Final Project Report:
Garden Home Historical Buildings and Railroad

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Introduction

The Garden Home neighborhood is located southeastern edge of Washington county and on the southside of Beaverton. Garden Home is often contained with the Whitford neighborhood just west of Garden home.

The project was to determine the building placement back through the decades. There were specific buildings requested for along Garden Home Rd. which included the Garden Home School, “Red” store, “White” store, Whitman’s Cannery, Community Church, Feed and Seed, Johnson’s Texaco, Lamb’s Thriftway, and the Garden Home Junction train station. In addition to buildings the project covered the Oregon Electric Railroad, including the station. The Garden Home Junction split the main line, creating an offshoot to Forest Grove from Garden Home.

Most of the buildings are no longer standing. The school, Feed and Seed, and Cannery have been repurposed into the Garden Home Rec Center, Dugout bar, and Old Market Pub, respectively. Lamb’s old building was demolished and replaced during the 1990s.

Methods

Georeferencing Images and Maps

Using aerial photography from the US Geological Survey, I found sufficient photos to digitize buildings going back to 1950’s. The years I used to digitize from were 1955, 1960, 1970, 1985, 1995, 2008, and 2017. For the railroad, I used Right-of-Way maps the were made in 1908 and 1910 by the Oregon Electric Railroad Company that were held at the Oregon Historical Society.

There were 89 maps that covered the railroads extent at the time which spanned from Portland to Salem and from Garden Home to Forest Grove.

The first step was to georeference both the aerial photographs and maps so that are accurately portrayed on a map with a coordinate system. For some of a few of the earlier aerials, I had to use multiple photos due to the distortion on the edges of the photograph. The worst distortion was in 1955 where I had to use three and the extent of the neighborhood lined up with the edges of the photographs in certain areas.

Regarding the railroad maps, there were few reference points I could use due to lack detail in the maps. However, using a current aerial photograph, I was able to line up the railroad with at least two or three reference points for at least a 1-dimensional transformation, but was aiming to use the projective transformation instead of 1-dimensional or polynomial transformation. I determined the projective due to its effectiveness for referencing maps (ESRI documentation).

Digitization of Features

For the buildings, I set the table schema to include information regarding the year that I noted and the name of the building if it was known. These two attributes would allow me to query each decade feature to pull out specific buildings for later analysis and mapping.

The digitization process was straight-forward as it was tracing the borders of each building. I used the rectangular shape, and merged multiple rectangles as needed per building. To remain consistent, I would append the following decade feature with the previous decade's buildings

and continue digitizing. This process allowed me to pass the year noted from each feature to feature as well. To keep the shapes lined up with each concurrent decade I would shift the position of building footprints to match the current aerial I was using, as there was some margin of error with each referenced aerial photograph. There was little issue digitizing the railroad after georeferencing the maps.

Density Analysis

As a basis for analysis, I created a hexagon grid using the "Create Hexagon Tessellation" tool found on ArcGIS.com (Link to tool). To use the tool I used the Garden Boundary that Erin Woolbright created, the fellow student who is also doing a project for Garden Home History Project, and a separate polygon I created using a concave hex script (Link to script), since ArcGIS does not have a built in tool. I had to create the concave hex polygon so there wouldn't be holes in the hexagon grid when I apply the tool. I then merged the two polygons and applied the hexagon tessellation tool.

For the analysis, I focused on buildings only noted for each decade interval. To create these features, I iterated through each feature and queried the "year_noted" column pulled out buildings that were created during the decade interval. I then used a spatial join to tie the decade buildings to the hexagon grid.

Cartographic Features and Symbology

To improve the cartography of the maps I created a fading buffer, using the multiple buffer tool on the hexagon grid and the merged polygons I created for the basis of the hexagon grid. To get the effect I desired, inversed the transparency of buffer color to fade the edges of the map to white. To improve the readability of the density maps I used proportional symbols and tinting of colors to achieve enough difference between each cutoff value.

Rephotography Study

Reshot vintage photographs to compare landscapes of old and current. Used created maps to help pinpoint angle and position of photos. Photos I recreated were of the Garden Home Road by the "Red" store from 1911, Garden Home Junction train station from 1911, Whitman's Cannery from 1950, Garden Home school, Lamb's Thriftway from 1994.

Data Sources

Historical Aerial Imagery:

Description: Raw Aerial Imagery for Garden Home.
Source: USGS, www.earthexplorer.usgs.gov (Single Photo Aerial Frames 1955, 1960, 1970, 1985 & DOQ 1995 and 2008)

Current Aerial Imagery:

Description: Current Aerial Imagery

Source: ESRI,

www.arcgis.com/home/item.html?id=10df2279f9684e4a9f6a7f08febac2a9

Historical Railroad Maps:

Description: Historical Right-of-way maps created in 1908 and 1910 for the Oregon Electric Railroad

Source: W.S. Barstow Co. / Oregon Historical Society

1908 Main Stem map

http://librarycatalog.ohs.org/EOSWebOPAC/OPAC/Details/Record.aspx?BibCode=6531248

1910 Forest Grove stem map

http://librarycatalog.ohs.org/EOSWebOPAC/OPAC/Details/Record.aspx?BibCode=6531129

Garden Home Boundary:

Description: Neighborhood boundary of the Garden Home – Whitford Neighborhood

Source: Erin Woolbright – Current PCC Student

Portland Metro Streets:

Description: All streets in the Portland Metro

Source: Metro – RLIS,

rlisdiscovery.oregonmetro.gov/metadataviewer/display.cfm?Meta_layer_id=556 (meta)

Concave Hull script:

Description: Script for tool that will create a polygon the encapsulates all points.

Source: Richard Fairhurst,

geonet.esri.com/blogs/richard_fairhurst/2015/06/11/bruce-harolds-concave-hull-estimator-tool-enhanced

Hexagon Tessellation tool:

Description: Creates a hexagon mesh grid based on a feature input.

