UPlan Tutorial:

Contents:

Note: The following is intended to be a general overview to UPlan; it is not a technical operating guide. Additional in-depth resources are located at http://www.ice.ucdavis.edu/um/

Section I: Introduction to UPlan

About UPlan

- **UPlan was developed at** the Information Center for the Environment at UC Davis.

- **Funding for UPlan** comes from the California Department of Transportation, University of California Transportation Center, the California Energy Commission, U.S. Department of Energy, U.S. Department of Agriculture, and the Mineta Institute at California State University San Jose.

- **UPlan** is used to help regions study the interactive effects of growth and development by projecting future land-use patterns. It shows how decisions made today are most likely to impact the region decades into the future.

Because the user can choose all the inputs, one can 'model' (i.e. create a computer generated simulation) the future based on current trends or an infinite number of alternative futures by modifying the inputs and assumptions that govern the model.

The output of UPlan is provided in a user-friendly map format designed to facilitate regional consensus building and enhance the decision making process.

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Section I: Introduction to UPlan

A 'Rule-Based' Model

Beginning with the population forecast for the year 2050*, UPlan relies on a basic set of rules to 'grow' the region:

- People take up space
- People live in groups (aka Households)
  - Different households types take up different amounts of space (Residential Densities)
  - The number of new households multiplied by the space needed per household equals the total residential space needed
- Some portion of each household is employed
  - Different forms of employment require different amounts of space
  - The number of employees multiplied by the space needed per employee equals the total employment space needed
- Each residential type has distinct "things" that attract or discourage growth
- Each employment type has distinct "things" that attract or discourage growth
- Some "things" prohibit all growth
- The General Plan determines where each type of growth can go
- Growth will happen first in the most attractive areas and then work its way down until all new growth either has a place to go or we run out of appropriately zoned space

*Forecast population is based on a combination of data from the California Department of Finance, the Shasta County Travel Demand Model, and localized refinements from the SF>> Technical Advisory Committee.

Attractions & Discouragements

Attractions

Attractions are characteristics that encourage or induce certain types of development. Attractions may include natural features (e.g. land with minimal slope is attractive to industrial development), man-made features (e.g. areas with existing water and sewer infrastructure is attractive to residential development), and/or political features (e.g. tax credits and other incentives within an enterprise zone is attractive to commercial development).

Discouragements

Discouragements are characteristics that deter or hinder certain types of development. Discouragements make it more difficult or more expensive to develop (e.g. areas with unstable soils may need additional engineering, materials, and labor before it may be developed), and/or it is simply a less desirable location (e.g. noise pollution under the flight path of a busy airport).

Weighting, Buffers & Masks

Weighting

Each attraction and discouragement layer has its own user-assigned point value or 'weighting'. For example, it may be absolutely essential for an industrial development to locate in an area with access to municipal water and sewer (maximum number of attraction points). This may not be very important for low-density residential where a well and septic system would suffice (low attraction points).

Buffers

Attractions and discouragements may be surrounded by a user-specified sphere of influence or 'buffer'. The user decides the number and width of buffers. Typically the highest attraction or discouragement value is given to areas closest to a selected feature; lesser values are assigned in graduating degrees the farther away it is from that feature.

For example, the maximum number of attraction points for a regional shopping center may be given within a ¼ mile radius surrounding a freeway off-ramp. A lesser number of points would be given to the same development if it were located between ¼ and ½ mile from a freeway off-ramp.

Masks

The user may also set aside certain areas as an exclusion or a 'mask'. A mask is completely ignored by UPlan, having no potential for development. Due to the uncertainty of future land-use policies decades into the future, the use of masks is limited to bodies of water, permanent land trusts, national park lands and such.

