is also open, showing a 'New DBH class' of '10-15'.

File Edit View Help

Initial Stand Climate Management and Simulation Simulation Overview Detailed View

Import Stand

Create Stand

Stand Description

forest_id	1
stand_id	1
latitude	42
longitude	42
precipitation	950
temperature	10
slope	20
aspect	1
elevation	950
road_distance	100

forest\_id 1

stand\_id 1

latitude 42

longitude 1.5

precipitation 950

temperature 10

slope 20

aspect 1

elevation 950

road\_distance 100

Select number of species: 1

trees distribution graph

PISY PISY PIUN PINI

dbh class: 14-15 700

dbh class: 15-20 800

Change dbh ... ? X

New DBH class:

10-15

OK Cancel

Simulation Horizon (years): 100

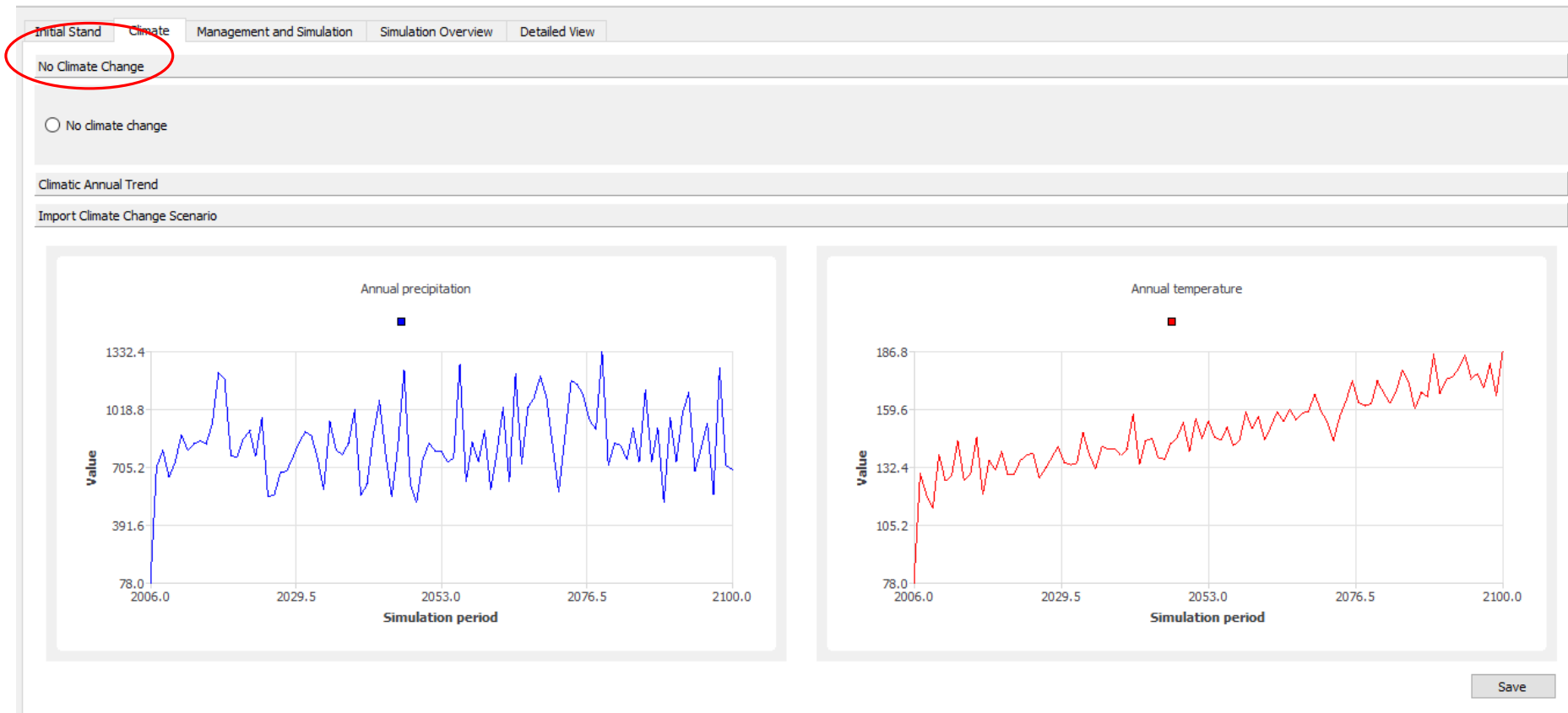
Save

Specify simulation horizon  
And save

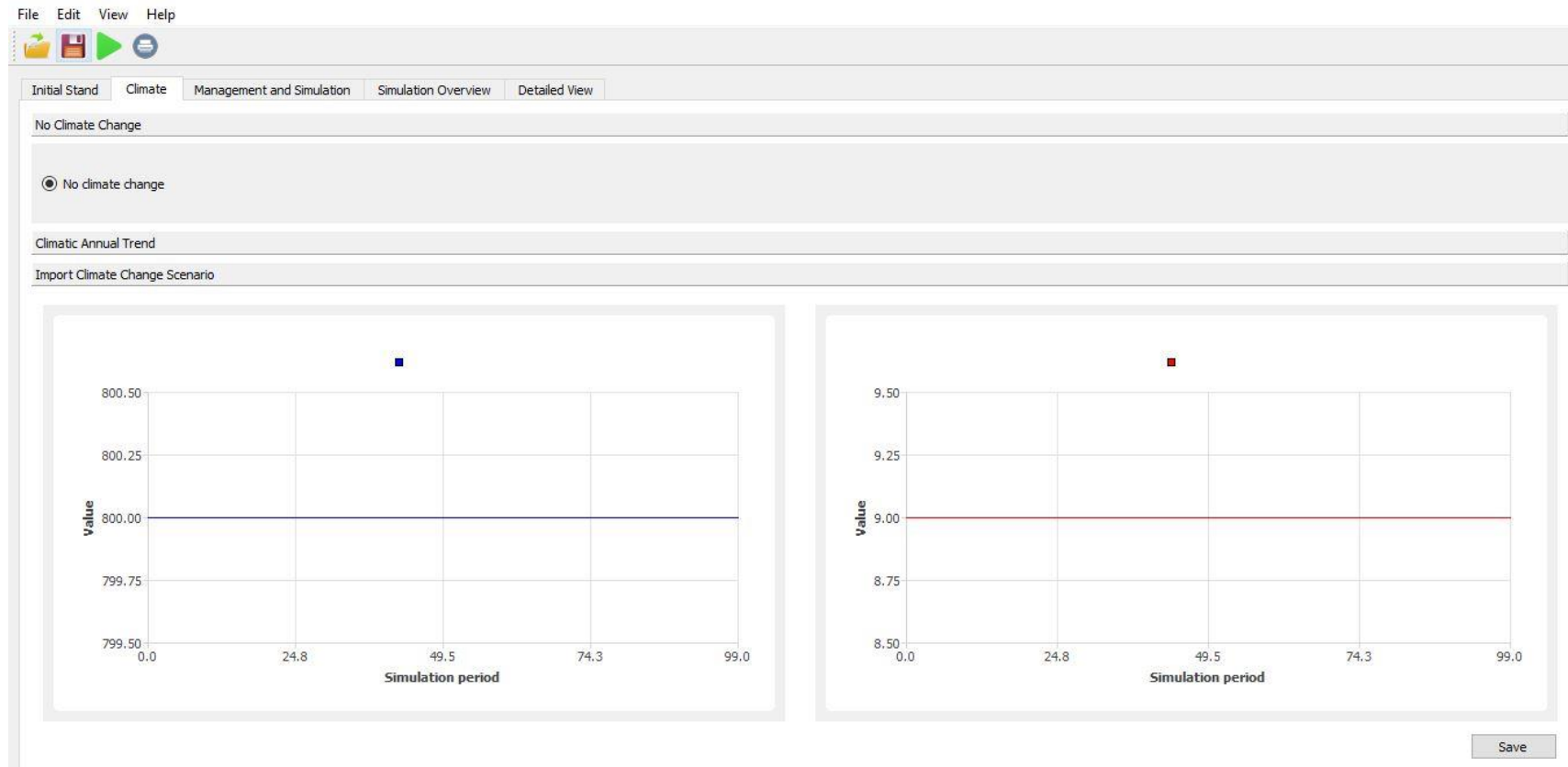
# CLIMATE TAB

1. No Climate Change (precipitation and temperature will remain constant during the simulation)
2. Climatic trend (climate is altering each year based on specified coefficients)
3. Climatic Scenario files Import