Source: Tim Whitetaker, University of Texas Austin

http://www.arcgis.com/home/item.html?id=03388990d3274160afe240ac54763e57#!

Rephotography Photos

Description: Vintage photograph of Garden Home

Source: Garden Home History Project,

www.gardenhomehistory.wordpress.com/photographs

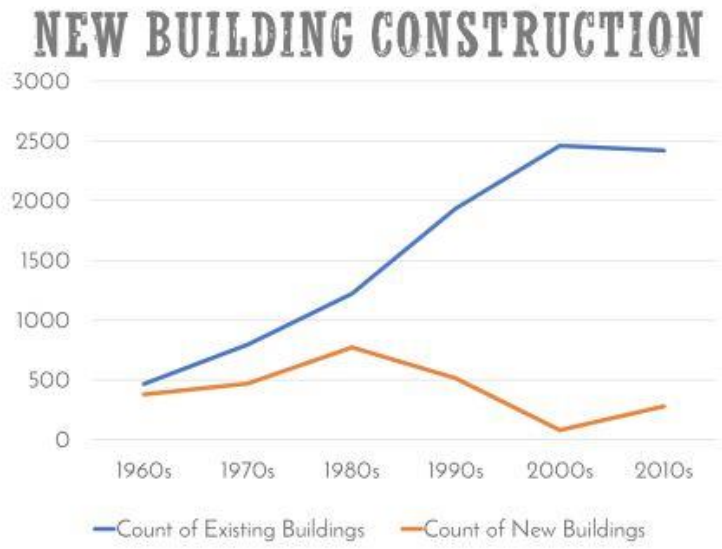
Buildings by Decade:

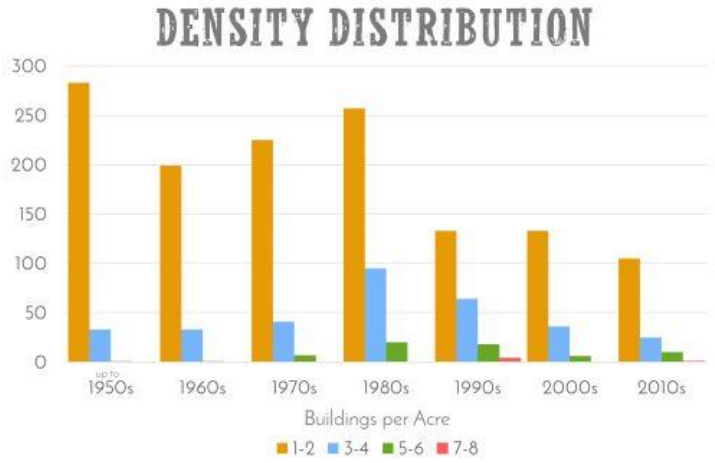
Description: Building footprints for 1955, 1960, 1970, 1985, 1995, 2008 and 2017 for the Garden Home – Whitford neighborhood

Source: Self

Appendix:

Graphs:





Rephotography:

1) Red Store 2) Garden Home Junction 3) Whitman's Cannery

4) Garden Home School, 5) Lamb's Thriftway

Garden Home, Oregon Extant Structures (1950s - Present)

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

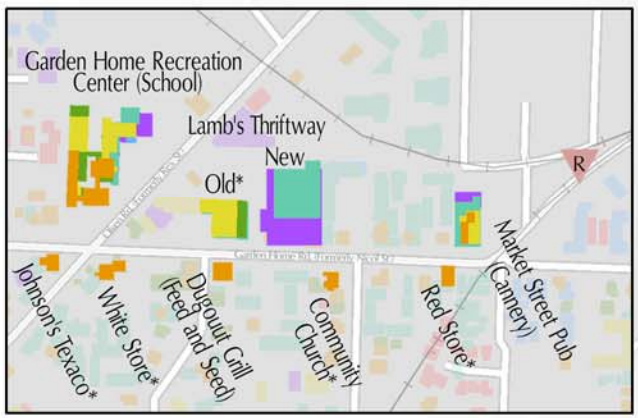
1950s
1960s
1970s
1980s
1990s
2000's
2010s

* - Demolished

(Old Name) - Changed Occupant

1/2
1/4
0
Miles

Detail Inset



A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society,
USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - 1950s

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

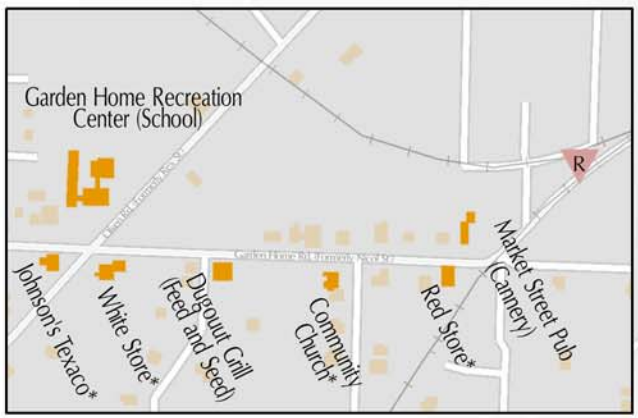
1/2

1/4

0

Miles

Detail Inset



* - Demolished

(Old Name) - Changed Occupant

A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society,
USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - 1960s

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

1/2

1/4

0

Miles

Detail Inset

* - Demolished

(Old Name) - Changed Occupant

A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society,
USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - 1970s

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

1/2

1/4

0

Miles

Detail Inset

* - Demolished

(Old Name) - Changed Occupant

A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society,
USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - 1980s

