

Zoning, Land-use Fragmentation And Environmental Justice In Early Phoenix, AZ

Joseph Tuccillo¹, Abigail York¹, Bob Bolin¹, Briar Schoon^{1,2}

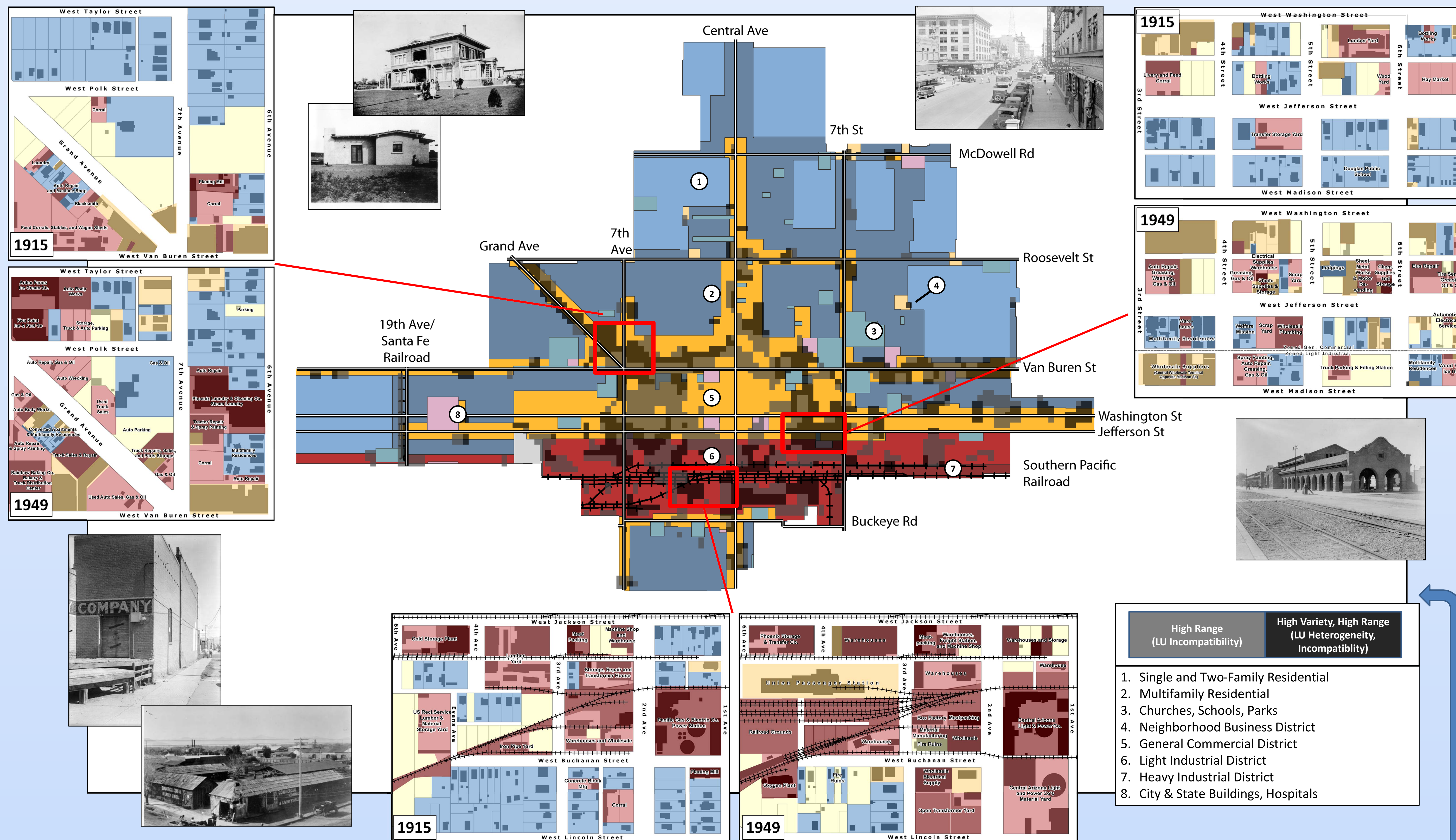
School of Human Evolution & Social Change, Arizona State University, Tempe, AZ, 85281; School of Sustainability, Arizona State University, Tempe, AZ, 85281