# EDIT CLIMATE



# CLIMATE TAB — NO CLIMATE CHANGE





# MANAGEMENT

1. Number of thinnings
2. Thinning Years
3. Thinning Type (Percent of Density or Percent of Basal Area)
4. Apply to which species
5. Amount to cut per each thinning (can be different for each DBH class)

# MANAGEMENT INTERFACE

The screenshot displays the 'Management and Simulation' tab of a software interface. It includes a menu bar (File, Edit, View, Help), a toolbar, and several configuration panels. Red annotations highlight the following steps:

- Step 1. Select number of thinnings:** Points to the 'Number of thinnings' spinner set to 4.
- Step 2. Define thinnings: year, species to cut, type:** Points to the 'Thinning years' table.
- Step 3. Amount to cut per DBH class:** Points to the 'Thinning Table'.
- Step 4. Define Final Cut:** Points to the 'Dissemination cut year' and 'Final cut year' options.
- Step 5. Save:** Points to the 'Save as ...' button.
- Step 6. Simulate:** Points to the simulation controls (stop and play buttons).

**Thinning years configuration:**

Thinning years:	2	22	42	62
Apply to species:	All	All	All	All
Thinning Type:	Basal Area (%)	Basal Area (%)	Basal Area (%)	Basal Area (%)
Tallest First	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Thinning Table: Amount to cut per DBH class per thinning**

	Thinning 1	Thinning 2	Thinning 3	Thinning 4
dbh class: 10-20	37	33	35	40
dbh class: 20-30	37	33	35	40
dbh class: 30-40	37	33	35	40
dbh class: 40-100	37	33	35	40

**Final Cut Configuration:**

	% BA to cut
<input checked="" type="checkbox"/> Dissemination cut year	72
<input type="checkbox"/> Final cut year	82

