Urban growth in the Treasure Valley of Idaho: Past, present and future

Khila Dahal; Chris Felt; Eric Lindquist
Public Policy Research Center (PPRC)

B
BOISE STATE
UNIVERSITY

This research focuses on:
- Spatiotemporal trajectories of urbanization in the Treasure Valley
- Prediction of future growth

Data and sources:
Cadastral parcels; assessor records; high resolution aerial imagery; US censuses

Methods and Results:
- Urban extent maps were created for eight different years between 1938 and 2014 (first two columns in Figure 1) by reclassifying and merging developed parcels.
- Urban extent maps for different years between 2015 and 2100 were generated by predicting future growth. A vector-based logistic CA (cellular automata) model was implemented for simulating the future scenarios. Results of a baseline scenario with the current rate of urbanization is shown in the last two columns of Figure 1.
- The total urban area increased continuously with a varying average annual growth rate until 2014, and then steadily with more or less a stable rate (Figure 2). This is because the baseline simulation model uses a fixed growth rate of ~ 1.7.
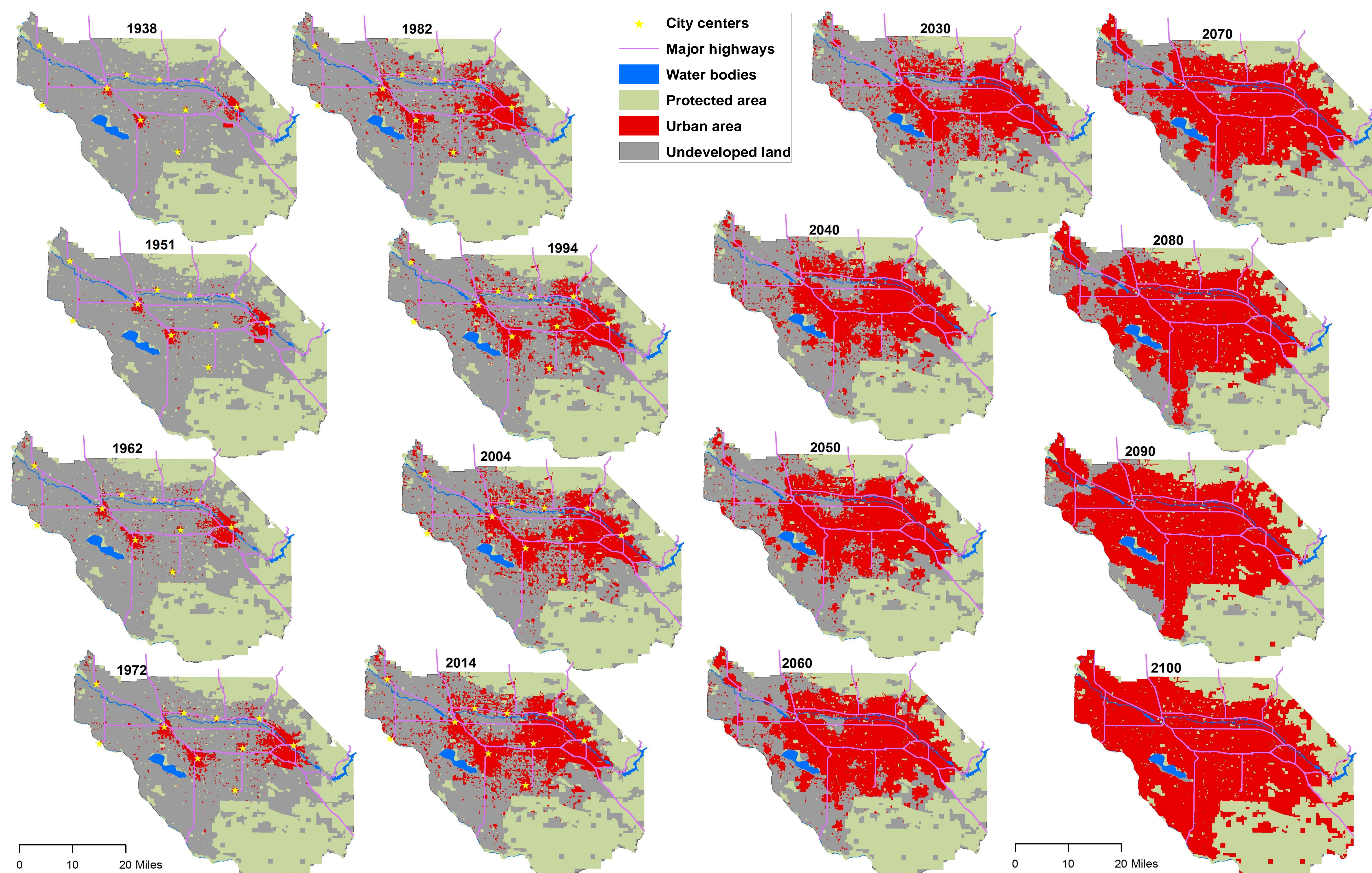

Figure 1: Historical and future snapshots of urban area in the Treasure Valley.