Background

- Euclidean Zoning adopted by Phoenix in 1930 to promote urban health/efficiency through rigid separation of land-uses
- Effects of zoning have often run counter to this. Posited that zoning decisions in Phoenix have over time created “random” (fragmented) land-use designations (Talen 2011)
- Building from this: does the early onset of zoning in Phoenix promote fragmented land-uses *within* zones themselves?
- Comparison of land-use in Phoenix pre (1915) and post- (1949) zoning using parcel-level land-use coverages generated from Sanborn Fire Insurance Maps
- Environmental Justice emphasis: identifying community exposure to nuisances and hazards

Analysis

- Case study area: 1915 Sanborn Map Coverage of Phoenix
- Digitization/editing/analysis performed using ESRI ArcGIS
- Metrics: **Variety** (LU Heterogeneity): unique LU's/cell; **Range** (LU Incompatibility): Distance between LU classification scores. Higher Range = greater land-use conflict
- Aggregated to two 1/20 mile fishnets to capture block and corridor-level interaction effects



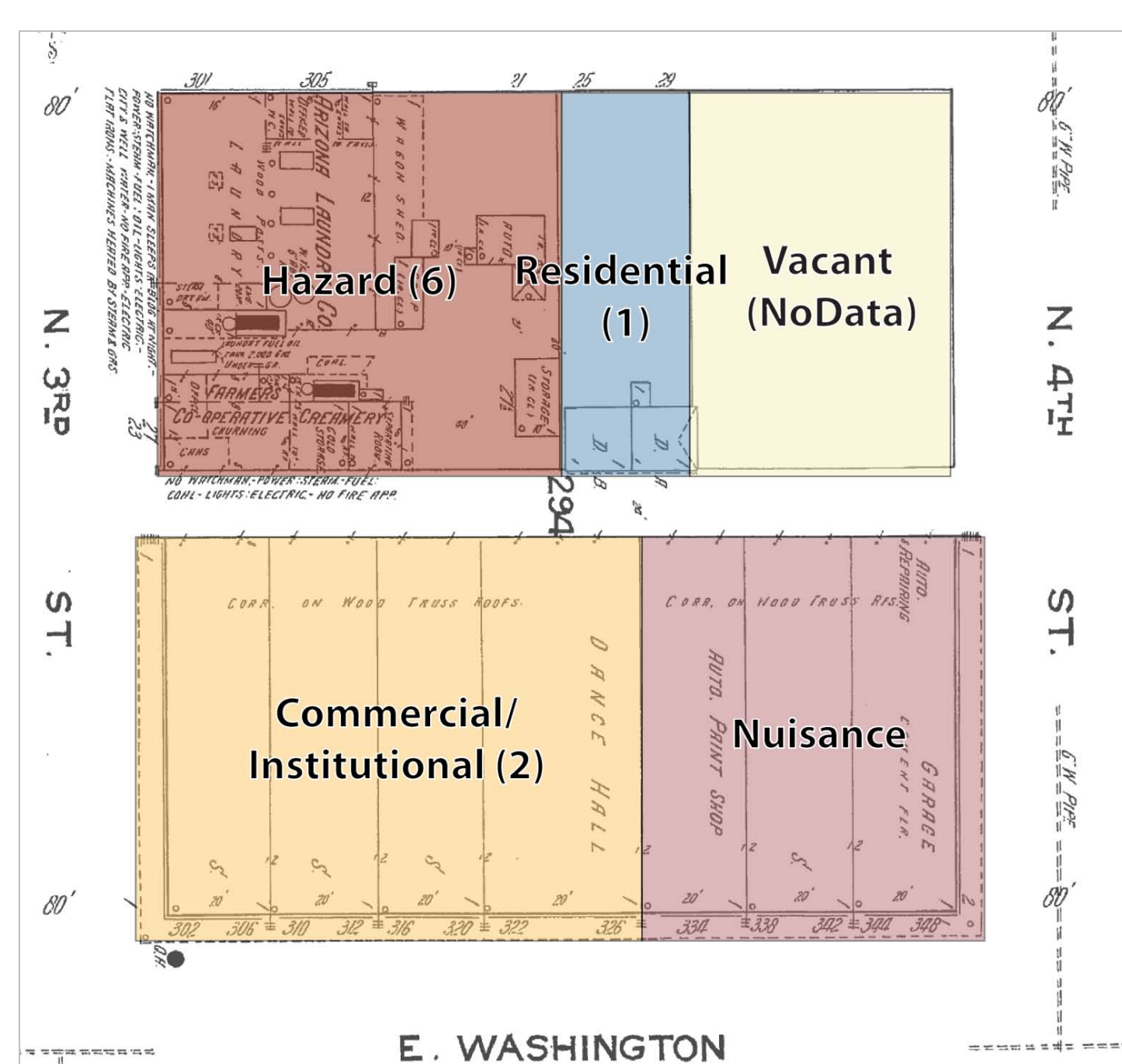
Results