# VISUALIZATION

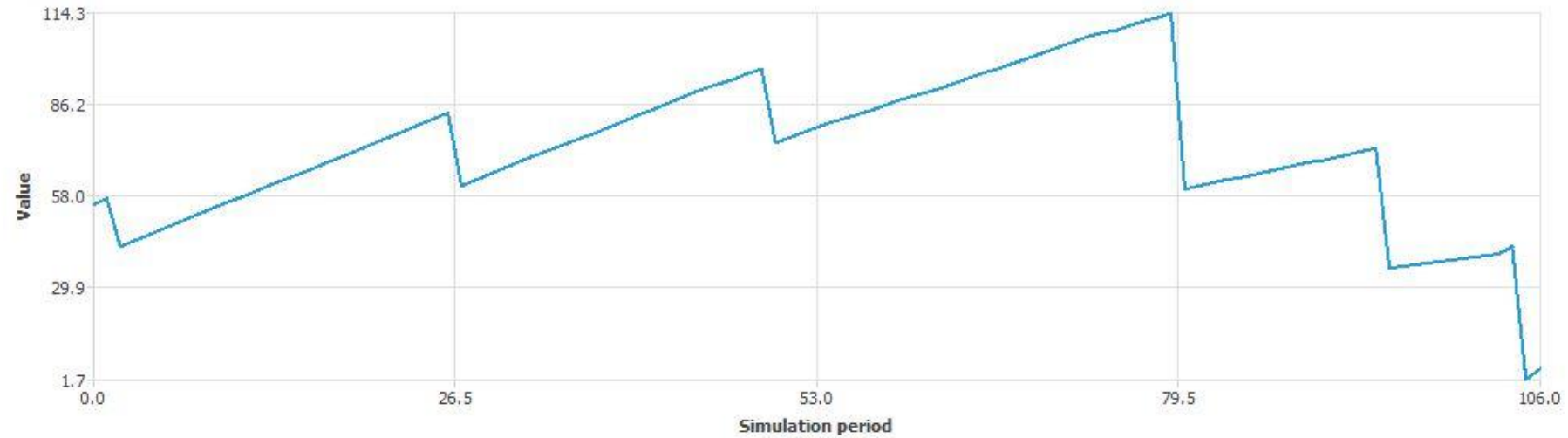
Simulation Overview

Detailed View of the stand per each simulated year

# SIMULATION OVERVIEW — BASAL AREA

Select variable to visualize