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

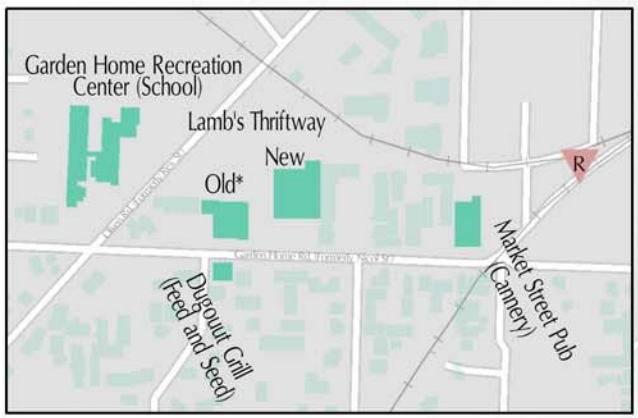
R Garden Home Junction Train Station*

1/2
1/4
0
Miles

Detail Inset

* - Demolished

(Old Name) - Changed Occupant



A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society,
USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - 1980s

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

1/2
1/4
0
Miles

Detail Inset

* - Demolished

(Old Name) - Changed Occupant

A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society, USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - 2000s

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

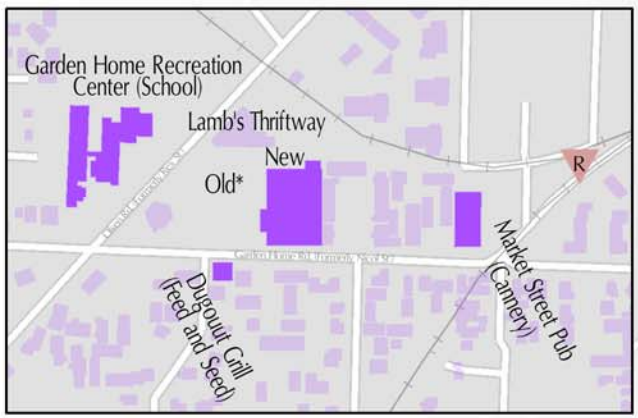
Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

1/2
1/4
0
Miles

Detail Inset



* - Demolished

(Old Name) - Changed Occupant

A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society, USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structures - Present

The buildings were digitized using USGS historical aerial photography from previous decades. Along with georeferencing aerial photographs, maps of the historical railroad georeferenced to locate the Garden Home Junction train station and railroad not present.