- LU Heterogeneity and Incompatibility each spread with the onset of zoning in Phoenix
- Spread of nuisance LU's along major thoroughfares (Van Buren, Grand, Central) and clustering around CBD
- Increase 1915-1949 in residential exposure to nuisance land-uses: dispersion of nuisances
- Slight decrease 1915-1949 in residential exposure to environmental hazards: concentration of hazards
- Net decrease in LU homogeneity/compatibility: Decrease in perfect homogeneity; increase of relative LU compatibility (i.e. along N. Central Ave corridor, RR-oriented land-uses)

Discussion

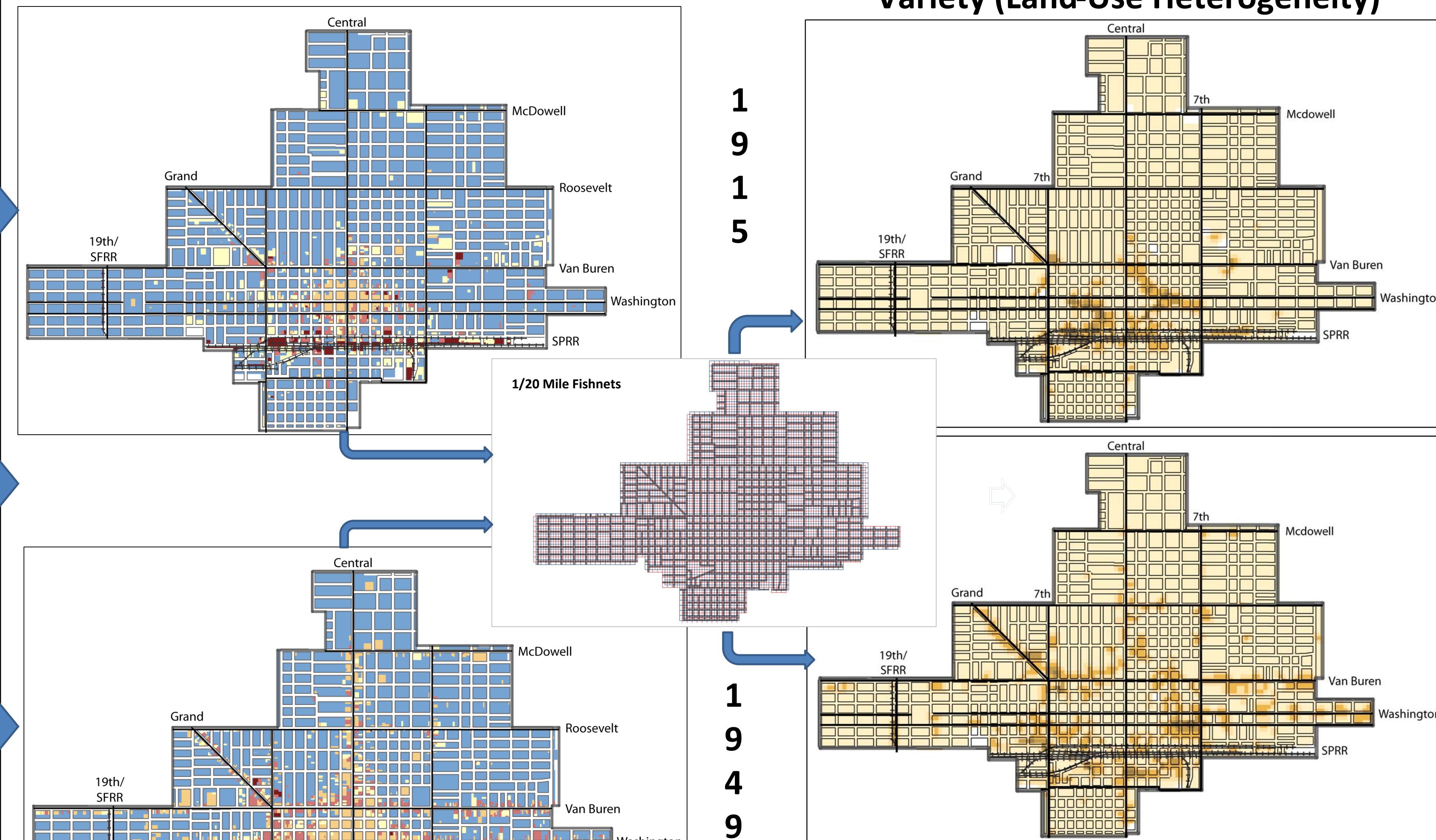
- Permissiveness of nuisance LU's (esp. automotive services, warehouses & wholesale) under Phoenix's original zoning ordinance
- Persistence of older minority neighborhoods within areas rezoned Gen. Commercial and Light Industrial
- Multifamily Residential zones as buffers between homogeneous, racially-restrictive single-family neighborhoods and disamenity zones
- Homebuilding boom, automobile dependency 1920s+ : distancing of Phoenician suburbs from expanding industry and problems of CBD; Boosterism thrives
- Onset of postwar Phoenix sprawl amid decaying CBD