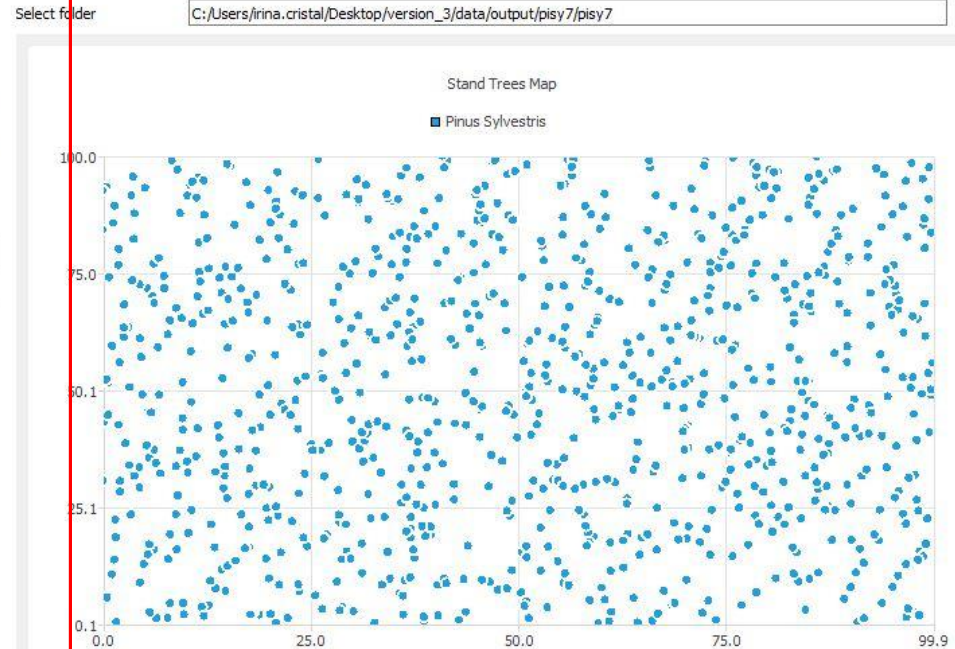
standing\_timber



# DETAILED VIEW

## Tree Map

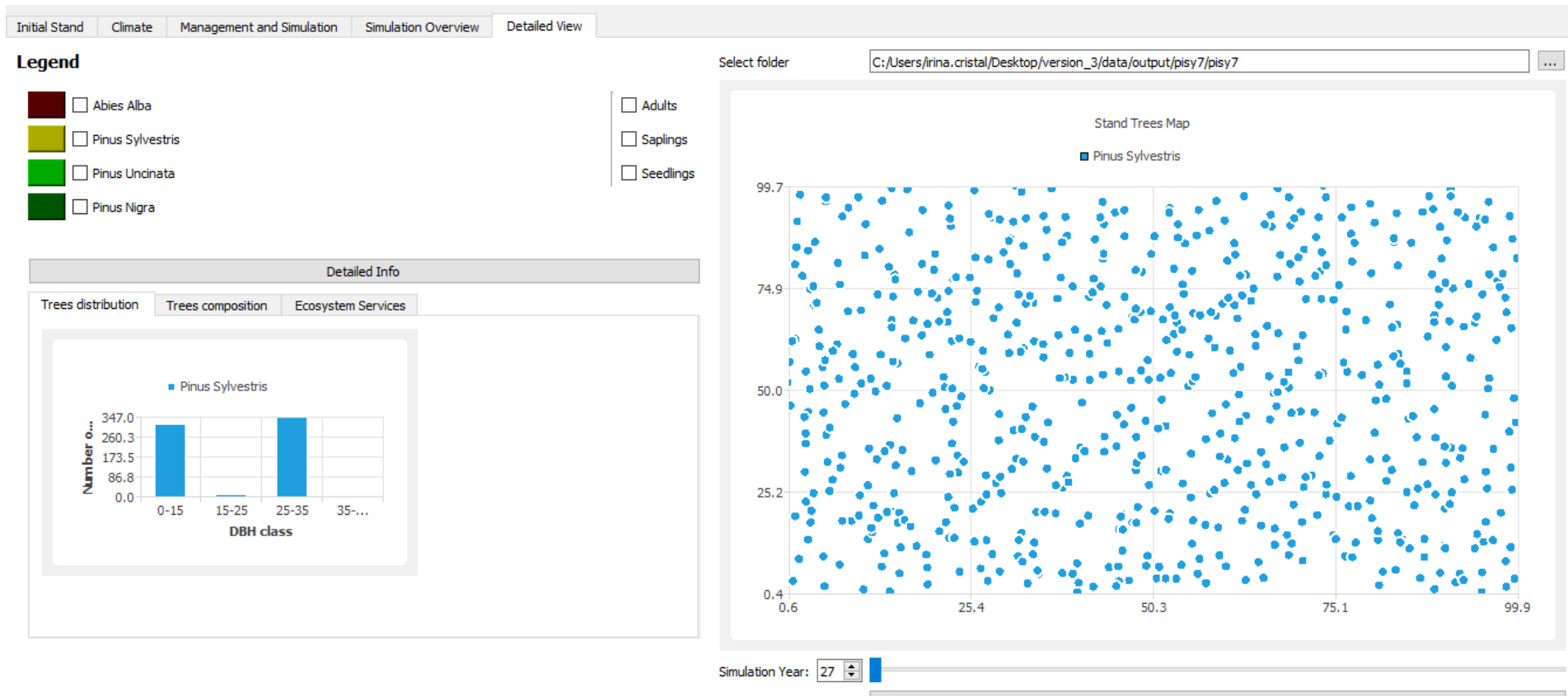
**Additional Info:**  
Trees distribution  
Ecosystem Services