Current Garden Home Neighborhood Boundary

Oregon Electric Railroad

R Garden Home Junction Train Station*

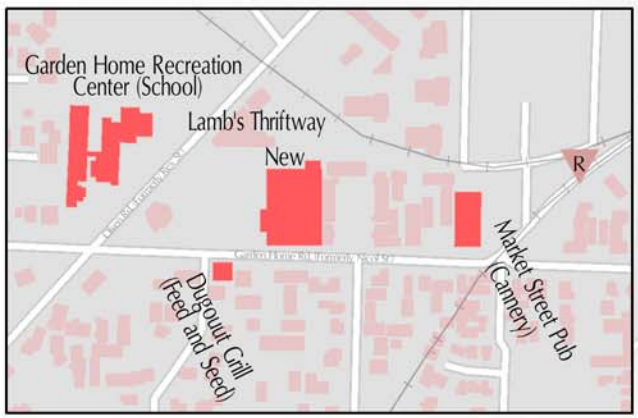
1/2

1/4

0

Miles

Detail Inset



* - Demolished

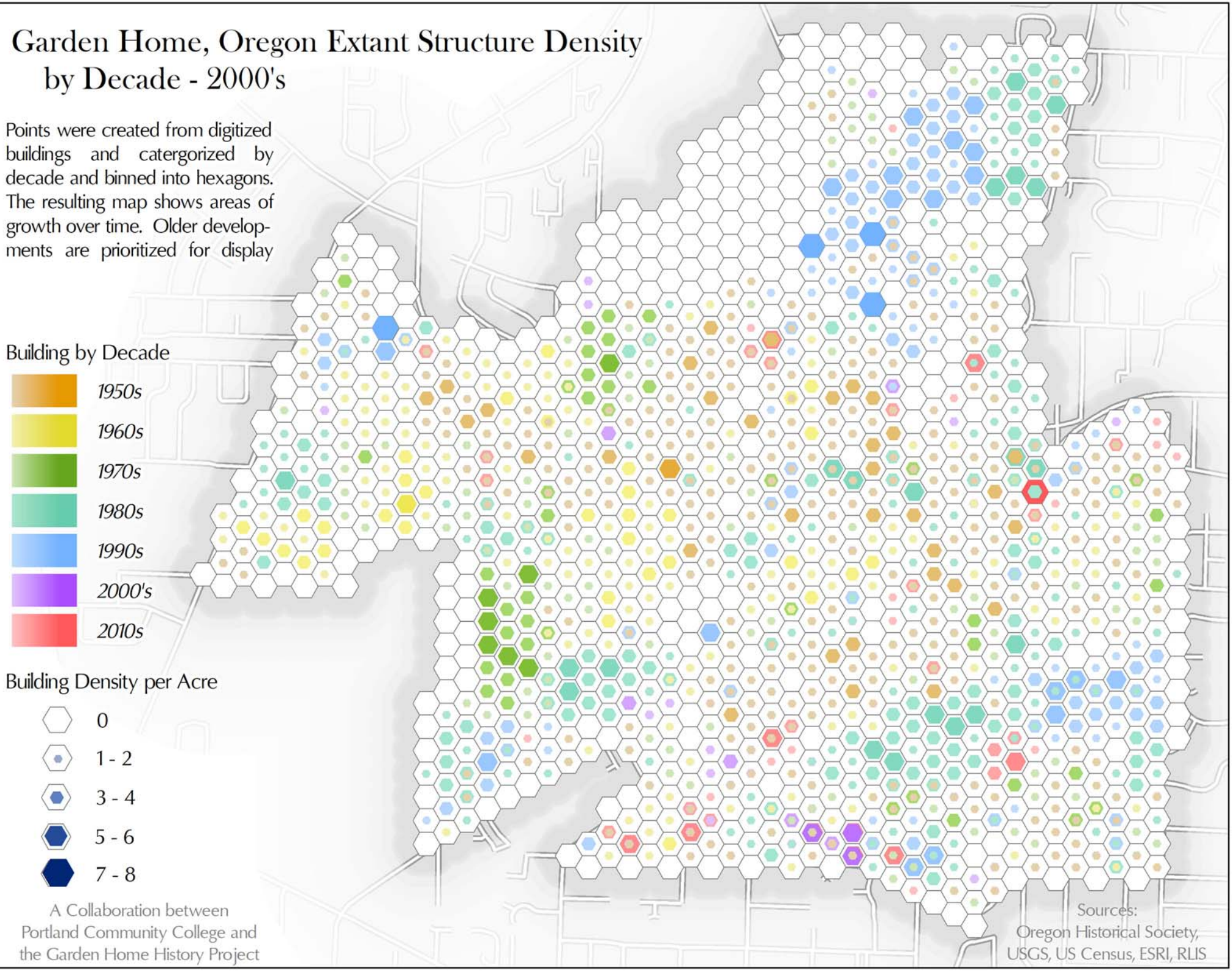
(Old Name) - Changed Occupant

A Collaboration between Portland Community College and the Garden Home History Project

Sources:
Oregon Historical Society, USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structure Density by Decade - 2000's

Points were created from digitized buildings and catergorized by decade and binned into hexagons. The resulting map shows areas of growth over time. Older developments are prioritized for display

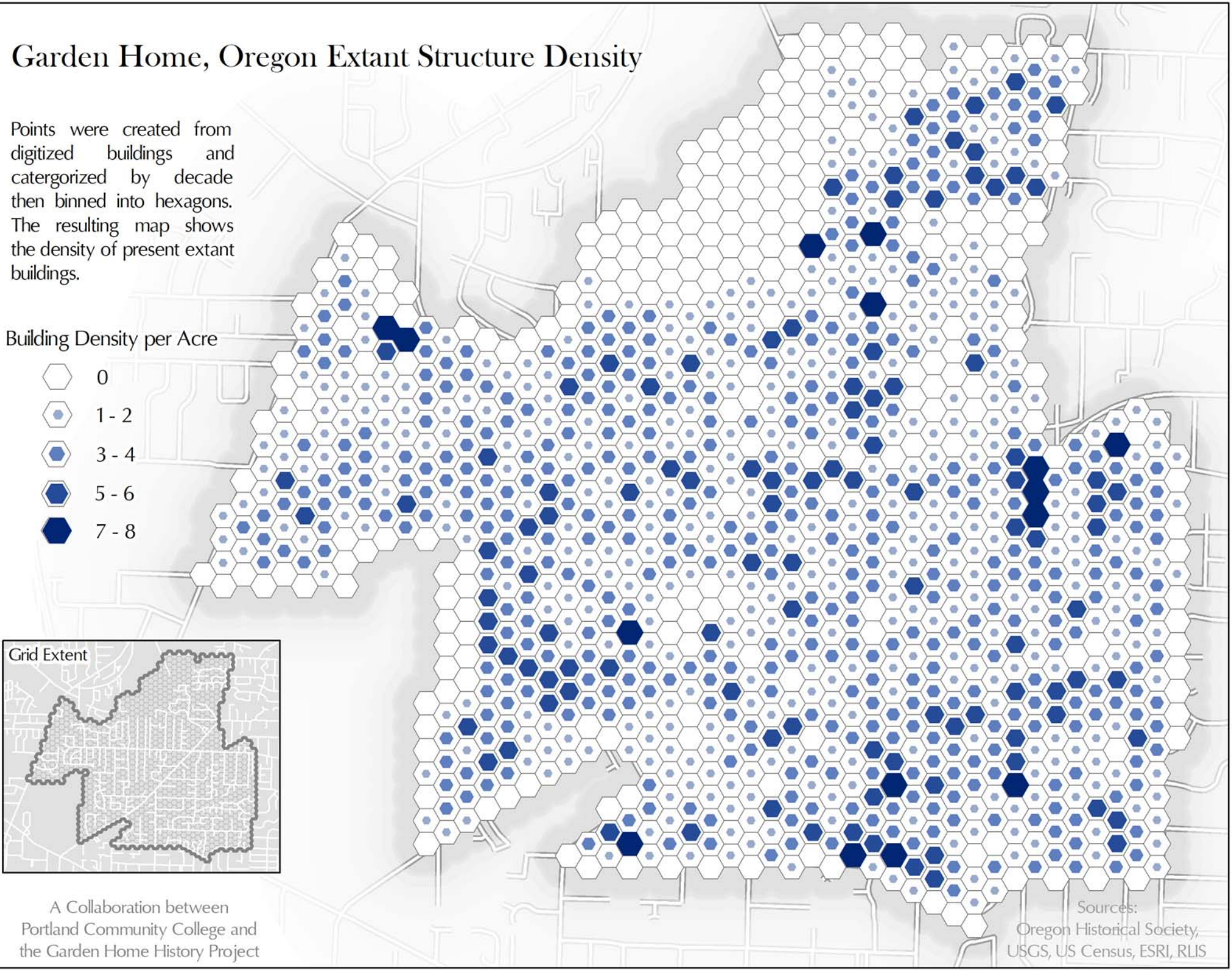


A Collaboration between Portland Community College and the Garden Home History Project

