A. glossary of terms

## **Model Organization**

SyncroSim has ‘levels’ of structure to help users organize their work, and to make sure that model inputs are in the best place for the software to run properly.

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| **Library** | The foundational structure or database that organizes and stores the model components, including the defined states, the transitions between states, and the probabilities associated with each transition |
| **Project** | The container where the components for the modeling project are stored. A project may include different types of disturbances, state types, ecosystems, or species; each project holds its own set of assumptions, scenarios and configurations for a particular modeling exercise. In this classroom setting, one project is used to keep the focus on learning the principles of state and transition modeling. |
| **Scenario** | The unique “location” where the models are built, run and modified. Within each scenario, model parameters can be adjusted to simulate different possible futures. Model outputs are created following each run and can be used to inform scenario adjustments. |

## **specific model definitions**

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| **State class** | A practical tool in SyncroSim to monitor, sort and track the development stages of an ecosystem (early, mid, late). The state class sets the growth timeline of an ecosystem using start and end points. Students can interactively experiment with these stages and timelines, providing an adaptable model for ecosystem development. |
| **Start and end time steps** | The duration over which the state of a system or ecosystem is observed or predicted. During the time span the model simulates how the forest transitions through various states based on probabilities, simulated disturbances, and other factors. |

## **specific model definitions (continued)**

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| **Transition** | A shift of a system or ecosystem from one state to another over time due to natural processes, disturbances, or human interventions. For example, a closed canopy forest may transition to an open canopy forest due to flooding or fire, creating a new system “state”. |
| **Probability** | The likelihood of a certain transition happening within a timestep (1 timestep = 1 year). In ecology we typically do not think in terms of probabilities, but rather in terms of ‘return intervals’, or the amount of time that typically passes between events such as hurricanes. For SyncroSim we can convert return intervals into probabilities by dividing 1 by the return interval. For example, if you predict a 25 yr. return interval for grazing you would do this math to get the probability: 1/25 = 0.04 |

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| **State labels** | User-defined state labels are simply the names or identifiers given to the various states that a system or ecosystem can be in. In the following screenshot we see labels such as “Mid2” and “CLS”. For LANDFIRE these terms were variable from ecosystem to ecosystem. For example, the “Early1” class might last from 0-5 years in one ecosystem, or from 0-20 years in another. It is all based on what the modeler thought was appropriate. Similarly, “OPN”, “CLS” and “ALL” are user defined. OPN (or ‘open’) might mean -20% canopy closure in one ecosystem, and 0-50% in another. These specifics for LANDFIRE are defined in the [Biophysical Settings Model Descriptions](https://www.landfirereview.org/). |

## **State labels**