Sanborn Map Classification



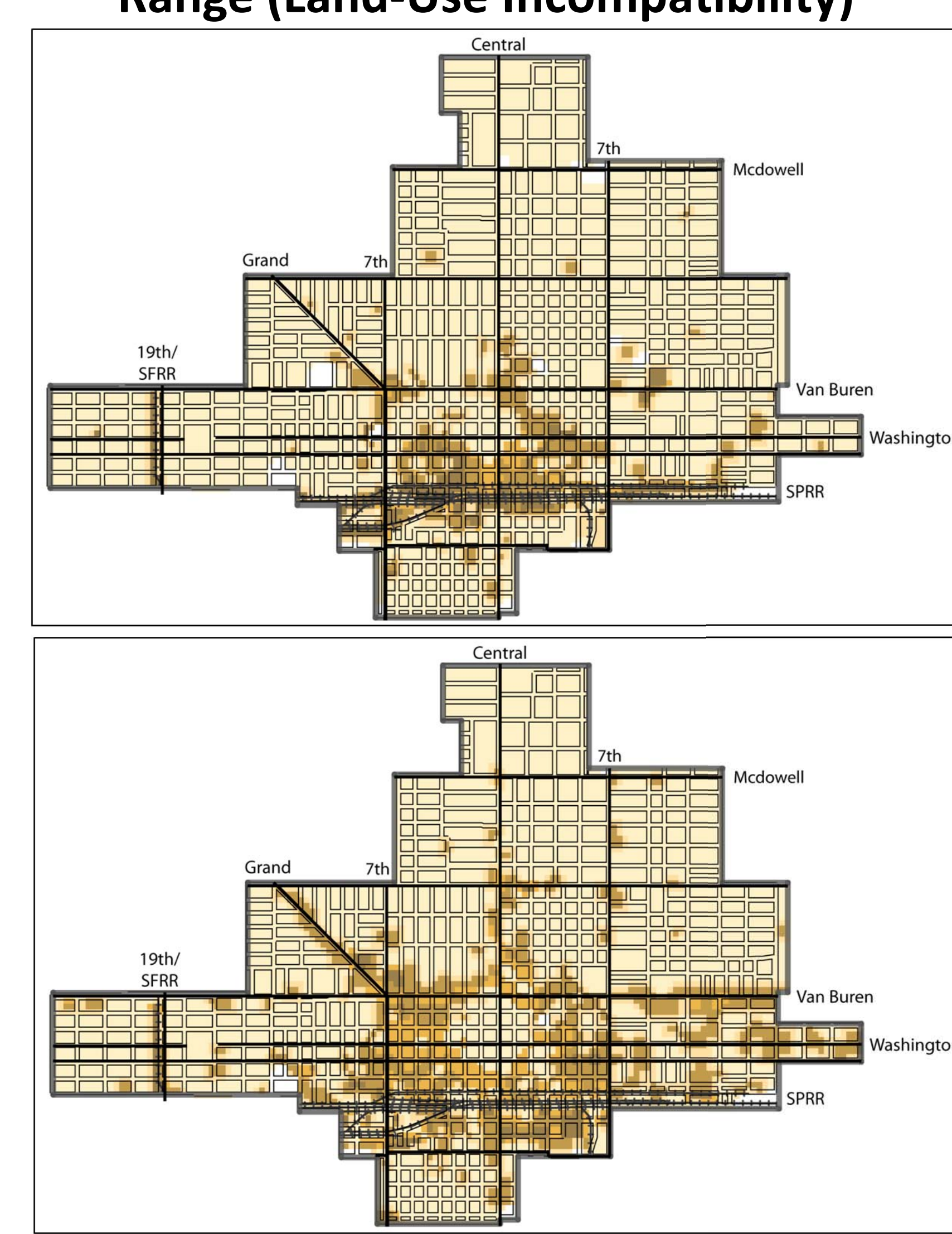
Class (Score)	Description
Undeveloped (NoData)	Vacant parcels, parking lots, parcels containing vacant or damaged structures
Residential (1)	Single- and two-family homes, apartments, boarding houses, lodgings, tenements, cabins, shanties; Churches, schools, parks, clubs; Parcels subdivided for residential use
Commercial/Institutional (2)	Retail, restaurants, hotels, offices, neighborhood groceries, health services; Government offices, public services, armories, hospitals
Nuisance (5)	Warehouses, wholesale suppliers, lumberyards, scrap yards, transport distribution facilities, light manufacturing, repair, and maintenance facilities; Automotive services
Hazard (6)	Planing and flour mills, industrial steam laundries, ice manufacturing and cold storage, chemical storage and manufacturing, steel manufacturing, electric power stations and transformer yards, iron works; Rail yards and railroad tracks