Legend:
- ★ City centers
- — Major highways
- Water bodies
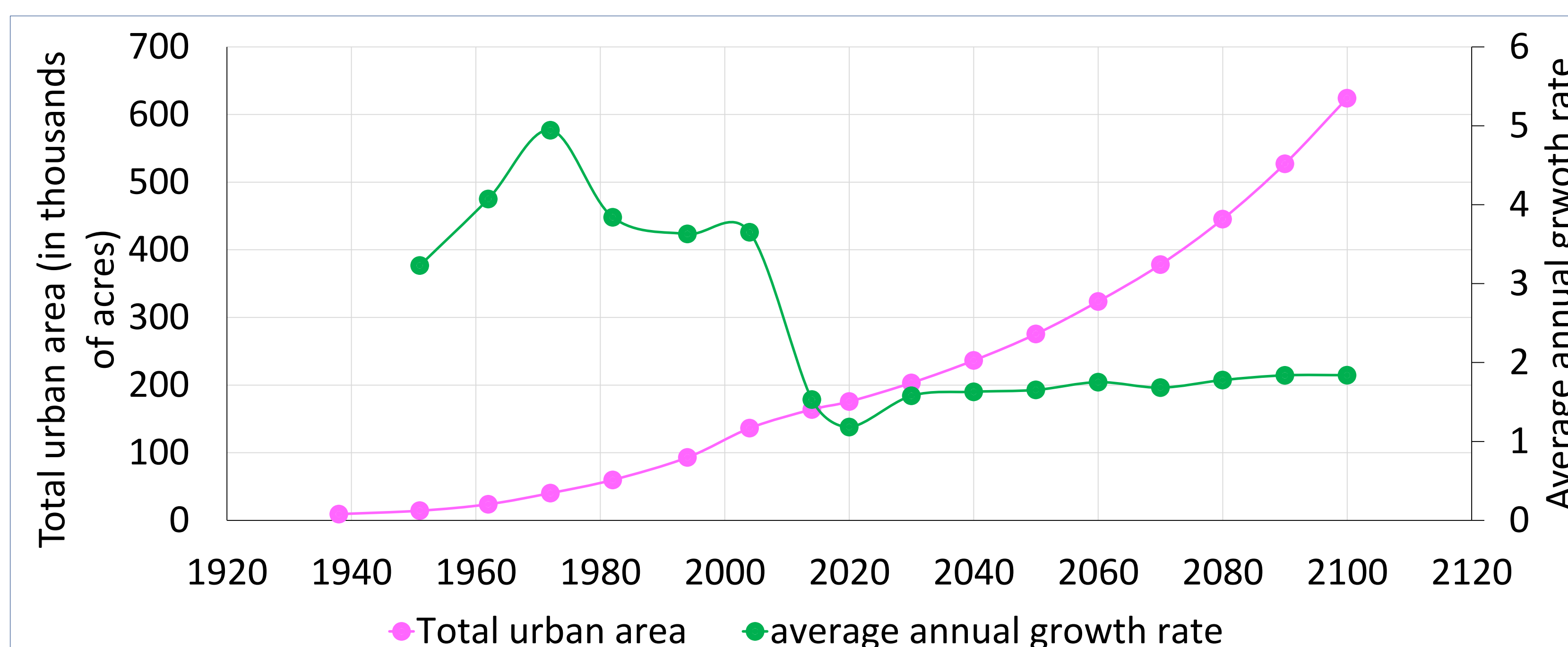- Protected area
- Urban area
- Undeveloped land

Figure 2: Longitudinal data on total urban area in the study area, and average annual change rates of population and urbanization. The average annual change rate at year t was computed as $((n_t - n_{(t-m)}) / n_{(t-m)} * 100) / m$, where n is the total population (or urban area) at time t, and m is the number of years in a change period.

Connections and Integration
Characterization of urbanization and prediction of future growth (i.e. this project) is closely associated and integrated with other projects including:
- Hydrological modeling and generation of future scenarios of water consumption and water availability as the current and future urban land use status should be utilized either as input data or model parameters
- Recreation and wildlife studies as the wildlife and related ecosystem services are directly and indirectly impacted by the increasing urbanization
- Agricultural research as urban growth directly influences land values, farmer decisions and probability of land conversion etc.
- Stakeholder engagement as the urban growth simulation model itself is used by people responsible for urban management

Future foci
- Simulation of additional growth scenarios likely to characterize the future Treasure Valley
- Further enhancement of the simulation model so as to make it more automated, user-friendly and robust
- Modeling and quantifying the social and ecological impacts of these different growth scenarios.