Sources: Oregon Historical Society, USGS, US Census, ESRI, RLIS

Garden Home, Oregon Extant Structure Density

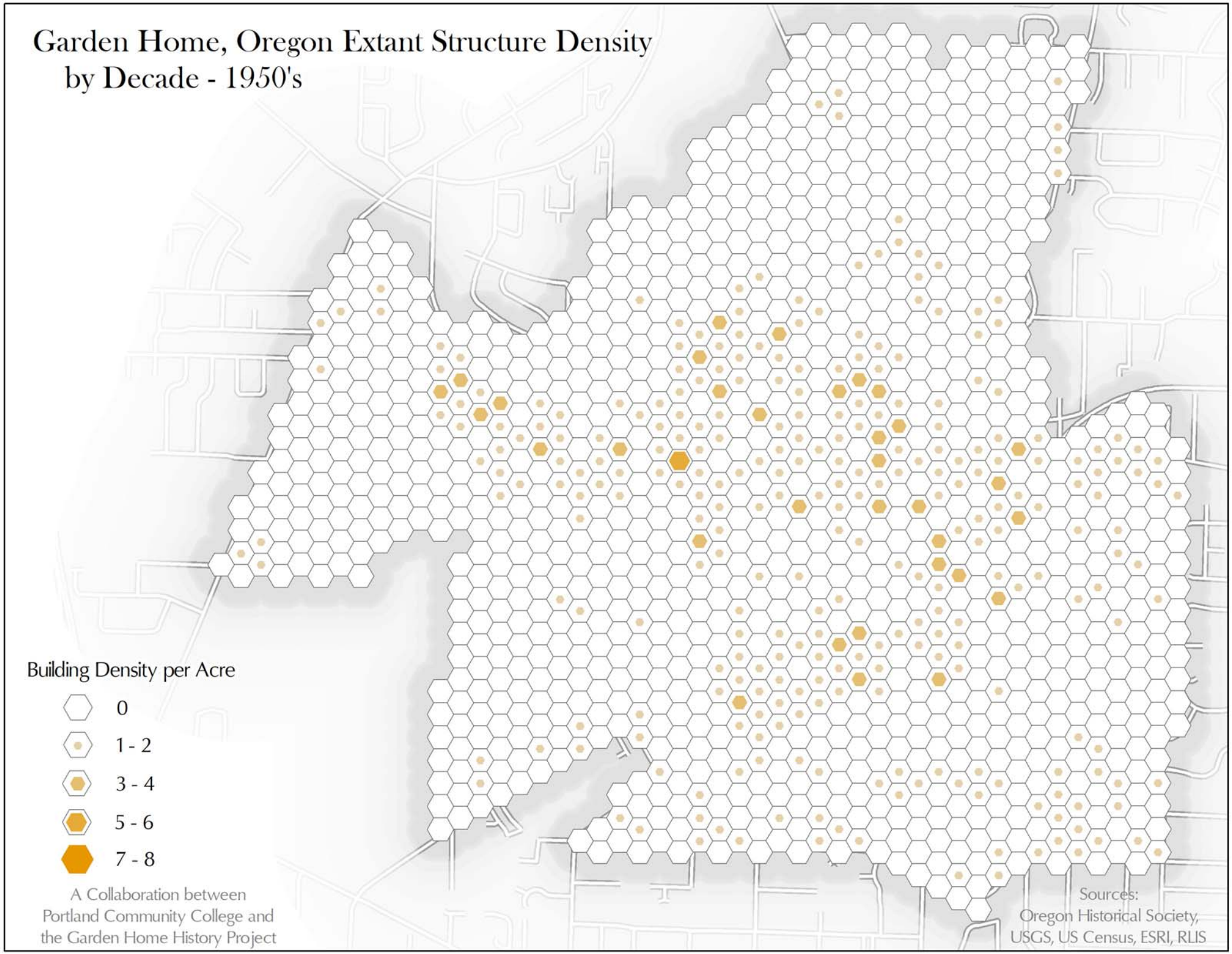
Points were created from digitized buildings and catergorized by decade then binned into hexagons. The resulting map shows the density of present extant buildings.



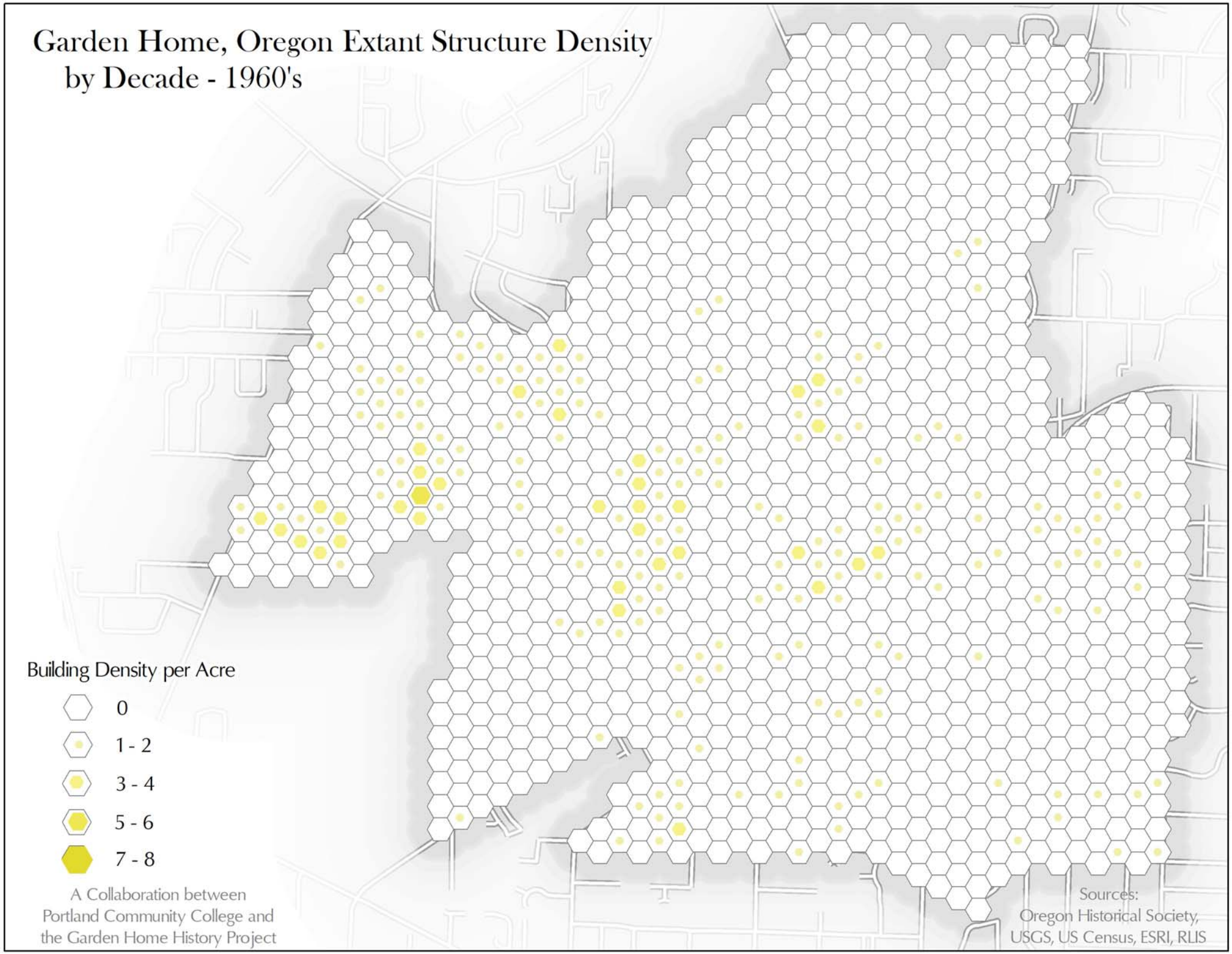
A Collaboration between
Portland Community College and
the Garden Home History Project

