ENVISION TUTORIAL I

LA 494/594 Landscape Planning and Design Studio
Department of Landscape Architecture / University of Oregon
Johnson/Ribe/Mhuireach Fall 2013

What is ENVISION?

ENVISION is a GIS-based tool for scenario-based community and regional planning, and environmental assessments. It combines a spatially-explicit polygon-based representation of a landscape, a set of user-defined policies (decision rules) that are grouped into alternative scenarios, landscape change models, and models of ecological, social and economic services that together simulate land use change. It can be used to provide decision-makers, planners, and the public with information about resulting effects on indices of valued landscape products.[1]

Why are we using it in studio?

The development of resilient landscapes that can maintain desired ecological, economic and social conditions in the face of rapid global change is an important goal for planners and landscape architects going into an uncertain and likely different future than has been experienced in past human history. Mitigation and adaptation are two widely discussed strategies for responding to climate change, but the idea of climate adaptation has been the least developed. In this studio we will consider three types of adaptive strategies: resistance, resilience and facilitation. We will encourage teams to explore all three types of strategies — how they can be expressed in terms of measurable landscape characteristics, what trade-offs may occur between benefits (like quality of life) and detriments (like wildfire risk), and how policy decisions can be linked to supportive, site-scale interventions.

[1] Modified from http://envision.bioe.orst.edu/

ENVISION TUTORIAL I: Outline

1. Start Envision and use the “Find Existing Project” button to navigate to Study Areas folder, Eugene.envx file, if that file is not already in the “Project File to Use” box. Then click “Open”.
2. When it finishes loading you should see a map of the study area colored according to “Coarse-Articulation Land Use” and the Home tab along the top of the window should be active.
3. From here, first practice changing the field that is shown on the map — to do this, right-click anywhere in the window that is NOT part of the map then choose a new field from the list that appears. Use the down arrow in the lower right to scroll to other fields, including the see “Additional Fields” submenu at the bottom of the list. If you right-click on part of the map you can still navigate to the field list, but it is at the bottom of the context menu that appears.
4. Next, click over to the Map tab at the top of the window (you can explore the Data Preparation tab at your own leisure). Try using the zoom in, zoom full and pan functions. To zoom in, click the button and create a rectangle around the area you want to view in greater detail. If you do this and zoom out instead, you may be outlining a box too close to the edge of the screen. Every time you zoom in, you must click the button first.
5. Now, let’s run a scenario. Click the Run tab at the top and then choose one of the scenarios from the drop-down list. The default value for length of run is 50 years — change this to 20 years if you want to make the run finish quicker.
6. After it finishes, click on Postrun Results near the upper left of the screen. On the sidebar that appears, you can click each title to drill down for information like tables, graphs and maps. You can also open multiple output windows simultaneously for comparison.
7. First let’s open a single map - you can choose any of them. Within the Postrun Results you can still click the Map tab and manipulate the map by zooming and panning.
8. Then try opening multiple maps. When you have these maps open, you can view landscape changes over time by either clicking on the play button in the lower left corner or by dragging the slider bar at the bottom of a window. All of the maps will stay in synchronization, both in the playback of landscape changes and in the area shown when zooming and panning.
9. Close all of the map windows and expand Graphs on the sidebar. The graphs we will use the most are probably Model Results and SWCNH-Pre. Again, you can open multiple graphs at the same time, either within a single scenario run or across multiple runs.
10. Finally, we can look at spreadsheet-style tables that summarize variables of interest. Specifically we will focus on the Policy Application Rates, Summary of Policy Applications, and Global Constraints tables.

Definitions:

IDU — The IDU coverage is a polygon-based GIS database that stores the spatial representation of the landscape and contains attributes required for policies and models used in the analysis. In the case of our study area, the IDUs are formed by the intersection of taxlot parcel boundaries and soil phase polygons. They vary in size from < 0.1 ha in urban areas to a maximum of 5 ha on slopes <=10% and 2 hectares on slopes >10%.

Actor — Actors are the entities in ENVISION that make decisions about policy selection and land use change on individual IDUs. Actors are characterized by 1) their defined propensities for different types of decisions, 2) the values they hold about landscape productions and conditions, and 3) the attributes of the IDU's for which they have responsibilities for policy selection and implementation. Envision may contain multiple agent types, each with different decision propensities and spatial distributions.

Policy — Policies in ENVISION represent the fundamental unit of decision-making – they define and constrain the range of possible decisions an actor can make, and define the outcomes resulting from an actor selecting and applying the policy to an IDU.

Scenario — Each scenario is comprised of a selected group of policies that are available to agents in that scenario, as well as other variables that define scenario-specific conditions and processes, such as landscape feedback, population allocation, budget and climate parameters.

Evaluative Model — An evaluative model provides ENVISION with metrics of landscape production. They use ENVISION's representation of the current IDU coverage at any time step to compute a "scarcity" metric describing how that landscape is performing at providing the metric of interest. The metric is used as a landscape-level feedback that increases agent propensities to adopt supportive policies when the production of interest is in short supply (scarce) or reduce policy adoption when the production is already abundant.

Scarcity — We use the term "scarcity" to indicate an insufficient supply of desired goods or services relative to some reference condition, including, in our usage, biodiversity and supportive ecological processes and services.

Eugene.envx File — The file controls which policies are "turned on/off" for each scenario, and defines other global and scenario parameters such as the modification of an annual fuels treatment and restoration budget. See "scenario."

Policies.xml File — The file that defines each individual policy in terms of the site attributes that control where and when it may be applied and the outcomes of its selection. This file allows changes to be made to specific policies, or new policies to be created.

'Expand' Function — A command in ENVISION that applies the outcome of a policy to be applied to adjacent IDUs that have the specified attributes, so that larger "nuggets" or clusters of landscape change can occur.