Variety (Land-Use Heterogeneity)



Unique Land-Uses/Rescore	% Area 1915	% Area 1949	% Change	Net % Change
Homogeneous (0)	70.7	41.4	-41.5	-17.5
Rel. Homogeneous (1)	18.8	32.5	73.0	
Fuzzy (2)	5.9	16.4	179.4	179.4
3 LU's (3)	3.2	8.3	160.8	
3-4 LU's (4)	1.2	1.2	1.5	110.8
4 LU's (5)	0.3	0.2	-6.5	

Range (Land-Use Incompatibility)



Interaction/Rescore	% Area 1915	% Area 1949	% Change	Net % Change
Homogeneous (0)	70.7	41.4	-41.5	-20.5
Rel. Homogeneous/Compatible (1)	8.1	21.2	163.3	
Fuzzy (2)	10.5	16.9	61.1	53.5
Com-Nuisance (3)	0.3	2.1	607.8	
Res/Com-Nuisance; Com-Hazard (4)	4.9	14.9	202.6	91.4
Res-Hazard (5)	5.5	3.5	-36.6	

Future Directions

- Incorporation of a larger time series of Sanborn Maps for future research (1890s-1960s)
- Spatial modeling of parcel-level land-use change in central Phoenix
- Assessment of zoning change (rezoning and variances) in Phoenix from the postwar era to present

Sources

Talen E, 2011, "Zoning for and against sprawl: A local analysis", Working paper, School of Geographical Sciences & Urban Planning, Arizona State University, Tempe, AZ.
 Map Sources:
 •ProQuest Digital Sanborn Maps Database
 •Phoenix City Zoning Commission 1930 and 1941 Zoning Maps
 •Hale A and Talen E, 2011, "Analysis of Zoning Changes in Phoenix, AZ", CAP-LTR 13th Annual Poster Symposium.
 •Image Source: Arizona State University Libraries Arizona and Southwestern index

Acknowledgements

Funding provided by the President's Strategic Initiative School of Human Evolution and Social Change's Late Lessons from Early History Project