Sources:
Oregon Historical Society,
USGS, US Census, ESRI, RLIS

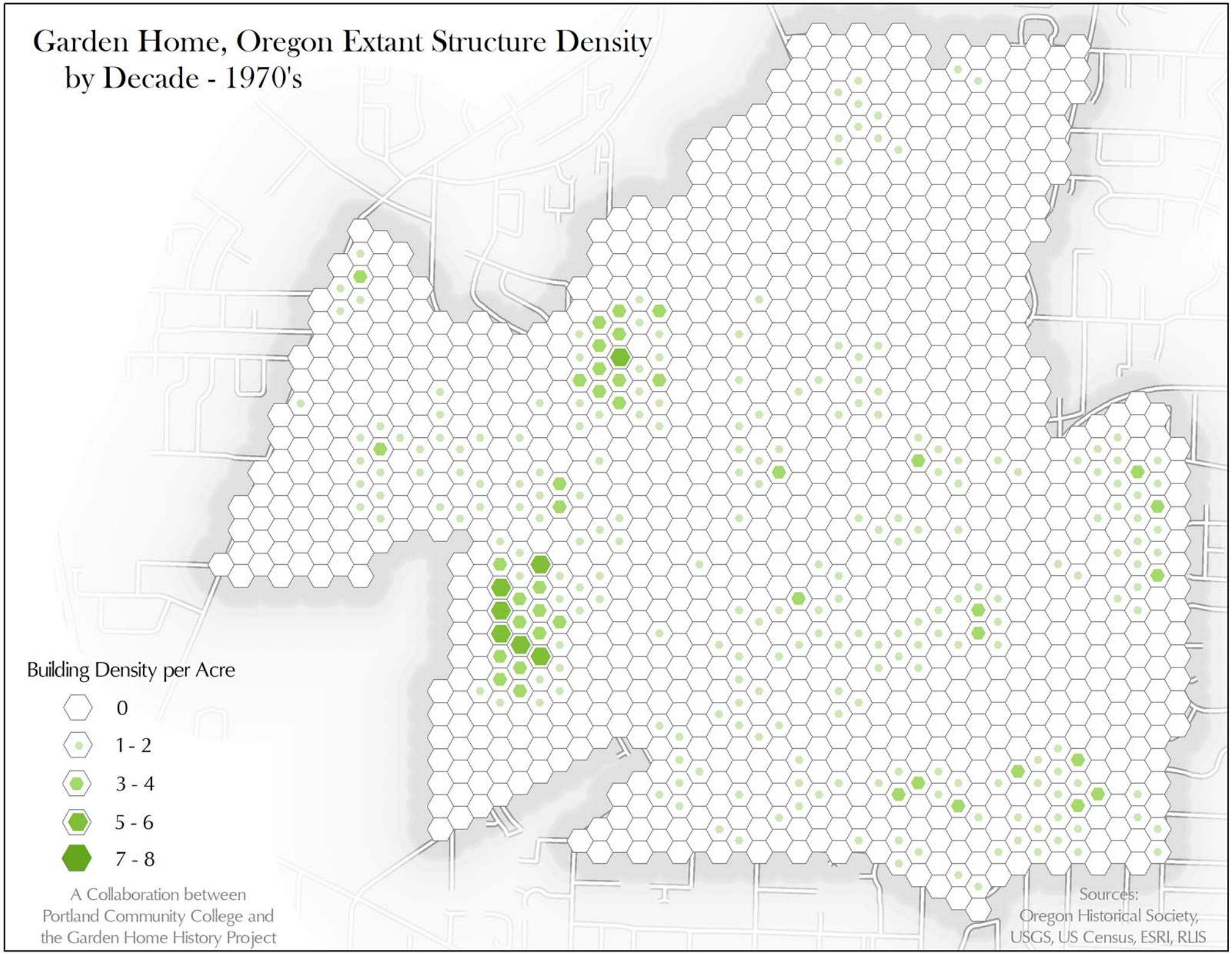
Garden Home, Oregon Extant Structure Density by Decade - 1950's