Allocating New Growth

Cells

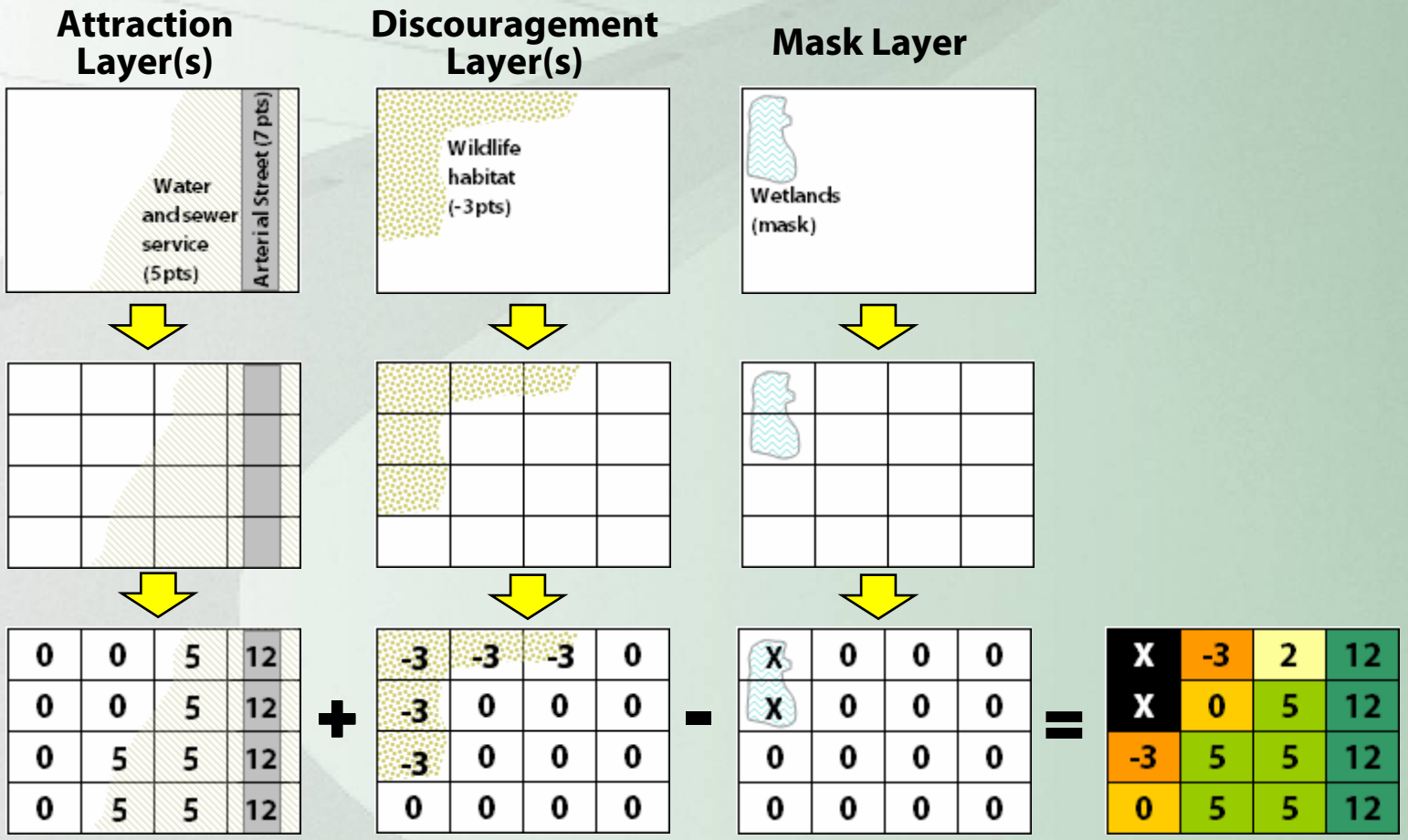
UPlan does not recognize parcels of land, rather it divides the entire project area into a grid of equally sized 'cells'. In our model, each cell equals an area 150 ft by 150 ft. Each cell may have any number of overlapping attraction or discouragement layers. The combined point values of all attraction and discouragement layers determine if and when each cell will be developed in the future.

UPlan calculates the sum of all attraction/discouragement values within each respective cell in order to prioritize the allocation of new growth. Cells with the highest combined attraction point value will be developed first. Cells with lesser attraction point values may be developed, but only after all other cells with a greater attraction value have been exhausted.

Section II: Operating Principles & Inputs

Allocating New Growth

Below is a simplified representation of how the process works:



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Creating Scenarios

Current Trend Scenario

The 'Current Trend' scenario is based on demographic trends and current land-use policies. It is not what we *hope* will happen, but what *is* happening played out over the next few decades. In other words, if we continued to develop in the same fashion as we are now, this is what the future will most likely look like.

Whether or not this trend is good or bad depends upon how well it matches up with our local values and priorities and how it compares to other alternative growth scenarios.

Alternative Scenarios

Alternative or 'what if' scenarios try to improve upon the Current Trend scenario in some way; it is an attempt to better align the future growth and development of the region with local values and priorities.

UPlan allows the user to explore a variety different futures by adding or modifying any variable, so long as data is available.

Conclusion

In Summary

We know what correlates with growth; we know the attractions and the discouragements…

- Based on observations worldwide
- Based on observations locally

We put these variables into a 'model' that follow rules…

- We watch the interactions
- We compare to experience (calibrate)
- We make human judgments (validation)

We use the outcome to help facilitate the public's understanding of growth related issues and to assist decision makers in regard to land use policies and transportation investment strategies needed to accommodate new growth.

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