Simulation Year: 18

Change Simulation Year

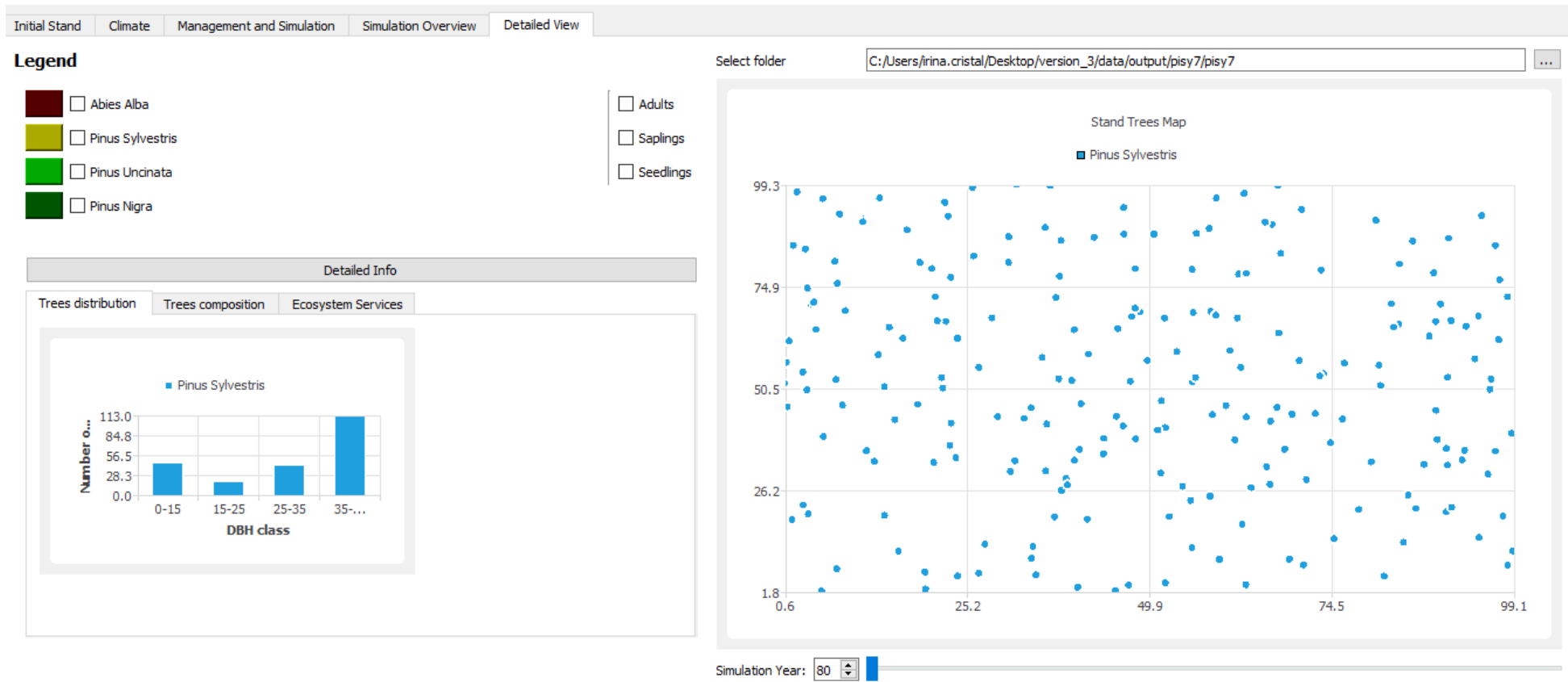
# DETAILED VIEW: 2ND THINNING (YEAR 27)