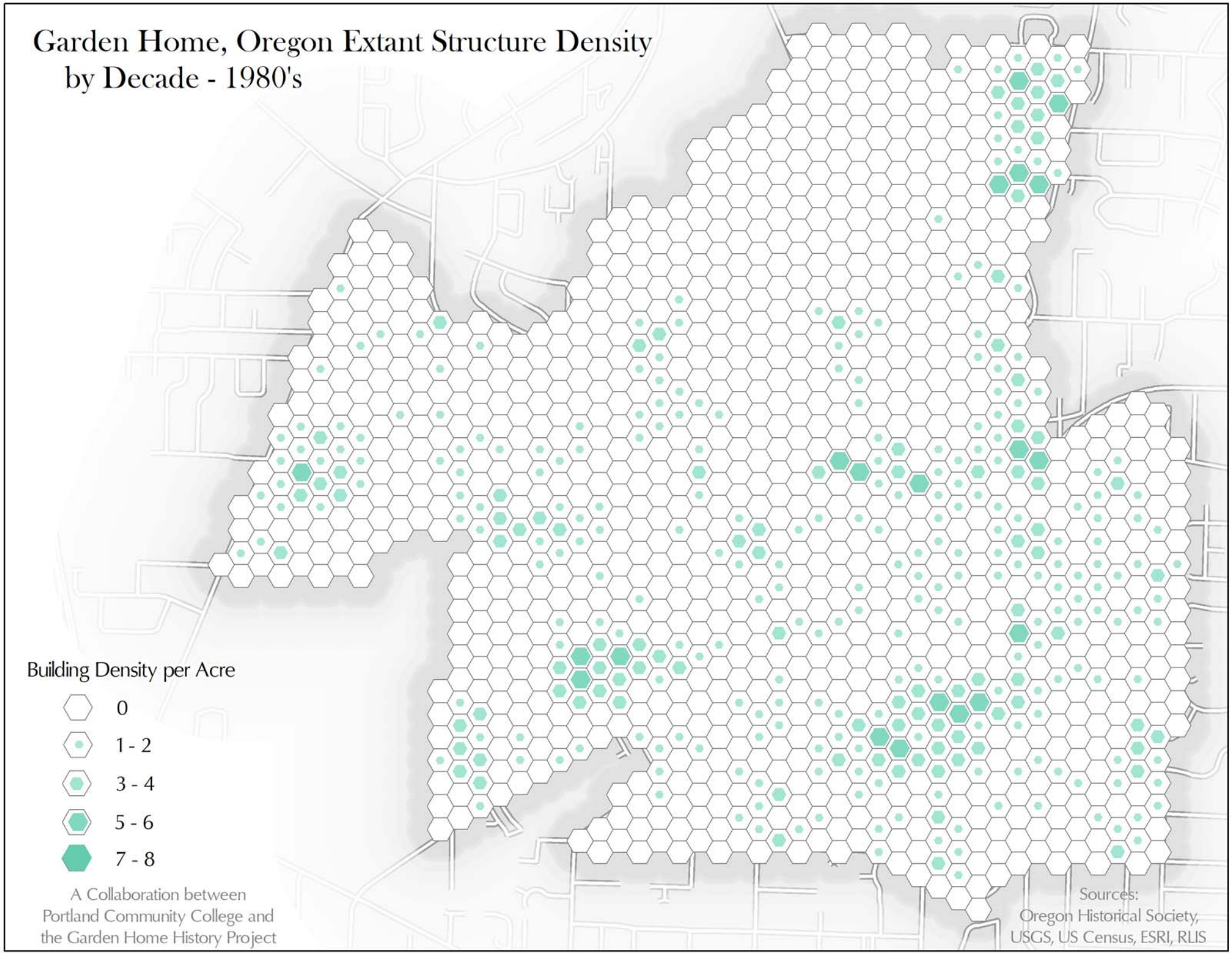
Garden Home, Oregon Extant Structure Density by Decade - 1960's



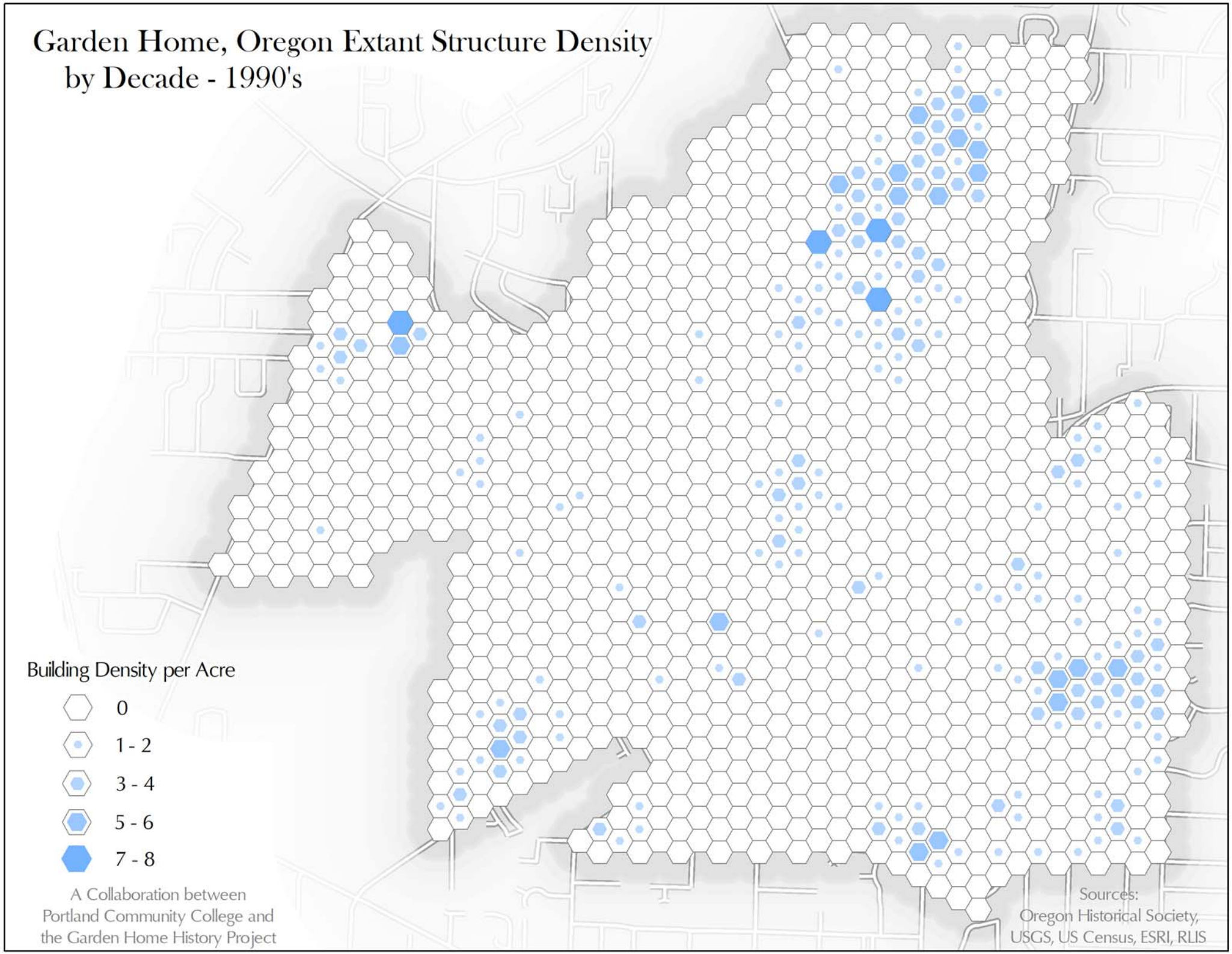
Garden Home, Oregon Extant Structure Density by Decade - 1970's



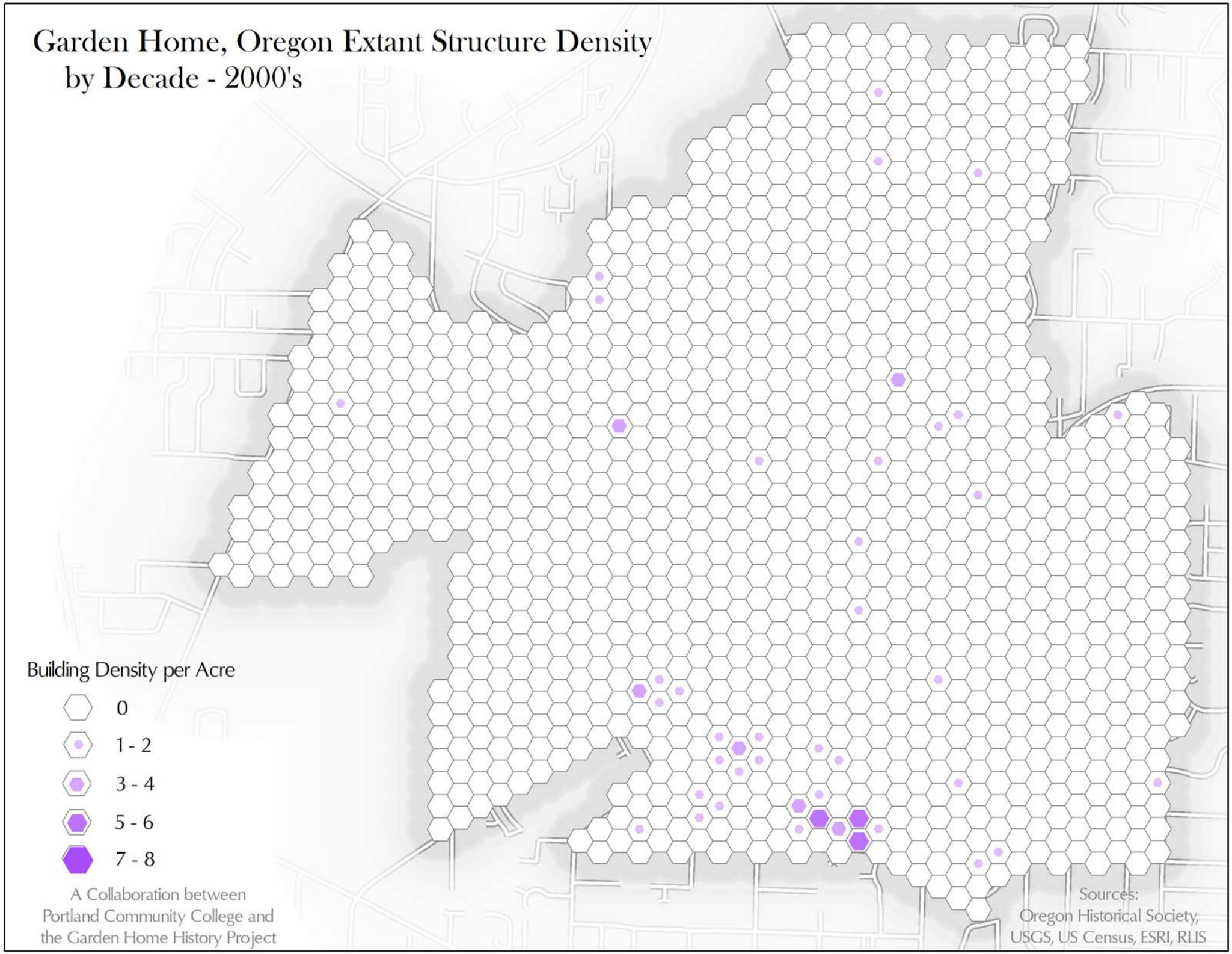
Garden Home, Oregon Extant Structure Density by Decade - 1980's



Garden Home, Oregon Extant Structure Density by Decade - 1990's



Garden Home, Oregon Extant Structure Density by Decade - 2000's



Garden Home, Oregon Extant Structure Density by Decade - Present