# DETAILED VIEW: 3RD THINNING (YEAR 50)

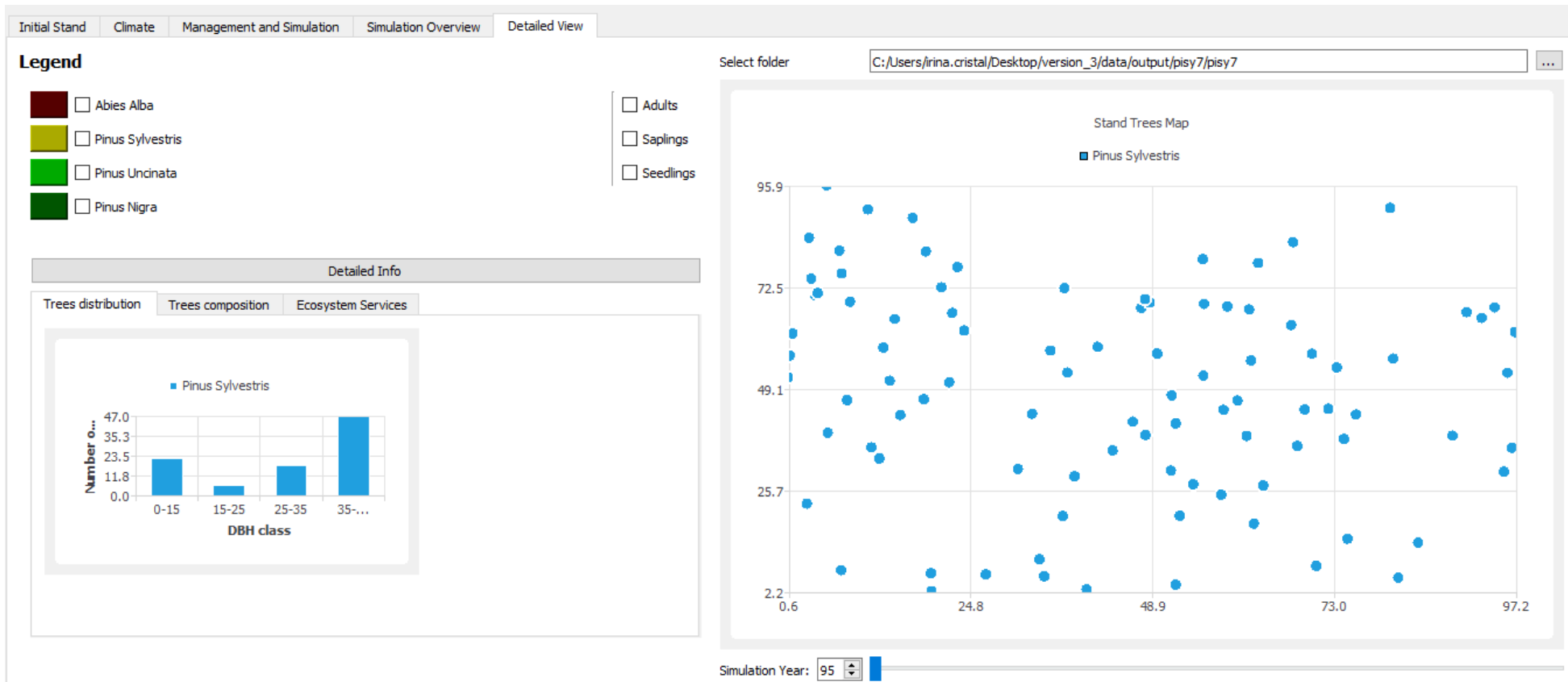


# DETAILED VIEW: 4TH THINNING (YEAR 80)

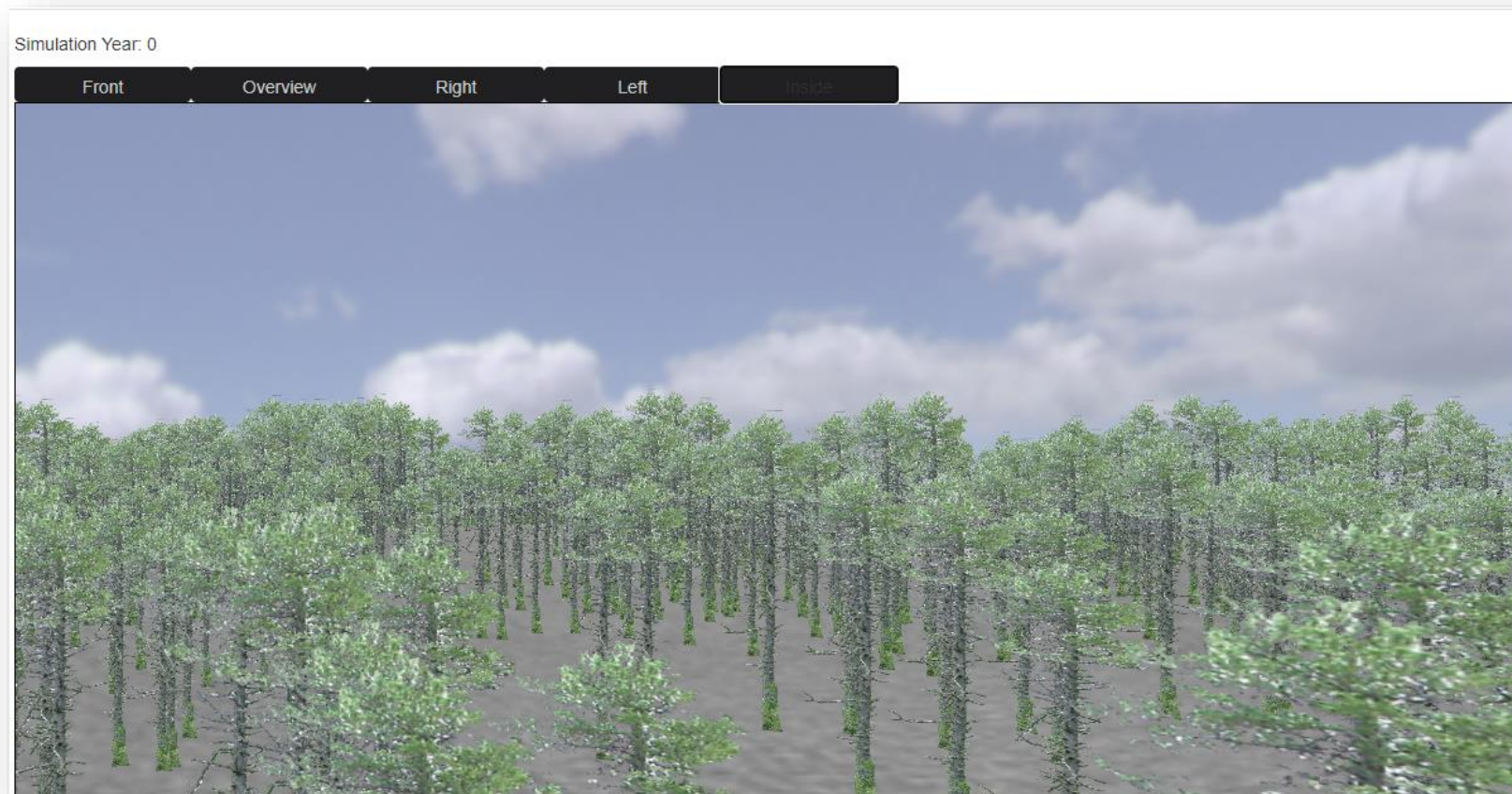




# DETAILED VIEW: DISSEMINATION (YEAR 95)



# 3D VIEW



# ADDITIONAL INFO

## Publication:

Cristal, I.; Ameztegui, A.; González-Olabarria, J.R.; Garcia-Gonzalo, J. A Decision Support Tool for Assessing the Impact of Climate Change on Multiple Ecosystem Services. *Forests* **2019**, *10*, 440.

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